2017 - 2018
Student Handbook & Catalog

August 1, 2017 - July 31, 2018

Published July 2017

This publication is an announcement of the current policies at International Technological University (ITU).

ITU makes every effort to ensure accuracy of the information contained in this catalog. Some policies, rules, procedures, and regulations may change and therefore, alter the information during this catalog period. The University reserves the right to change policies, regulations, fees, and course of instruction upon direction of the ITU Administration.

ACCREDITATION

International Technological University is accredited by the WASC Senior College and University Commission (WSCUC), 985 Atlantic Avenue, Suite 100, Alameda, CA 94501; (510) 748-9001. Questions regarding the University's accreditation may be directed to the institution or to WASC at:

www.wascsenior.org/contact or (510) 748-9001.
International Technological University (ITU) is a private institution. The University has received approval to operate from the Bureau for Private Postsecondary Education (www.bppe.ca.gov). An approval to operate means compliance with state standards as set forth in the California Education Code, Title 3, Division 10, Part 59, Chapter 8.

GENERAL INFORMATION FOR PROSPECTIVE STUDENTS

Prospective students are encouraged to review this catalog prior to signing an enrollment agreement. They are also encouraged to review the School Performance Fact Sheet, which must be provided to a student prior to signing an enrollment agreement.

COMPLAINTS

Students or any member of the public may file a complaint about this institution with the Bureau for Private Postsecondary Education by calling (888) 370-7589, or by completing a complaint form, which can be obtained on the bureau's Internet website at www.bppe.ca.gov.

ADDITIONAL QUESTIONS

Any additional questions and/or concerns may be addressed by contacting the school at 2711 North First Street, San Jose, CA 95134, or by calling (888) 488-4968. Any questions a student may have regarding this catalog that have not been satisfactorily answered by the institution may be directed to the Bureau for Private Postsecondary Education at:

Physical Address:
2535 Capitol Oaks Drive,
Suite 400,
Sacramento, CA 95833

Mailing Address:
P.O. Box 980818, West
Sacramento, CA 95798

Website:
www.bppe.ca.gov
Phone Number:
(916) 431 - 6959
Toll Free:
(888) 370 - 7589
Fax Number:
(916) 263 - 1897

From the Office of the University President

Dear Student,

On behalf of the International Technological University (ITU) faculty, staff, and alumni, welcome to a new year at ITU and to the many enhancements that are described in this 2017-2018 catalog. We are proud to be your university of choice and wish you a most successful year and career ahead.

In this catalog, you will find a wealth of valuable and important information about ITU's academic programs, services, procedures, and regulations that will help you succeed. Our University's vision is to empower our students through inventive, industry-linked education. Because ITU faculty members are working professionals in their fields, they impart relevant knowledge and applicable skills that you can use long after graduation. It is our shared goal that when you graduate you will leave, not only well educated, but also well prepared for the career opportunities ahead.

Please review this catalog and learn more about our University's rich history and ideals. You can get to know our academic and research programs led by distinguished industry and academic leaders, and learn more about new developments in our research laboratories. Valuable information about services to support your personal and professional success is described here, as well as important regulations and procedures. Please take time to become familiar with the improved services and procedures that have been developed to facilitate your success at ITU and in your professional career.

Don't forget that, in addition to your graduate studies, ITU offers a variety of cultural and social activities, including social mixers, lectures, presentations (such as ITU Presents), and cultural celebrations that reflect our university's rich diversity. ITU's Student Government Association offers community and social events where students are encouraged to come, be among colleagues, and make lasting friendships. During your studies, take advantage of the special community resources of Silicon Valley and the Bay Area, among the most dynamic communities in the world.

We are thrilled to have you join us. We value our students and strive to provide a memorable educational experience and services to ensure their professional and personal success.

Again, we thank you, and we look forward to another remarkable and exciting academic year.

Sincerely,

Gregory O'Brien, Ph.D.

University President

ACADEMIC CALENDAR

FALL 2017	September 5, 2017 - December 17, 2017
Regular Registration Period (priority enrollment based on seniority)	July 24 - August 27
Late Registration (additional fees apply)	August 28 - September 3
Add/Drop Period*	September 4 - September 17
Withdrawal Period*	September 18 – November 5
On-Campus Courses	September 5 - December 17
Online Session I Courses	September 5 - October 22
Online Session II Courses	October 23 - December 10
Conferral date	December 23
Holidays (campus closed)	November 23 November 24

Note: For more detailed information, refer to the policies in this catalog: Adding and Dropping Courses Policy and Refund Schedule

SUMMER 2018	May 7, 2018 - August 19, 2018
Regular Registration Period (priority enrollment based on seniority)	March 26 - April 29
Late Registration (additional fees apply)	April 30 - May 6
Add/Drop Period*	May 7 - May 20
Withdrawal Period*	May 21 – July 8
On-Campus Classes	May 7 - August 19
Online Session I Classes	May 7 - June 24
Online Session II Classes	June 25 - August 12
Conferral date	August 25
Holidays (campus closed)	May 28 July 4

Note: For more detailed information, refer to the policies in this catalog: Adding and Dropping Courses Policy and Refund Schedule

SPRING 2018	January 8, 2018 - April 22, 2018
Regular Registration Period (priority enrollment based on seniority)	November 20 - December 31
Late Registration (additional fees apply)	January 1 - January 7
Add/Drop Period*	January 8 - January 21
Withdrawal Period*	January 22 - March 11
On-Campus Classes	January 8 - April 22
Online Session I Classes	January 8 - February 25
Online Session II Classes	February 26 - April 15
Conferral date	April 28
Holidays (campus closed)	January 15 February 19

Note: For more detailed information, refer to the policies in this catalog: Adding and Dropping Courses Policy and Refund Schedule

2018-2020 AT A GLANCE	
Fall 2018	September 4, 2018 - December 16, 2018
Spring 2019	January 7, 2019 - April 21, 2019
Summer 2019	May 6, 2019 - August 18, 2019
Fall 2019	September 3, 2019 - December 15, 2019
Spring 2020	January 6, 2020 - April 19, 2020
Summer 2020	May 4, 2020 - August 16, 2020

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ABOUT ITU

International Technological University (ITU) is based in the technology center of the world, allowing us to apply the best of Silicon Valley's technology and business models to our curriculum. The University provides a practical academic experience for students who want to learn directly from the people shaping our technology-driven world. From the University's inception, Silicon Valley's brightest minds have been part of our faculty, advisory board, and Board of Trustees, ensuring we deliver a premier education in technology and business.

ITU faculty members bring a high-level of industry experience to the courses they teach, giving students an edge on the latest discoveries and implementations in tech innovation. Our Silicon Valley professors use their real-world experiences at innovative companies like Google and Oracle to give our classrooms the most practical relevance and empower our students throughout their careers.

VISION

To empower people and advance global prosperity through inventive, industry-linked Silicon Valley education.

MISSION

ITU pioneers a modern, industry-focused educational model to deliver education globally. ITU's educational pedagogy cultivates innovative thinking, ethical leadership, and entrepreneurial spirit through practical, industry relevant curriculum that reflects Silicon Valley's culture. ITU closes the employment skills gap and empowers people to lead successful, enriching lives as meaningful contributors to the global community.

PURPOSE

The purpose of ITU is to foster excellence in education for students particularly interested in the high-tech entrepreneurial field. All our programs have an applied nature, with an emphasis on specialty areas tailored to the market needs of Silicon Valley companies. Students are actively encouraged to affiliate or intern with relevant local industry firms from the very beginning of their academic studies as an integral part of ITU's academic pedagogy. As such, the hallmarks of an ITU education include:

- A special focus on practical engineering, business, biotech, and media arts research projects.

- Relevant internships integrated into academic programs from the beginning of a student's tenure.

- Multicultural awareness through the international exchange of scholars and students from locations around the globe.

- Systemically designed, competency-based courses that utilize innovative instructional methods.

- Cross-disciplinary curriculum that encourages students to look beyond their own fields and generate new possibilities.

- Programs that meet the high standards of both the ITU Advisory Board, which consists of prominent Silicon Valley industry leaders, and the WASC Senior College and University Commission (WSCUC).

HISTORY

After earning his Ph.D. in Electrical Engineering from the University of Illinois, Urbana-Champaign, ITU's Founder Dr. Shu-Park Chan joined Santa Clara University's Electrical Engineering department, where he served for 30 years, eventually becoming Dean of the Engineering School. Dr. Chan started at SCU with a mere fifty students and under his direction, brought the department to a height of over 1,200 students. Because of his cutting-edge research in the area of graph theory and network topology, his Ph.D. students include the co-founders of Cadence, ATMEL, Microelectronics Technologies, Oak Technology, Inc. and many other pillar companies that created the phenomenon known as the Silicon Valley. Conservatively speaking, over 80% of all microprocessors designed and developed within the last 25 years throughout the world have been created or touched by technology generated from Dr. Chan's students.

In 1994, Dr. Chan retired early and founded ITU to be the world's first global networked university model. Having successfully pioneered Silicon Valley high-tech engineering education, Dr. Chan recognized that proper engineering education bridges the "relevance gap" – found in most academic institutions – between academic theory and practical application. Together with Silicon Valley technology, business, media, and venture capital leaders, he built ITU as a solution for graduate students looking for practical, industry-relevant training.

In February 2013, ITU received regional accreditation from the WASC Senior College and University Commission (WSCUC). Now in its 23rd year, the University offers ten accredited graduate degrees through six departments of study. Today, ITU continues to provide its students an industry-relevant education that focuses on cross-disciplinary studies and practical work experience. ITU faculty have worked at industry-leading Silicon Valley institutions such as NASA, Google, Intel, and Oracle, and its alumni have gone on to successful careers in companies such as Microsoft, HP, Cisco, and others. Currently, more than 1,000 graduate students from over 54 countries are enrolled in the university, making it a dynamic and exciting place to work and study.

ABOUT THE FOUNDER

"We are now in the new millennium with the challenge of solving contemporary problems while achieving the unfinished agenda of the future. Modern society must engage in a constant search for the good in its quest for the better."

Dr. Shu-Park Chan
1929-2013
Founder & First President

A role model to many, Dr. Shu-Park Chan was a bold visionary, a passionate leader in education and a warm builder of community.

MAJOR MILESTONES:

- 1929 – Born in Canton, China as the 10th son of famous Chinese general Jitang Chen
- 1955 – Graduated from Virginia Military Institute with a bachelor's degree in Electrical Engineering
- 1962 – Graduated from University of Illinois, Urbana-Champaign with a Ph.D. in Electrical Engineering
- 1962 – Joined Santa Clara University as a Professor of Electrical Engineering and taught there for over thirty years
- 1972 – Co-wrote the textbook Analysis of Linear Networks and Systems: A Matrix-Oriented Approach with Computer Applications, one of his many research publications
- 1989 – Became Dean of the School of Engineering at Santa Clara University
- 1993 – First Asian American appointed to the Fulbright Scholarship Board
- 1994 – Founded International Technological University and served as President until 2011

INSTITUTIONAL LEARNING OUTCOMES

- Problem Solving
- Critical Thinking
- Communication
- Team Work
- Technical Literacy
- Research
- Responsibility

DEGREES OFFERED

- Master of Business Administration
- Master of Science in Computer Engineering
- Master of Science in Computer Science
- Master of Science in Digital Arts
- Master of Science in Electrical Engineering
- Master of Science in Engineering Management
- Master of Science in Information and Cybersecurity
- Master of Science in Software Engineering
- Doctor of Business Administration
- Doctor of Philosophy in Electrical Engineering
- Doctor of Philosophy in Interdisciplinary Sciences

WASC POLICY ON TEACH-OUT PLANS AND AGREEMENTS

An institution accredited by the Commission must submit to the Commission for its prior approval a teach-out plan or agreement upon the occurrence of any of the following:

1) The Secretary of Education notifies WASC that the Secretary has initiated an emergency action against an institution in accordance with section 487(c)(1)(G) of the HEA or an action to limit, suspend, or terminate an institution participating in any Title IV, HEA program, in accordance with section 487(c)(1)(F) HEA, and that a teach-out plan is required.

2) WASC acts to withdraw, terminate, or suspend accreditation or candidacy of the institution.

3) The institution notifies WASC that it intends to cease operations entirely or close a location that provides one hundred percent of at least one program.

4) A state licensing or authorizing agency notifies WASC that an institution's license or legal authority to provide an educational program has been or will be revoked.

A teach-out plan means a written plan developed by that institution that provides for the equitable treatment of its own students if an institution, or an institutional location that provides one hundred percent of at least one program, ceases to operate before all students have completed their program of study, and may include if required by the institution's accrediting agency, a teach-out agreement

between institutions. A teach-out agreement means a written agreement between two institutions that provides for equitable treatment of students under these circumstances. WASC may require an institution to enter into a teach-out agreement as part of its teach-out plan.

When an institution enters into a teach-out agreement with another institution, the initiating institution must submit the agreement to the Commission for approval prior to its implementation. The teach-out agreement may be approved only if the agreement is between institutions that are accredited by a nationally recognized accrediting agency; and

1) Must be consistent with applicable standards of accreditation and Commission Policies;

2) Must provide for the equitable treatment of students by ensuring that the teachout institution has the necessary experience, resources, and support services to provide an educational program that is of acceptable quality and reasonably similar in content, structure, and scheduling to that provided by the institution that is closing or discontinuing its program(s), to remain stable, carry out its mission, and to meet all obligations to its existing students;

3) Must ensure that the teach-out institution can provide students access to the program and services without requiring them to move or travel substantial distances;

4) Must provide for notification of another accrediting agency if the teach-out institution holds accreditation from that agency; and

5) Must specify additional charges, if any, levied by the teach-out institution and provide for notification to the students of any additional charges

If an institution the Commission accredits or has granted candidacy to closes without a teach-out plan, the Commission must work with the Department of Education and the appropriate State agency, to the extent feasible, to assist students in finding reasonable opportunities to complete their education without additional charges.

The Commission has adopted Guidelines for Closing an Institution, available from the Commission office.

The University will provide all graduate students currently in the affected programs who have at least 3 hours in the major, an opportunity to complete degree requirements during a "teach out" period. Dean or designees will inform affected students of the program closure and the time within which they must complete the program. Students should work closely with the Office of the University Registrar or designee, who will be knowledgeable about the projected course offerings of the terminated program. New students will not be enrolled in the program. The university will follow all rules and regulations stated by WASC and BPPE.

For the fully online degree option to existing university Master's programs, should it be necessary to teach out the online versions of these programs, the same WASC approved policies will serve as a guide, and apply to all students who have enrolled in these programs.

1) Students in the online schedule of offerings will be informed of the teach-out of the fully online versions of the program and a teach-out schedule of online offerings in that program will be promulgated, which will permit students in continuous enrollment to complete the required coursework in the online delivery format.

2) All degree students may complete all degree requirements through on-campus offerings, in either weekend or weeknight schedules or a combination thereof.

3) For all students who cannot complete all course requirements in the teach-out period, a policy to permit students to transfer degree-relevant coursework from other WASC or regionally accredited institutions will be adopted to ensure students access to completing course requirements.

4) If needed, and with prior WASC approval, an articulation agreement will be developed to allow smooth transfer of ITU students into another regionally accredited university's graduate programs in that discipline.

5) In exceptional cases, and where needed, individual teach-out plans will be developed for any students in the program for whom the above accommodations do not permit timely completion of their respective degree programs.

UNIVERSITY LOCATION

ITU's location in the heart of Silicon Valley provides access to one of the most well-known hubs for entrepreneurial activity. The innovative atmosphere of Silicon Valley and the wider San Francisco Bay Area provides students with a unique environment from which to draw inspiration. The excitement, innovation, and opportunity of the Silicon Valley is dispensed into the classrooms through our reputable faculty members, and class sessions. The energy of technology, entrepreneurship, and commerce is all around.

In March 2015, ITU finalized its move to a new campus in north San Jose, California. Some of the many leading corporations within twenty miles of ITU include: HP, Apple, INTEL, Microsoft, Yahoo!, Google, Facebook, AMD, ATMEL, Juniper Networks, Symantec, Cisco Systems, Applied Materials, Adobe Systems, Cadence, Electronic Arts, Oak Technology, Brocade, Nvidia, Synopsis, and IBM. The city of San Francisco, Marin County, Berkeley, Oakland, and the Santa Cruz beaches are all an hour away by bus, train, or car. The Monterey Peninsula, Carmel, and the famous Napa Valley wine country are less than two hours away. Norman Y. Mineta San Jose International Airport is about two and a half miles from campus.

2711 North First Street, San Jose, CA 95134
Tel: (888) 488 - 4968
Fax: (408) 331-1026
www.itu.edu

ADMISSIONS

ROLLING ADMISSIONS

Applicants may apply for admission into any of the trimester terms (Fall, Spring, Summer) each year. Completed applications are reviewed on a rolling basis during the admission cycles.

APPLICATION DEADLINES

Applicants should aim to apply for their targeted term before the application deadline:

TERM	APPLICATION DEADLINE
Fall 2017	August 15
Spring 2018	December 15
Summer 2018	April 15

MASTER'S DEGREE PROGRAM ADMISSIONS POLICY

Students applying for admission into ITU master's degree programs are expected to demonstrate the knowledge, skills, and experience necessary to succeed in a rigorous graduate educational environment. As such, successful applicants who are admitted to the University should have earned (the equivalent of) a US bachelor's degree with a cumulative 2.75 GPA or above, or (the equivalent of) a US master's degree with a cumulative 3.0 GPA or above. Degrees earned in the United States must be from a regionally accredited US institution. In some cases, ITU may also consider other evidence of readiness for academic studies at the graduate level, including: outstanding undergraduate work in the major, completion of graduate-level coursework at a 3.0 GPA or above, post-baccalaureate studies, and professional certifications.

Given the diversity of grading scales and accreditation standards worldwide, ITU requires that any foreign credentials (i.e., undergraduate/graduate diploma and transcript) be evaluated by an approved third-party evaluation service. The University will only accept foreign credentials that are deemed by the approved service provider as equivalent to a US bachelor's or master's degree. International applicants will also need to provide proof of English proficiency (see ITU's English Proficiency policy).

ENGLISH PROFICIENCY POLICY

The ability to communicate effectively in English – to comprehend, read, write, and speak the language fluently – is vital to student success. ITU applicants are therefore expected to demonstrate English proficiency as a part of the application process.

International students whose native language is not English must provide evidence of English proficiency. English competency tests (e.g., TOEFL, IELTS) are designed to provide the Office of Admissions with a guide to measure potential academic success.

Applicants are required to demonstrate English proficiency by one of the following means:

- A TOEFL score of 72 or higher (Internet-based test score (ibt)).
- An IELTS score of 6.0 or higher.

Test scores are valid for two years from the date when the tests are taken. If the test score is older than two years, the student will be required to resubmit a valid test score.

Valid, official scores must be sent to ITU's Office of Admissions directly from the testing service. If a TOEFL score is being sent, ITU's institution code is 4446. If you are sending an IELTS score, please be sure to select ITU from the list of available institutions.

Non-US citizen students who are currently residing in the U.S. and seeking to transfer to ITU may demonstrate English language proficiency as described above. In addition, such students may also demonstrate proficiency by attaining a score of 64 or higher on the MTELP Level 3 Exam, indicating a CEFR level B2 or higher. The administration of the MTELP Exam must be proctored and take place on the ITU campus.

International students may be exempted from the English proficiency requirement under the following circumstances:

1) **The applicant has earned an undergraduate degree from a regionally accredited institution in the U.S.**
The undergraduate degree must consist of a minimum of 120 trimester credit hours, with the majority of credit hours earned in the U.S. from a regionally accredited institution. Waivers will not be considered for credit hours earned at a branch campus in a non-English speaking country or degrees earned through distance learning programs. Credential evaluation may be required for transfer credit hours from foreign institutions.

2) **The applicant has earned a graduate degree from a regionally accredited institution in the U.S.**
The graduate degree must consist of a majority of credit hours earned in the U.S. from a regionally accredited institution. Waivers will not be considered for credit hours earned at a branch campus in a non-English speaking country or degrees earned through distance learning programs. Credential evaluation may be required for transfer credits from foreign institutions.

3) **An accredited undergraduate or graduate degree was earned in a non-U.S., Anglophone country, and the language of instruction must have been English.**
The majority of the credit hours must be earned from an Anglophone institution. Waivers will not be considered for credit hours earned at a branch campus in a non-English speaking country.

Countries that qualify for the waiver include: Antigua,

Australia, Barbados, Bermuda, Bahamas, Belize, British Virgin Islands, Canada (except Québec), Cayman Islands, Dominica, Grenada, Guyana, Ireland, Jamaica, New Zealand, Nevis & St. Kitts, St. Lucia, South Africa, St. Vincent, Trinidad & Tobago, Turks & Caicos, and the United Kingdom (England, Scotland, Northern Ireland & Wales).

4) **The applicant's native language is English.**
Applicants can demonstrate native English language proficiency by providing appropriate documentation.

5) **The applicant has completed an accredited ESL program in the U.S., or in a non-US Anglophone country, listed in criteria #3, with a proficiency level equivalent to a B2 or above according to the Common European Framework (CEFR).**
The applicant must submit official transcripts and an official copy of the certificate of completion to the Office of Admissions. The transcript must demonstrate a CEFR level of B2 or above in all areas.

ITU considers an English language program as accredited if it:

1) Is accredited by one of the following accreditation agencies recognized by the Secretary of the Department of Education (ED):

   a. Commission on Language Program Accreditation (CEA)

   b. Accrediting Council for Continuing Education & Training (ACCET)

   Or

2) Is a listed member of the American Association of Intensive English Program (AAIEP)

   Or

3) Is accredited by a government-recognized agency in an approved Anglophone country.

PROOF OF ENGLISH LANGUAGE PROFICIENCY

Non-US citizen students who are currently residing in the U.S. and seeking to transfer to ITU may demonstrate English language proficiency by all the means described in the current 2016-2017 catalog. In addition, such students may also demonstrate proficiency by means of successful passage of the MTELP Level 3 Exam with a score of 64 or higher, proctored and administered on the ITU campus, that indicates a CEFR level B2 or higher.

MASTER'S LEVEL ADMISSIONS APPLICATION REQUIREMENTS

All ITU applications must include:
- A completed new student application.
- Sealed official transcripts from all universities

attended. Transcripts must be mailed directly from the institution or through an official U.S. e-Transcript provider.

- International Students Only: Foreign credential evaluations for all transcripts must be submitted. Please see http://itu.edu/mkg/evaluations for a list of approved foreign credential evaluation services.

- Grade point average (GPA) requirements: A cumulative graduate GPA of 3.0, or a cumulative undergraduate GPA of 2.75.

- Statement of Purpose - an essay describing your personal and professional goals and reasons for obtaining your graduate degree. Word count must not exceed 750 words.

- Resumé - Must not exceed two (2) pages.

SUPPLEMENTARY MATERIALS

Most students who are admitted to ITU do not submit supplemental materials. All of the required documents will be used to evaluate your application. In the case that you do not meet the minimum academic requirements, supplemental materials may be considered. Only the following supplemental materials may be considered.

- Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) scores recommended. Scores must be sent directly from the testing center.

- Two Letters of Recommendation. Letters should mention the student's professional and academic experience, as well as their potential to succeed in graduate school.

- Work experience

- Professional achievements

All applicants must submit identification records to the Office of Admissions in the form of a valid or legitimate U.S. government identification card or passport.

* All documents submitted for admission become property of the University and will not be returned.

DOCTORAL LEVEL ADMISSIONS APPLICATION REQUIREMENTS

ITU's doctoral programs have extensive program-specific admissions requirements. Students interested in applying for admission into a doctoral program should contact the Office of Admissions for more information.

ADDITIONAL REQUIREMENTS FOR INTERNATIONAL APPLICANTS

International applicants who have completed their post-secondary education from an institution outside the U.S. must hold a degree from a university recognized by their Ministry of Education as a degree-granting institution.

International applicants coming from overseas are recommended to apply within the first month of each admission cycle (May, September, January) to ensure enough processing time for visa, if admitted.

In addition to the regular application requirements, international applicants must also provide:

1) **Foreign credential evaluation** for any non-US degrees and foreign credit hours transferred to a US undergraduate or graduate degree. ITU will accept a course-by-course evaluation completed by one of our approved credential evaluation service providers: http://itu.edu/evaluations.

2) **Proof of English proficiency.** Students may demonstrate English proficiency through one of the following ways:

   A) Test of English as a Foreign Language (TOEFL) examination. ITU looks for a score of 72 or better for the internet-based test (ibt).

   B) International English Language Testing System (IELTS) examination. ITU looks for a band score of 6.0 or better for the academic module.

   C) Accredited bachelor's or master's degree from a regionally accredited US institution or from a native English-speaking country.

   D) Evidence that the applicant's first language is English. Applicant should submit documentation that s/he was schooled in a country where English is the official language and language of instruction.

   E) Transcript demonstrating the completion of an accredited ESL program in the US, or in a non-US Anglophone country, with a proficiency level equivalent to a B2 or above, according to the Common European Framework (CEFR).

Note: All documents submitted for admission become property of the University and will not be returned.

SECOND ITU MASTER'S DEGREE ADMISSIONS REQUIREMENTS

At ITU, the term "second master's degree" is used for students who received their first master's degree at ITU and would like to pursue a second ITU master's degree in a different field. Students who completed their first master's degree at another institution are not considered "second master's students" at ITU.

Current and former ITU students who would like to apply for their second ITU master's degree must adhere to the current master's level admissions application requirements and admission cycles.

Students applying for a second ITU master's degree before their first degree has been conferred are required to submit an official ITU transcript and must be in good academic standing. If all admission requirements are met, these applicants will be offered a "Conditional Admission." Upon

completion of their first ITU master's degree, they will be offered full admission and may matriculate into their new program as normal.

CONDITIONAL ADMISSION

Applicants that meet ITU's academic criteria but do not meet ITU's English proficiency requirement may be offered a "Conditional Admission" from the Office of Admissions. A conditional admission is valid for one year and current admission records will be kept on file during this time. The conditional admission will be fulfilled if the student provides sufficient evidence of English proficiency through one of the following conditions stated in the English Proficiency Policy.

Conditional Admission may be granted to Second Master's Degree applicants whose first ITU degree has not been conferred. Please refer to the Second ITU Master's Degree Admissions Requirements section for additional details.

ADMISSIONS EXCEPTIONS

Program Admissions Criteria and Processes: In a unique case beyond the uniform minimum requirements for admission, a department may choose any criteria that is appropriate as a basis for its evaluation. This includes but is not limited to undergraduate and graduate grade point averages, work experience, test scores, letters of recommendations, and evidence of past achievements. Admissions criteria and decision procedures are subject to review by the Exceptions Committee.

PROVISIONAL ADMISSION POLICY

In cases where a student meets the academic requirements for admission to ITU, but experiences delays in supplying supplemental documentation to support their application, the Admissions Exceptions Committee may grant a provisional admission for the student to enroll for the first term. The student would receive an acceptance letter that describes the necessary provisions for completing the admission process and sets a deadline for the student to complete those requirements. The official admission will not be granted until the necessary items, such as an official final transcript showing award of the bachelor's degree or master's degree, are received.

All admission provisions must be cleared by the end of the first trimester of enrollment. In order to avoid any difficulties, students are strongly encouraged to meet the terms of their provisional admission prior to the start of the anticipated trimester. If a student fails to clear their provisional status by the end of the first enrolled term, an administrative hold will be placed on their academic record, which may result in their inability to register for classes and/or continue their graduate studies in future terms. The Office of Admissions will monitor provisionally accepted students and notify the appropriate departments about students who do not complete their requirements. The University retains the right to rescind admissions decisions and cancel registration for any student who is found not to be eligible after final admissions documentation has been evaluated.

ACCEPTING YOUR OFFER OF ADMISSION

All newly admitted students who have been granted admission to ITU will need to confirm their intent to enroll in order to secure a seat in their program. It is very important that you secure a seat for the upcoming term by completing the enrollment process as soon as possible. If the enrollment process is not completed, your spot at ITU will be forfeited and you will need to reapply.

Successful completion of the enrollment process will allow students to register for classes, initiate processing of their student ID card, among other services.

Students who are no longer able to attend ITU must contact the Office of Admissions immediately to discuss options (see Deferred Admissions). If the student has registered for classes already, the student must drop those courses in order to receive a refund. Some fees are non-refundable. If the student does not defer their enrollment and decides later in the future to attend ITU, the student must reapply for admission and meet the admission requirements and deadlines as stated above.

International students should also contact the International Students Office.

DEFERRED ADMISSION

If you have been admitted to ITU, but can no longer enroll by the start date, you may wish to postpone your admission until the next entry term. Once admitted, you can defer your admission only once; after that you must re-apply. Students must pay their Orientation Fee before they are eligible to request a Deferred Admissions. Submitting a request for deferral is not a guarantee of approval. If you are approved for deferment, you cannot enroll in another academic program at a different college or university, during your deferment period.

A completed Admissions Deferral Request Form must be submitted to the Office of Admissions before:

TERM	DEFERMENT DEADLINE
Fall	September 1
Spring	January 5
Summer	May 4

F-1 International Students who are currently in the U.S. who apply for deferment must be able to maintain lawful F-1 status within the 5-month maximum transfer time between schools. F-1 international students physically residing outside the U.S. may also apply for deferment. Students should speak with an International Student Advisor at ITU to defer admission.

TRANSFER CREDIT POLICY

Applicants who have taken graduate-level courses at other regionally accredited US colleges and universities may, at the time of application for admission, petition to transfer course credit hours towards their ITU degree program. The relevant Department Chair grants final approval, subject to the following criteria:

- A grade of B or better in the course is required for any credit hours to be transferred.
- No more than 9 graduate level credit hours may be transferred from other regionally accredited US colleges and universities.
- Courses transferred must be substantially equivalent to courses offered at ITU.
- The courses to be transferred may substitute for electives but not for core courses in the ITU degree program.
- Grades from previous institutions will not be transferred and will not affect GPA.
- In no case will a petition for transfer credit be considered later than the end of the first trimester of a student's enrollment.

ADMISSION POLICIES FOR RECEIPIENTS OF THREE-YEAR BACHELOR'S DEGREE OR EQUIVALENT

Individuals who have earned a three-year Bachelor's degree or a three-year diploma from an institution recognized by the Ministry of Education or corresponding governmentally approved higher education authorizing agency in their respective countries may apply for admission to the relevant Master's degree program at ITU, provided that specified, additional preparatory work* is completed.

Applicants who have earned an Associate's degree and who have completed ninety credit hours or more of coursework in a regionally accredited U.S. community college or from a regionally accredited U.S. university may also apply for admission to the relevant Master's degree program, provided that specified, additional preparatory work* is completed.

For each applicant who lacks the equivalent of a relevant U.S. Bachelor's degree, an evaluation of the applicant's undergraduate transcript(s) will be conducted by the appropriate Department Chair or designee, who will determine what additional coursework must be completed for the applicant to be sufficiently prepared to pursue graduate coursework in that field of study.

Students will be eligible to take graduate courses at ITU concurrently with the additional preparatory work. However, the additional required preparatory work will be completed prior the pursuit of any advanced coursework in that program for which the required foundational coursework is determined to be a prerequisite.

*Note: Required additional preparatory coursework may be taken at ITU or at an approved, regionally accredited US community college or university.

FINANCIAL INFORMATION

TUITION AND FEES FOR MASTER'S DEGREE
The following sample tuition and fees schedule applies for all students:

	FALL TRIMESTER	SPRING TRIMESTER	SUMMER TRIMESTER	ACADEMIC YEAR
TUITION [1]	$5,400	$5,400	$5,400	$16,200
REGISTRATION FEE [2,3]	$50	$50	$50	$150
TECHNOLOGY FEE [3]	$200	$200	$200	$600
STUDENT GOVERNMENT ASSOCIATION FEE	$15	$15	$15	$45
HEALTH INSURANCE [4]	$498.56	$498.56	$498.56	$1,495.68
VTA FEE [3,5]	$27 for first trimester only. $24 for all other trimesters.	$24	$24	$75
TOTAL	$6,190.56	$6,187.56	$6,187.56	$18,565.68

TOTAL COSTS FOR A PROGRAM AT ITU
The following estimated tuition and fees table is for the entire educational program:

	FEES PER TRIMESTER	TOTAL NUMBER OF CREDIT HOURS/ TOTAL NUMBER OF TRIMESTERS TO COMPLETE THE EDUCATIONAL PROGRAM EDUCATIONAL PROGRAM	TOTAL CHARGES DUE FOR THE ENTIRE EDUCATIONAL PROGRAM
TUITION	$600 per Credit Hour	36 Credit Hours / 4 Trimesters	$21,600
REGISTRATION FEE [5]	$50	4 Trimesters	$200
STUDENT GOVERNMENT ASSOCIATION FEE	$15	4 Trimesters	$60
TECHNOLOGY FEE [5]	$200	4 Trimesters	$800
HEALTH INSURANCE [4]	$498.56	4 Trimesters	$1,994.24
VTA PASS [3,5]	$27 for first trimester only. $24 for all other trimesters.	4 Trimesters	$99
APPLICATION FEE [6] (ONE TIME FEE)			$100

ORIENTATION FEE [6,7] (ONE TIME FEE)	$24	4 Trimesters	$250
PETITION TO GRADUATE [6] (ONE TIME FEE)			$200
TOTAL			$25,303.24

TUITION AND FEES FOR DOCTORAL DEGREE
The following sample tuition and fees schedule applies for all students:

	FALL TRIMESTER	SPRING TRIMESTER	SUMMER TRIMESTER	ACADEMIC YEAR
TUITION [8]	$9,000	$9,000	$9,000	$27,000
REGISTRATION FEE [2,3]	$50	$50	$50	$150
TECHNOLOGY FEE [3]	$200	$200	$200	$600
STUDENT GOVERNMENT ASSOCIATION FEE	$15	$15	$15	$45
HEALTH INSURANCE [4]	$498.56	$498.56	$498.56	$1,495.68
VTA FEE [3,5]	$27 for first trimester only. $24 for all other trimesters	$24	$24	$75
TOTAL	$9,790.56	$9,787.56	$9,787.56	$29,365.68

TOTAL COSTS FOR A DOCTORAL DEGREE PROGRAM AT ITU
The following estimated tuition and fees table is for the entire Electrical Engineering or Interdisciplinary Sciences Doctoral program:

	FEES PER TRIMESTER	TOTAL NUMBER OF CREDIT HOURS/ TOTAL NUMBER OF TRIMESTERS TO COMPLETE THE EDUCATIONAL PROGRAM	TOTAL CHARGES DUE FOR THE ENTIRE EDUCATIONAL PROGRAM
TUITION [8]	$1,000 per Credit Hour	60 Credit Hours	$60,000
REGISTRATION FEE [2,3]	$50	14 Trimesters	$700
STUDENT GOVERNMENT ASSOCIATION FEE	$15	14 Trimesters	$210
TECHNOLOGY FEE [3]	$200	14 Trimesters	$2,800
HEALTH INSURANCE [4]	$498.56	14 Trimesters	$6,979.84
VTA FEE [3,5]	$27 for first trimester only. $24 for all other trimesters	14 Trimesters	$339
APPLICATION FEE [6] (ONE TIME FEE)			$100

ORIENTATION FEE [6,7] (ONE TIME FEE)			$250
PETITION TO GRADUATE 6 (ONE TIME FEE)			$200
TOTAL			$71,578.84

The following estimated tuition and fees table is for the entire Doctor of Business Administration program:

	FEES PER TRIMESTER	TOTAL NUMBER OF CREDIT HOURS/TOTAL NUMBER OF TRIMESTERS TO COMPLETE THE EDUCATIONAL PROGRAM	TOTAL CHARGES DUE FOR THE ENTIRE EDUCATIONAL PROGRAM
TUITION [8]	$1,000 per Credit Hour	60 Credit Hours	$60,000
REGISTRA-TION FEE [2,3]	$50	11 Trimesters	$550
STUDENT GOVERN-MENT ASSO-CIATION FEE	$15	11 Trimesters	$165
TECHNOLOGY FEE [3]	$200	11 Trimesters	$2,200
HEALTH INSURANCE [4]	$498.56	11 Trimesters	$5,484.16
VTA FEE [3,5]	$27 for first trimester only. $24 for all other trimesters	11 Trimesters	$267
APPLICATION FEE [6] (ONE TIME FEE)			$100
ORIENTATION FEE [6,7] (ONE TIME FEE)			$250
PETITION TO GRADUATE 6 (ONE TIME FEE)			$200
TOTAL			$69,216.16

The above tables were based on fourteen trimesters for Electrical Engineering or Interdisciplinary Sciences Doctoral program, or eleven trimesters for Doctor of Business Administration program to graduate, not including the additional expense to be incurred by students for books, housing , food , and miscellaneous personal expense.

ALL OTHER NON-PROGRAM SPECIFIC FEES
The following table lists other fees:

OTHER FEES (NON REFUNDABLE)	AMOUNT
BOUNCED CHECK PENALTY FEE (PER CHECK)	$50
ISO PROCESSING FEE	$100
DIPLOMA REPLACEMENT FEE	$100
GROUND SHIPPING FEE	$25
OVERNIGHT POSTAGE FEE	$50
INTERNATIONAL POSTAGE FEE	Additional Charges Will Apply
GRADUATION FEE	$200
ORIENTATION FEE (ONE-TIME FEE FOR NEW STUDENTS PER PROGRAM)	$250
INSTALLMENT PLAN ADMINISTRATION FEE (PER TRIMESTER)	$100
EMPLOYER TUITION REIMBURSEMENT DEFERRED PAYMENT PLAN (ETR) FEE	$50 per trimester
LAB SUPPLIES/KIT (DEPENDS ON CLASS)	$50 - $200
LATE PAYMENT FEE [9]	$100
PAYMENT SWITCH FEE	$50
STUDENT ID REPLACEMENT FEE	$25
STUDENT VTA REPLACEMENT FEE	$3
TRANSCRIPT FEE (PER COPY)	$15 for first copy $10 each for copies 2 - 5 $5 each for copies 6 - 10

[1] *Based on full-time registration of nine (9) credit hours. Note: Tuition per credit hour is $600.*
[2] *Registration Fee is $50 per trimester. Late Registration Fee is $100 (applies to students who register for classes during the Late Registration Period).*
[3] *Fees are non-refundable once students register for classes.*
[4] *Fees may be refundable if all of the requirements are met. Refer to the ITU website for specific requirements regarding Health Insurance refund. Rate subject to change per insurance carrier notice.*
[5] *ITU is required by the City of San Jose to issue VTA passes to all enrolled students. VTA Fee for new students for the first trimester is $27, and $24 for all continuing students. Rates are subject to change by VTA.*
[6] *Fees are non-refundable.*
[7] *The Orientation Fee covers the New Student Orientation event, as well as pre-arrival assistance and services.*
[8] *Based on full-time registration of nine (9) credit hours for coursework. Full time for dissertation portion of the program is at three (3) credit hours per trimester (not shown in sample tuition and fees table). Tuition is $1,000 per credit hour.*
[9] *Late Payment Fee will be applied one (1) month after the first day of the trimester if there is an outstanding balance on the account and the student has not signed up for an installment plan.*
[10] *Late Payment Fee will be applied one (1) month after the first day of the trimester if there is an outstanding balance on the account and the student has not signed up for an installment plan.*

Students are responsible for payments of all tuition and fees. ITU reserves the right to adjust the above schedule of fees at any time. Refer to our website for the latest fee table.

COURSE MATERIALS AND SERVICES FEES

Students may be charged fees in some courses for the use, rental, or consumption of materials, tools, or equipment, or for the costs of materials or services necessary to provide a

special supplemental educational experience. For example, course materials fees may cover the purchase of chemicals and glassware for a science laboratory or art supplies for an art studio class. They might also cover film rentals, field trips, or the purchase or rental of specific equipment. Courses that may be subject to the course materials fee are listed in the Class Schedule at http://itu.edu.

PAYMENT DUE DATE

Tuition and fees for each trimester are due in full upon registration of courses, unless the student has enrolled in one of ITU's approved payment plans. ITU reserves the right to deny enrollment or cancel enrollment for students whose fees are not paid one month after the first day of each trimester.

ACCEPTED FORMS OF PAYMENT

1) Pay Online at MyITU:
   a. Credit/Debit Card
   b. eCheck

2) Pay in person at Accounting Services with:
   a. Cash
   b. Credit/Debit Card
   c. Cashier's Check, Money Order, Traveler's Check
   d. Personal Check

3) Pay by international wire transfer:
   a. Visit the Flywire website to pay via wire transfer.

4) Pay by Tuition Payment Plan:
   a. Installment Plan
      i. Plan allows tuition to be paid in two to three payments over the first two months of the term.
   b. Employer Tuition Reimbursement - Student Payment Deferral
      i. For a student who participates in a tuition reimbursement program through his/her employer, this plan allows a qualified participant to defer university tuition payment until such time as they qualify for their employer reimbursement.

INSTALLMENT PLAN POLICY

- Each installment plan is subject to a per trimester Installment Plan Administrative Fee of $100.

- Installment Plans are only offered to students with good financial standing with ITU. Students who have a bounced check record on their account due to non-sufficient funds are not eligible for any installment plans for the remainder of their tenure at ITU.

- Students are responsible to make sure they have enough money in their bank account for the post dated checks. If a student drop a class after the third week of the trimester, the student will still owe all outstanding balances and any default on payment will be subject to collection.

- Any student who wishes to pay using an installment plan must download, print, and complete a Promissory Note, and bring the completed form to the Department of Accounting Services.

- Each installment plan consists of a minimum of two (2) to a maximum of three (3) installments.

- Students must submit all their installment plan checks along with their first payment. The checks should be post-dated and will only be deposited on the day the installment is due. If the due date falls on a weekend or holiday, the check will be deposited the following business day.

- The installment plan process is not completed until the Installment Plan Promissory Note and all post dated checks have been submitted to the Department of Accounting Services.

- Students who wish to cancel an installment check or switch payment, must contact the Department of Accounting Services and complete the process prior to the installment due date.

INSTALLMENT PLAN PAYMENT SCHEDULE:

- The first installment is due on the day of registration, and the amount must be equal to or greater than three (3) credit hours of tuition in addition to all of the mandatory fees, including student health insurance.

- The second installment is due one (1) month after the first day of trimester, and the amount must also be equal to or greater than three (3) credit hours of tuition.

- The third installment is due two (2) months after the first day of trimester. Any remaining balance must be paid with this final installment.

INSTALLMENT PLAN EXAMPLE:

The example below assumes a student is registering for 9 credit hours in a given trimester. The estimated costs and projected pay will be the following:

Installment Plan Payment Schedule for Master's Program

Installment Payment #	Payment	What's in Each Installment	Due Date
1	$2,687.56	$1,800 - 3 credit hours $200 - Technology Fee $50 - Registration Fee $15 - SGA Fee $24 - VTA Fee ($27 for new students on their first trimester) $498.56 - Health Insurance $100 - Installment Plan Application Fee	Same day that student registers for classes
2	$1,800	$1,800 - 3 credit hours	1 month after 1st day of the trimester
3	$1,800	$1,800 - 3 credit hours	2 months after 1st day of the trimester
TOTAL	$6,287.56		

Installment Plan Payment Schedule for Doctoral Program

Install-ment Payment #	Payment	What's in Each Installment	Due Date
1	$3,887.56	$3,000 - 3 credit hours $200 - Technology Fee $50 - Registration Fee $15 - SGA Fee $24 - VTA Fee ($27 for new students on their first trimester) $498.56 - Health Insurance $100 - Installment Plan Application Fee	Same day that student registers for classes
2	$3,000	$3,000 - 3 credit hours	1 month after 1st day of the trimester
3	$3,000	$3,000 - 3 credit hours	2 months after 1st day of the trimester
TOTAL	$9,887.56		

Note: There is a $50 fee for switching payments if you decide to substitute an installment check with another form of payment on or before the due date of the installment, unless your installment plan has 3 installments AND you are settling your entire Installment Plan balance before the second installment due date.

EMPLOYER TUITION REIMBURSEMENT DEFERRED PAYMENT PLAN (ETR)

5) Plan Overview

International Technological University (ITU) has established a deferred payment plan for students who qualify for tuition reimbursement from their employer. Employer Tuition Reimbursement Deferred Payment Plan (ETR) is designed for eligible students whose employers offer reimbursement for tuition charges. Students accepted into the plan may defer payment of the portion of their tuition reimbursement under their employer's program up to six weeks after the last date of trimester. Any portion of tuition and fees not covered under an employer tuition reimbursement plan will be due upon registration.

Students may apply for the ITU Installment Payment Plan to cover any tuition and fees not included in the ETR. Please refer to our website for all installment plan information. Failure to pay or have an installment plan arrangement in place may result in a financial hold that will prohibit release of official transcript and enrollment.

Applications for the ETR have to be submitted and approved by the Department of Accounting Services each trimester. ITU has three trimesters, namely: (a) Spring Trimester from January through May, (b) Summer Trimester from May through September, and (c) Fall Trimester from September through January.

It is important to remember that the student is personally responsible for any and all financial obligations made to ITU, regardless of employment status or the length of time it will take the employer to process reimbursement. ITU does not bill a student's employer; the student is responsible for providing employer with the reimbursement information.

In order for the employer to receive confirmation of student grades, an official transcript request must be requested. Transcript requests are submitted by completing the Official Transcript Order Form which is available on the ITU website under Forms. The transcript will be sent to the address provided on the form after the associated transcript fee is paid.

The student is responsible for the amount deferred six weeks after the end of term, whether or not the amount is to be paid by the employer. If the employer, for any reason, refuses to reimburse the student's tuition, the student remains responsible for the full payment of all tuition and fees to ITU.

ITU reserves the right to cancel the plan, if the information provided on the application is false.

6) Eligibility

The ETR is available for students working in a company with an Employee Education Assistance/Reimbursement Plan, who have a portion, or 100% of their tuition reimbursed directly to them by their employer upon successful completion of coursework.

The ETR is only applicable to ITU students who are already authorized to work legally in the U.S. Students attending ITU on an F-1 student visa are not eligible to use this plan, as their visa status requires that they show proof of ability to pay for their studies independent of any on-campus employment, Curricular Practical Training (CPT), or other work authorization. On the date of application, the student must not have an outstanding account with ITU exclusive of an installment payment plan.

Students must complete and submit all required documents during the regular registration period. Applications submitted during the late registration period will be subject to an additional late processing fee.

Maximum deferral amount allowed for the calendar year should not be greater than the annual maximum limit reimbursable by the employer.

There is no prepayment penalty.

7) **Process**

1) Visit itu.edu/financial-info/etr.

2) Submit completed Employer Tuition Reimbursement Deferred Payment Plan Application Form and Statement of Financial Liability within ITU's regular registration period.

3) Along with the completed forms in #2, student must also provide a letter from the employer's Human Resources department confirming current employment, a copy of the student's employer education assistance/reimbursement plan, and check or cash to pay the non-refundable $50 ETR processing fee.

4) ETR applications submitted during the late registration period (See the University Calendar) will be assessed an additional late processing fee of $50.

5) A new ETR application and ETR Statement of Financial Liability must be submitted each trimester.

6) Submit the completed application form along with the $50 non-refundable ETR processing fee and proof of employment to ITU, Department of Accounting Services, Accounts Receivable, at 2711 N. First St., San Jose, CA 95134.

For the most updated information , please visit https://itu.edu/financial-info/ETR/

FINANCIAL HOLDS

Upon registration of courses, a student must either (a) pay tuition in full, or (b) apply for an ITU Payment Plan. Failure to do so will result in a financial hold being placed on the student's account, restricting the student's ability to add and drop courses on MyITU or to request official transcripts. The financial hold is automatically removed from the student's account once full payment is made.

REFUND POLICY

1) Students will be given a 100% refund if a class is cancelled by the University.

2) Refunds are calculated using one of the following methods:

a. The time and date the class was dropped by the student on MyITU, or

b. The time and date the student requested a class to be dropped by the Office of the University Registrar's Office on their behalf, if the student was unable to drop the class by themselves on MyITU.

3) Depending on the original form of payment, the following refund methods will be used:

a. Online credit card payments will be refunded back to the same credit card account. In the event we are unable to refund back to the credit card, a refund check will be issued.

b. Cash, Check, Cashier's check, E-check, traveler's check, and Money orders will be refunded via check.

c. Flywire payments will be refunded to the original bank account via Flywire.

d. Refunds for international wire transfers (when applicable) will only be issued by wire transfer back to the originating account. No exceptions. Students are responsible for any fees incurred for a wire transfer refund. Refunds by wire transfer may take up to 3 months due to the receiving banks' policies and practices.

e. For non-wire transfer refunds, please allow 3 to 5 weeks of processing time.

ITU's refund schedule is as follows:

CLASS DROP DATE	REFUND PERCENTAGE
Prior to the start of the trimester:	100%
During the add/drop period (ending the second Sunday from the beginning of the trimester at 11:59PM):	100%
During the third week of the trimester (ending the third Sunday from the beginning of the trimester at 11:59PM):	80%
After the third week of the trimester:	0%

FINANCIAL ASSISTANCE AND STUDENT LOANS

International Technological University does not currently participate in any federal or state financial aid programs. In order to ease the burden of a single lump sum tuition payment, the University offer payment plan options.

Private educational loans are available through private lending institutions, including banks and credit unions. Please note that private loan providers have their own application, requirements, and repayment terms for these credit-based loans.

If students obtain a loan to pay for their educational program, students will have the responsibility to repay the full amount of the loan plus interest, less the amount of any refund.

SCHOLARSHIPS

International Technological University offers Merit Based Scholarships to a select number of students every trimester. Beyond ITU, there are many opportunities for scholarships from numerous organizations and foundations worldwide. ITU's Financial Information Webpage has links to resources that can help you identify and apply for scholarships. There is also important information about how to recognize and avoid scams.

CAMPUS RESOURCES

ACADEMIC ADVISING

The Academic Service Department is here to serve students and guide them toward educational success during their tenure at ITU. Students receive individual attention in the planning of their degree program and are provided important information regarding deadlines and university policies. Advising is an integral part in assisting students with their decision making when selecting courses toward their career goals and future plans. Advisors can meet one-on-one with students or in a group setting.

We assist students with the following:

- Information about degree program, compliance, integrity, academic regulations and policies
- Information regarding change of program/transfer of credit hours
- Academic evaluation and assessment
- Provide students with preliminary graduation checklist, Petition to Graduate and Reduce Course Load (if applicable)
- Degree planning (roadmaps)
- Academic Probation
- Exit Interview questionnaire
- Liaison between students and faculty members
- Improving skills/strategies
- Time management skills
- Resources to help students be successful
- ITU Scholarship information

LIBRARY

The mission of the friendly library team is to help students succeed at ITU by helping them become scholarly users of information and research protocols. The University Librarian is a member of the ITU Academic Leadership Council (ALC) and liaises with faculty to ensure that information literacy and scholarly information access is a high priority in ITU.

An online inquiry form, email address, library website and reference desk help students, faculty and staff to locate resources, logins and learn about APA citation, copyright, information literacy and writing research reports.

Virtual (24/7) and in-person (6-days per week) services help students and faculty to access and use, scholarly books, textbooks, journal articles, proceedings, curated electronic databases, theses, student projects and other media, in an honest and ethical manner (see Recommended Resources). Academic honesty, plagiarism and copyright are serious topics at ITU. The library website, Library Pocket Guide, and Information Literacy Program, teach students how to

format the sources they cite (using APA, IEEE and the ITU thesis guidelines). The library teaches students to report their findings legally and to the highest standard of academic honesty.

Neighboring library relationships are facilitated. As a small graduate University, the library team develops linkages with large neighboring University and Public Libraries such as: San Jose State University (SJSU) Martin Luther King, Jr. Library and San Jose Public Library (SJPL), to secure extended access to rich electronic and other collections in business, computer science, electrical engineering and digital humanities.

The library provides access to the following services, policies and facilities:

1) Physical Library, Study Rooms and Laptops: See library website for opening hours.

2) Library website and ITU Online Library Catalog

3) Virtual Inquiry: An web-based inquiry form and email address: ibrary@itu.edu

4) Pocket Guide: ITU Library Pocket Guide (PDF on library website)

5) Information Literacy Workshops and Resources: Website, Workshops (e.g. Business Information Resources Workshop), ACRL information literacy competencies.

6) Recommended Resources: Scholarly resource links and research tools

7) Books, Materials and Textbooks: The Collection Policy, Textbook"s and Thesis policies provide for the loan of over 3,500 in-house books and 350 course reserves

8) Electronic Database Subscriptions and Trials: Five subscription databases. "a" to "d" are accessed through the EMS (ITU Educational Management System). Contact library@itu.edu about logins and access.

   a. ACM Digital Library
   b. Ebsco Business Source Elite
   c. Wall Street Journal Online
   d. NYTimes Academic Pass Online
   e. Database Trials: IEE Xxplore, IEEE CSDL, Ebsco Business (ebooks) Collection, ACI Scholarly Blog, Credo Information Literacy Online Learning
   f. Current Trials: Ebsco Business [eBooks] Collection, IEEE CSDL, Credo Reference and ACI Scholarly Blog

9) Online Access to Free curated scholarly repositories in business and computing such as:

   a. Proquest PQDT Open dissertations
   b. InTechOpen, Free Computer Books Online, FreeTechBooks
   c. Google Books
   d. PubMed Central
   e. Media Commons Free Media Library

f. [Moving Image Archive](#)
g. [DOAJ Directory of Open Access Journals](#)
h. [Cite Seer X](#) [scholarly computer and information science
i. [Safari Books Online](#) (with [SJPL or local public library card](#))

10) Theses and Projects: [The ITU Thesis Reference Policy](#) ensures that PDF copies of theses are accessible from the library and projects (at the discretion of faculty). See also the [ITU Master's Thesis Guidelines](#) and Proquest PQDT for access to dissertations that are openly published.

For more information about how to access library and research services, please drop by or email library@itu.edu. Or visit the [library website](#).

RESEARCH PROGRAMS AND RESOURCES

There are four research labs: Artificial Intelligence, Bio-Electronics, Embedded Research, and Green Energy Research Labs. All labs are led by the industry experts and ITU professors for researching the cutting edge technologies and products. Both labs provide the latest tools for best research and practice such as Synopsys and Cadence tools.

STUDENT LIFE AND CAMPUS RECREATION

ITU prides itself on offering a balance between what goes on inside and outside of the classroom. The University strives to create an environment that encourages social interactions with fellow students and the ITU administration. Student Life events give you the opportunity to forge friendships and join clubs while preparing for your career. Student Life has various events throughout the year. Events have included the ITU Cultural Fair, where ITU's diversity is celebrated, ITU's Got Talent, where student talents are showcased in the form of performances and artwork, Build & Pitch Hackathon, where inter-departmental innovation is encouraged, and Family Fun Day, a family friendly event for students, faculty, and staff. Student Life also celebrates various events throughout the year to acknowledge cultural holidays such as the Autumn Moon Festival, Valentine's Day, Holi Festival, and St. Patrick's Day.

As an ITU student, you can learn leadership skills as a student government association representative, meet new people at student mixers, and attend career driven workshops. In addition, ITU facilities offer open collaborative spaces for group projects, a student common area with a pool table and ping pong table, and dance/yoga studio. Classrooms contain a projector, ergonomic tables and chairs, accessible outlets, a desktop computer, and wifi access that can be used during instruction. Students at ITU are free to organize and join associations whose stated purpose is consistent with the university's mission. All student organizations seeking ITU support must be registered.

STUDENT GOVERNMENT

The Student Government Association (SGA) exists to serve, advocate for, and lead the student body with dedication to unity, teamwork, diversity, honesty, transparency, mutual respect, and creativity. SGA commits to being a voice for all students as well as a committed group of leaders among the ITU community.

SGA membership consists of four elected executive positions as well as a group of representative members. Each member is committed to serving students through hands-on assistance, and collaboration with ITU leadership. Experience as an SGA leader not only helps ITU become a better place, but is also an enriching part of your academic life. As a member of the SGA you will gain valuable leadership and communication skills. These transferable skills can be used at companies the world over, with many former SGA members going on to successful careers in industry.

TRANSPORTATION AND PARKING

Through ITU's partnership with the Santa Clara Valley Transportation Authority (VTA), as required by the City of San Jose, the Eco pass provides enrolled students unlimited rides on all VTA bus and light rail lines, when used in conjunction with an ITU student identification card.

The VTA fee is a mandatory non-refundable fee, and is required each trimester, whether or not a student requests/uses their pass. Students can request their Eco pass through ITU website or support ticket system.

Information on how to get and use a student Eco pass is available on the ITU website or at the campus Information Center.
The University is conveniently located near the Bonaventure light rail stop. Bus and light rail schedules can be found on the Santa Clara Valley Transportation Authority website, and available on campus.

Other notable modes of transportation NOT covered under the Eco pass include:

- **Bay Area Rapid Transit (BART)** is a train that provides clean, scenic service from Fremont, Richmond, Berkeley, and San Francisco.
- **Caltrain** provides commuter rail service along the San Francisco Peninsula, through the South Bay to San Jose, and Gilroy.
- **San Francisco Municipal Transportation Agency (SFMTA)** is one of America's oldest public transit and the seventh largest system in the U.S. Commonly known as the "Muni", it consists of historical streetcars, modern light rail vehicles, taxis, electric trolley coaches, world famous cable cars, and diesel buses.
- **Transit511.org** provides train, bus and ferry services for trips around the San Francisco Bay Area, including popular bicycle routes.

PARKING

International Technological University at the 2711 North First Street Campus has a very limited private parking lot. We offer a free "first-come, first-serve" parking lot that is monitored by campus security staff 24/7. The University is not

responsible for any damages that may occur to a personal vehicle while parked at the 2711 North First Street Campus. Parking in adjacent private parking lots to the campus is prohibited and may be subject to towing & impound.

Student Parking
The University currently does not utilize any type of parking pass for any portion of any term for students. The University does not allow for overnight student parking. Any vehicle found on campus without prior authorization to be on campus overnight may be subject to towing. Due to the nature of our limited parking, International Technological University students are encouraged to take public transportation utilizing their Valley Transit Authority Commuter Pass.

Employee Parking
The University currently does not utilize any type of parking pass for any portion of any term for employees. The University does allow for short-term overnight parking on a case-by-case basis with approval from the Facilities Development and Operations Office.

Towing Services
The University utilizes Campbell Towing at 1461 Terminal Ave San Jose, CA 95112.
Phone: (408) 295-7490
Office Hours: Monday-Friday 8AM-5PM

SPECIAL PARKING POLICY
Drivers using parking designated for disabled persons must display a valid state issued placard, license plate, or other form of identification recognized by state or national authority.

STUDENT EMPLOYMENT
Eligible students may be able to apply for on-campus jobs. The following opportunities may become available at any time:

Student Interns: Some departments that commonly hire student interns include: Admissions, Marketing, Operations, Information Technology, and the International Student Office.

Student Assistants: Student Assistants perform administrative duties, such as making photocopies and other classroom errands, as well as helping the Student Information Desk as greeters and campus tour guides. They are hired and managed by the Student Information Desk.

Teaching Assistants: Teaching Assistants are assigned to a specific course as needed, usually due to large class size. The TA must have received an A in that course. The student cannot be currently enrolled in the course for which they TA. Academic duties include tasks such as uploading course materials into EMS, tutoring, and holding office hours. TAs cannot proctor exams or guest lecture; all TA work must be done on campus.

Note: Students who are currently on academic probation OR are currently working off campus under Internship or OPT are not eligible to hold on-campus jobs.

STUDENT HEALTH INSURANCE
Health insurance is mandatory for all students. Every student will automatically be enrolled for health insurance through ITU unless the student has coverage under an alternative insurance provider, completed the online waiver process by the allotted deadline, and the student's coverage has been determined as comparable to ITU's requirements. Failure to pay the insurance premium or to complete the online waiver process, will result in a financial hold on the student account. For more information visit ITU's Health Insurance page.

CAREER SERVICES
ITU provides a variety of services to assist students in clarifying, planning, and achieving their career goals. Workshops are held regularly on topics including career planning, job search strategies, resume writing, interviewing skills, and other professional guidance sessions. Career Services staff work one-on-one with students, internship providers, and employers to assist students in obtaining quality positions in industry both before and after graduation. On campus open drop-in hours are held weekly and students may also email careerservices@itu.edu to schedule live or virtual appointments as needed. Additionally, ITU offers various on-campus industry, and employment events including an annual career fair, targeted employer engagement events, and regular industry group meetings and speaker events.

BEREAVEMENT POLICY
Students experiencing a death in the family should contact the Department of Academic & Student Services in order to request a Standard Bereavement Leave or a Bereavement Leave of Absence:

Standard Bereavement Leave – Upon approval from the Department of Academic & Student Services, the student is allowed 14 consecutive days of excused absence. Dates are specifiable by the student. The student would still be required to complete all course requirements.

Note: International students must file a Travel Request Form with the International Student Office if they are leaving the country.

Bereavement Leave of Absence – Should a student feel s/he needs more time than the allotted 14 consecutive days, students may withdraw from the trimester in which the death occurs.

In consultation with the Department Chair and academic advisor, students in good academic standing may:

- Drop currently enrolled courses without any notation on the academic record, if within ITU's add/drop period;
- Withdraw with a W notation from currently enrolled courses, if prior to the Withdrawal deadline; or
- Receive an incomplete (INC) grade for currently enrolled courses and have the opportunity to complete any missed exams and/or assignments in the following trimester in which they return. In the

instance that the instructor is not available to teach in the following term, the student's Department Chair may assign another instructor to assist the student in finishing the course. Further extensions beyond the following trimester may be granted under special circumstances.

Note: International students who leave the country for more than 30 days must file a Leave of Absence Request Form with the International Student Office. Students leaving the country are advised to meet with the International Student Office prior to their departure.

Once a Standard Bereavement Leave or Bereavement Leave of Absence has been received and approved:

- The Department of Academic & Student Services will notify the student's academic advisor who will communicate with the Department Chair, instructors for currently enrolled courses, and any other relevant offices to facilitate the leave.
- Instructors will be advised that excused absences and extensions should be granted to the student for the time of allowed leave.

Typical Bereavement Leave is reserved for deaths within the student's immediate family, but students may petition for the right to implement the Bereavement Policy in the event that a death occurs outside their immediate family. Immediate family is defined as: Spouse, Grandmother, Grandfather, Mother, Father, Sister, Brother, Child, Stepmother, Stepfather, Stepsister, Stepbrother, or Stepchild. ITU reserves the right to request documentation, such as an obituary, verifying the death.

STUDENT INFORMATION CENTER

The Student Information Center is an essential part of the everyday functions of the University. Student Information Representatives strive to give students the best available information in a prompt, efficient and professional manner. Representatives greet students on campus, guide them through university processes, direct them to appropriate offices for assistance, view open tickets, manage inbound calls, and schedule student appointments for the International Student Office, Academic Advisors, and Outreach (on-campus or Skype).

Students can pick-up documents, Student ID cards, and VTA passes at the Reception Desk, located next to Accounting Services. Please check the ITU website for open hours, document pick-up procedures, and contact information.

ITU STUDENT ID CARD

All students are required to have an ITU Student Identification Card (Student ID) to access campus facilities, borrow equipment, check-out textbooks, receive attendance credit for ITU classes, and pick-up official documents such as diplomas, I-20, transcripts, refund checks, and VTA Eco Pass at the Information Center.

Students should carry their ID card at all times. The card is required for class attendance (check-in and check-out), and

used in conjunction with your VTA Eco Pass card to board the VTA bus and light rail.

Student identification cards are the property of ITU. Only the named cardholder has privilege use. Services rendered by the card are non-transferable to other individuals. All students are expected to abide by ITU's Student Code of Conduct. Students who lend their card to another for the sole purpose of accessing University facilities and/or circumventing the attendance system will be recommended for disciplinary sanctions outlined in Article IV of the Student Code of Conduct. The holder must present and surrender card upon request of any ITU staff member or designated authorities.

Students will receive their first ITU Student Identification Card free. Replacement fees apply.

ADA PROCEDURES

International Technological University is committed to providing a quality and accessible educational environment to all students. In accordance with Section 504 of the Rehabilitation Act, the American with Disabilities Act (ADA), the ADA Amended Acts (ADAA), and associated California laws and regulations, no qualified individual with a disability shall be excluded from participation in our university programs or activities based solely on their disability. Students seeking reasonable accommodations for documented conditions or disabilities, including: physical, psychological, medical, sensory or learning, or otherwise; may submit a request via the online student services ticketing system located on the support page on the ITU website at https://itu.edu/mkg/studentservices.

Students in need of accommodations due to a disability should contact the Office of Student Services for verification and determination of reasonable accommodations as soon as possible following admission to the University or in the weeks prior to the first day of classes for each Trimester.

To submit an accommodation request or for additional assistance or inquires, please submit a ticket at https://itu.edu/mkg/studentservices or email studentservices@itu.edu for additional information.

ACADEMIC INFORMATION

REGISTRATION

The registration period for each trimester begins six weeks prior to the first day of the trimester and concludes on Friday, one week prior to the first day of the trimester. A student is considered enrolled in the University if registered for a minimum of one credit bearing course. Students enroll in classes through the MyITU portal, which is accessible at my.itu.edu

LATE REGISTRATION

Late registration occurs during the week prior to the start of the trimester. A late registration fee of $50 is applied if the student has not registered for at least one credit bearing course during the registration period.

ADDING AND DROPPING COURSES

Students have an opportunity to adjust their course schedules without penalty as long as they do so during the Add/Drop period. The Add/Drop period begins with the first day of the respective trimester and concludes at 11:59 p.m. (PST) of the second Sunday following the first day of the trimester.

The university withdrawal period runs from the Monday following the end of the Add/Drop period through 11:59 p.m. (PST) of the Sunday that concludes the 9th week of the trimester. Dropping a course during the withdrawal period results in a grade of W (Withdrawn).

Dropping a course after the conclusion of the university withdrawal period will result in a grade of F (Fail) or NP (No Pass). Dropping a course after the last day of the class is not permissible.

Exception: Dropping a CFL course after the first day of instruction for that course section will result in a grade of W (Withdrawn). Dropping a CFL course after the second day of instruction for that course section will result in a grade of NP (No Pass).

Note: Refer to the Refund Policy under Financial Information for applicable dates and deadlines.

COURSE CANCELLATION

Courses with enrollment of less than 7 by the first day of the trimester, are subject to cancellation.

AUDITING COURSES

Auditing a course is an option that allows the student to sit in on the course without receiving academic credit or a grade. The student is not required to complete course assignments, though he or she may do so with the permission of the instructor. A grade of AUD (Audit) is assigned to the course and recorded on the academic record. Courses taken for Audit do not apply toward any academic degree, and do not count as part of a student's course-load. The tuition for an audited course is 50% of the tuition for a credit bearing course. Requests for auditing a course require approval of the instructor and must be made before the end of the Add/Drop period.

COURSE LOAD

The maximum course load for any graduate student in one trimester is nine (9) credit hours. Continuing students are eligible to register for a maximum of nine (9) credit hours during the registration period. Students wishing to register for the tenth (10th) through thirteenth (13th) credit hours must follow registration procedures, as prescribed by the Office of the University Registrar and administered by the Academic Advising department.

ONLINE COURSES

This policy applies, beginning Spring 2017, to all newly admitted degree seeking students. In addition, the cap referred to in the policy requires that current students may not register for additional online courses if by so doing they will reach the 50% limit.

Online Course Limit
Degree seeking ITU students may take online courses, subject to the requirements of their program and immigration status. Online course credit hours must constitute less than 50% of total credits counted toward degree completion. ITU's Master's programs typically consist of 36 credit hours or 12 courses. Therefore, no more than five 3 credit hour courses may be taken online, out of a total of 12 courses.

DECLARING OR CHANGING A CONCENTRATION (FOR MBA PROGRAM ONLY)

Concentrations may be declared, starting at the point of admissions. If a student does not declare a concentration during the admissions process, the student will be enrolled in the general degree program.

Students may add or change their concentration at any point before the completion of 19 credit hours. Any approved transfer credit will be counted towards the 19 credit hours. Requests to declare or change concentrations must be made by the first day of the trimester in which the student will attempt the 20th credit hour in order to be considered.

If a student has declared a concentration and does not complete the required concentration courses by graduation, the student will graduate with the general degree, with no concentration. Concentrations will only appear on the transcript, and not on the diploma.

CREDIT MEASUREMENTS

Academic credit hours are measured in terms of credit hours. This is a listing of how Academic credit hours are measured:

- » 1 credit hour = 1 trimester term hour
- » 1 trimester credit hour = 15 hours of classroom lectures/30 laboratory hours/45 practicum hours

The student must enroll in 9 credit hours to be considered as a full-time student.

GRADING SYSTEM

Grade	Interpretation
A+, A, A-	4.0, 4.0, 3.7 Excellent
B+, B, B-	3.3, 3.0, 2.7 Good
C+, C, C-	2.3, 2.0, 1.7 Fair
D+, D, D-	1.3, 1.0, 0.7 Failed. Credit hours will be included in computing GPA, but will not be used toward satisfaction of unit requirements for the degree.
F	0.0 Failed. Credit hours will be included in computing GPA, but will not be used toward satisfaction of unit requirements for the degree.
P	Pass. Equivalent to a C- or better; not included in computing GPA.
NP	No pass. Equivalent to below a C-; not included in computing GPA.
AUD	Audited the class. Credit hours will not be calculated in computing GPA.
I	Incomplete coursework due to circumstances beyond the student's control, but of passing quality; not included in computing GPA.
WIP	Work in Progress; final grade to be assigned upon completion of entire course. Credit hours not included in computing GPA.
W	Withdrawn. Credit hours not included in computing GPA.

Discontinued Grades, as of Fall 2015:
R – Replaced original grade when course was repeated.
EXL – Original grade replaced and excluded.
X – Students did not complete course or officially withdraw.
NR – No Record

Discontinued Grades will not be included in computing GPA.

GRADE POINT AVERAGE REQUIREMENT FOR GRADUATION
The following statement applies to the degree program requirements for each program in the 2016-2017 catalog.
A minimum 3.0 cumulative GPA is required for granting of the Master's and Doctoral degree

GRADE POINT AVERAGE (GPA)
GPA is calculated by dividing the total amount of grade points by the total amount of credit hours attempted.

Only courses in which a student has earned at least a grade of C- or P are counted towards the master's degree. All registered credit hours are counted as attempted credit hours, and all grades except P, NP, I, AUD, WIP, and W are used in GPA computation. All courses require letter grades, except those specifically designated otherwise.

GRADE CHANGES
Requests for grade changes must be made no later than 30 days after the first date of the trimester following the trimester in which the course was taken.
Grade change requests will only be considered if the student believes the assigned grade is incorrect due to a clerical, calculation, or other technical error.

Grade change requests that contest the instructor's judgment regarding the academic quality of the student's work or achievement will not be considered. Grade change requests that are based solely on the student's desire to have a better grade will not be considered. Grade change requests that include coursework submitted after the course has concluded will not be considered.

REPEATING COURSES
A course with an earned grade of B-, C+, C, C-, D+, D, D-, F, and NP may be repeated for a maximum of two (2) times. A withdrawn (W) course is not counted as a repeated course. Repeating a course is not allowed for courses where an Incomplete (I) grade has been assigned.
Earned course credit will be awarded only once. Grades assigned at each attempt are permanently recorded on the student's transcript and the term (trimester) GPA will not be modified. The highest grade earned will be used in the cumulative GPA calculation.

FINAL GRADES
Grades will be made available on the MyITU portal following submission by the instructor.

TRANSCRIPTS
A record of each student's academic work at ITU is retained permanently by the Office of the University Registrar. For more information on how to request an official transcript and applicable transcript fees, visit the ITU Office of the University Registrar webpage.

TIME LIMITS FOR DEGREE COMPLETION
All candidates for master's degrees must complete all the matriculation requirements within six calendar years after initial registration at ITU. See Doctoral program policy for doctoral degree completion time limits.

GRADUATION
Each candidate for a master's degree should submit the Petition to Graduate form along with a Preliminary Checklist signed by an Academic Advisor and deliver to the Office of the University Registrar prior to the start of their final trimester.

EXPERIENTIAL LEARNING
The university does not award credit for prior experiential learning.

TRANSFERABILITY OF CREDIT HOURS
The transferability of credit hours earned is at the sole discretion of the receiving institution.

CLASS SIZE LIMIT
Classes are limited to 48 students per weekday course, and 75 students per weekend course.

ACADEMIC POLICIES

ACADEMIC PROBATION AND EXPULSION POLICY

ITU exercises a "three strikes" policy when it comes to academic probation, suspension, and expulsion.

- **Strike 1** – Probation I
  A student whose GPA for any trimester is below 3.00 will be placed on academic probation the following trimester. A hold will be placed on the student's record and the student MUST meet with their academic advisor before they are allowed to register for the next trimester. A student on academic probation is not considered to be in "good standing" and has therefore lost the following privileges:
  - » Applying for on-campus jobs, including TA positions
  - » Receiving an ITU scholarship
  - » Running for student government

  A student on academic probation must earn a GPA above 3.00 the following trimester in order to return their academic status to "good standing."

- **Strike 2** – Probation II
  Earning a term GPA in any subsequent trimester that falls below 3.00 for a second time will result in Probation II. A hold will be placed on the student's record and the student MUST meet with their academic advisor before they are allowed to register for the next trimester. Probation II acts as a final warning before Expulsion.

- **Strike 3** – Expulsion
  If a student earns a GPA in any subsequent trimester that falls below 3.00 for a third time, the student will be expelled from the University. Once expelled, the student may not reapply for admission to the University for a period of one year.

ATTENDANCE AND PARTICIPATION POLICY

All on-campus courses are held at ITU, 2711 N. First Street, San Jose, CA 95134. Attendance is mandatory for all on-campus courses at ITU. The university requires all of its students to attend, fully participate, and be engaged in all of the courses in which they are enrolled each term.

CREDIT HOUR POLICY

Except as provided in Federal Regulation 34 CFR 668.8(k) and (l), a credit hour is an amount of work represented by intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates not less than:

1) One hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work

each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or

2) At least an equivalent amount of work as required in paragraph (1) of this definition for other academic activities as established by the institution, including laboratory work, internships, practice, studio work, and other academic work leading to the award of credit hours.

ITU has adopted the United States Department of Education requirements for "courses offered entirely online and without any required face-to-face class meetings."

FINAL EXAMINATIONS POLICY

All classes conducted at the ITU main campus have a mandatory in-class final examination or presentation.

SPECIAL TOPICS COURSES FOR MASTER'S PROGRAMS

Special topics courses cover subjects not currently contained in the curriculum, but are designed to address especially relevant trends or developments related to the discipline. While special topics courses may eventually become part of the curriculum, they are intended to be temporary in nature. Consequently, they cannot be required as a core or concentration course, but may be included as an elective for any program.

The specific topic of the course should be offered for one trimester only and will use 688 as the designated course number across all departments.

Note: EMG 580 Special Topics as listed in this catalog is now EMG 688 Special Topics.

INCOMPLETE GRADE POLICY

Incomplete grade is student initiated.

An Incomplete "I" is a temporary grade which may be given at the instructor's discretion to a student when illness, unanticipated extraordinary circumstances, or other reasons clearly beyond the control of the student prevent completion of course requirements by the end of the term. Incomplete grades may be given only in the following circumstances:

1) The student's work to date is passing;

2) Attendance has been satisfactory through at least 50% of the term; an illness or other extenuating circumstance legitimately prevents completion of required work by the due date;

3) Required work may be reasonably completed in time frame agreed upon by the instructor and the student;

4) The incomplete is not given as a substitute for a failing grade;

5) The incomplete is not based solely on a student's failure to complete work or as a means of raising his or her grade by doing additional work after the grade report time frame;

6) The student initiates the request for the incomplete grade before the last day of the class,

7) The instructor and the student submit a Petition for Incomplete Grade form before the last day of the class

8) In other circumstances, the appropriate grade must be assigned. A failing grade and last date of attendance should be recorded for students who cease attending class without authorization. Students who are unable to complete a course and who do not meet these circumstances should consider dropping course.

9) The following provisions for Incomplete grades apply:

10) It is in the student's best interest that incomplete grades are made up by the end of the following academic term. Incomplete grades must be made up and final grades submitted no later than the last day of the subsequent term.

11) An Incomplete grade may not be considered passing for purposes of determining academic standing.

12) An Incomplete grade may not be considered for a student in their last term of attendance.

13) Students who have an incomplete grade and who do not submit complete outstanding coursework by the end of the subsequent academic term, will not be eligible for to apply for a part-time or full-time internship, regardless of their cumulative GPA.

14) The Incomplete grade counts toward the student's attempted credit hours, but is ignored in the calculation of the student's GPA.

15) The Incomplete grade is expunged from the academic record and the final permanent letter grade is recorded when the final grade is submitted via a Grade Change form.

16) The Incomplete grade is converted to a F, Failing grade if the student does not submit coursework according to the agreed deadline documented on the Petition for Incomplete form.

17) The Incomplete grade does not apply to courses such as Capstone, Independent Study, Thesis, Internship, CFL, etc.

INDEPENDENT STUDY POLICY

Purpose
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty. Students are limited to 3.0 credit hours of Independent Study toward their Master's program and 6.0 credit hours towards their Doctoral program and may not take more than one Independent Study in a single trimester.

Eligibility
Independent Study is available to students who have completed a minimum of 9.0 credit hours and with a minimum cumulative 3.0 GPA. It must be taken within the student's degree program.

Course
The Independent Study course is offered as variable credit within each degree program and area of study. It carries a maximum of 3 credit hours for students enrolled in a Master's program and 6 credit hours for students enrolled in a Doctoral program per trimester. The course number 689 is used across all departments for Master's and 891 for Doctoral and uses the appropriate area of study subject code.

Grading
Independent Study is graded based on the standard ITU letter grade scale (not P/NP).

Contracts
For all Independent Study programs an Independent Study Contract Request Form must be completed and approved by the supervising faculty and the Department Chair. The approved contract is submitted to the Office of the University Registrar for processing. The student's contract must:

• Present an outline of proposed study, which indicates an amount of work equivalent to the lecture and study 147 time devoted to a standard course. This equates to a minimum of 15 hours per 1 trimester credit hour. The proposal must describe the educational value for the student's total program of study, the specific objectives, and the justification for enrolling in Independent Study.

• Provide a schedule for meeting with the instructor, for completing assignments/progress reports, for the submission of the final paper or project, and for the criteria used to assign a grade (including specific values if the grade will be based on more than the final paper or project). A minimum of weekly conferences with the supervising instructor is expected, normally on campus. Other arrangements may be made, provided the work may be appropriately supervised.

• Show preparation and competence to do independent work and to address the proposed topic.

LEAVE OF ABSENCE POLICIES

1) **One-Trimester Stop-out**

   With certain restrictions and exceptions, matriculated students may stop-out from ITU for one trimester in a calendar year and maintain his or her continuing student status. Continuing status includes the maintenance of catalog year for graduation and priority registration privilege. Students who do not

continue their studies after a one-trimester absence will be withdrawn from ITU. This section only applies to students in good academic standing. This section does not apply to newly admitted students who have not earned any credit hours at ITU. This section does not apply to F-1 International Students who were issued Forms I-20 by ITU.

2) **Personal Leave of Absence**
ITU recognizes that a student might find it necessary to interrupt his or her progress toward a degree for various reasons such as medical, family, or other personal causes. To obtain an authorized break from ITU, a personal leave of absence application must be filed with and approved by the Office of the University Registrar. Applicants must indicate in which trimester he or she will continue. The deadline to file the application is the first day of the trimester in which a student would like to begin the personal leave. Upon return from the approved personal leave, the students will retain his or her continuing status, which includes the maintenance of catalog year for graduation and priority registration privilege. However, if the personal leave of absence lasts for more than three (3) trimesters, the students' catalog year will be automatically changed to the academic year to which the students return. Failure to resume studies in the trimester indicated in the application will result in being withdrawn by ITU. The Office of the University Registrar does not extend an approved personal leave of absence. A new personal leave of absence application is required if a student seeks to return in a later trimester. This section only applies to students in good academic standing. Students are advised that they should pay attention to the time limit allowed to complete their degrees.

3) **Restrictions on F-1 International Students**
Students on F-1 visas should seek advice from their International Student Advisors before filing for a personal leave of absence. The U.S. Federal Immigration Law and Regulation supersede the foregoing policy if any inconsistency arises. The final approval decision is at the discretion of the ITU International Student Office.

Current degree-seeking ITU students are not eligible to register as Open Campus students.

OPEN CAMPUS POLICY

An Open Campus student is a non-degree seeking student who is enrolled in courses for a particular trimester, but not yet admitted into any degree program. Such a student may enroll in any master's level (numbered 500-699) course in any discipline at ITU, except for internship, CFL, capstone, independent study or thesis courses. An Open Campus student may not enroll in a doctoral level course without special approval from the relevant Department Chair.

There is a 9 credit hour maximum per trimester. If a student decides to apply to an ITU Master's program that student may only apply to transfer a maximum of nine (9) credit hours earned under Open Campus towards a degree program.

Open Campus students must adhere to any and all university policies and the Student Code of Conduct. Open Campus students are subject to the same tuition and fees, as well as refund schedule, as all other students, with the exception of the health insurance premium. Access to university facilities, services, and resources will be available. However, an Open Campus student cannot hold a leadership role in a student organization at ITU.

Current degree-seeking ITU students are not eligible to register as Open Campus students.

INTERNSHIP POLICY
PURPOSE

Hands-on experience and skill development is a key component of ITU's pedagogy. We recognize how important internships are in transferring course theory, concepts, and skills from a graduate program to a career in the student's field of study. For this reason, we are committed to linking the classroom with relevant industry experience. As affirmed by the university's Academic Quality Committee (AQC), ITU requires students to participate in an internship (one credit hour for part-time, three credit hours for full-time, up to a maximum of 10 credit hours per degree) from the first trimester as a core part of the curriculum for all of ITU's master degree programs.

ITU is proud to offer a strong internship program that is required for all students in graduate degree programs.

Internships are managed through enrollment in INT 593, a course that may be taken for a maximum of ten credit hours over the course of an academic program. ITU reviews each internship request on an individual basis to ensure that it is consistent with the student's coursework and academic policies. For ITU students in F-1 international student status, the internship request must also meet the standards found in the U.S. Code of Federal Regulations – 8 CFR § 214.2(f)(10)(i).

ITU's internship eligibility requirements, academic components and expectations, procedures and due dates, and conditions are presented below.

Eligibility Requirements
The following requirements apply to all students who wish to participate in ITU's internship program:

- Admission/Enrollment – Students must be admitted to one of ITU's graduate programs and enrolled in a full course load of nine credit hours per trimester. (Note: See exception below for Annual Vacation or Last Term of Study).
- INT 593 series enrollment – Students must enroll in INT 593 in order to have an internship. This course may be part of the student's 9 credit hour full time course load. Internships will not be approved as any other course at ITU, including independent study

or special study courses. To continue an existing internship, students must enroll in INT 593 and follow the procedures listed here for each new trimester.

- Tuition/Fees – Students will not be allowed to apply for or begin an internship until all past and current tuition and fees have been paid in full.

- GPA – Students must maintain a minimum cumulative GPA of 3.0 and passing grades in INT 593.

- Internship relevance – Students must show that the requested internship is relevant to their field of study and that the internship provider has extended a formal offer that is consistent with the procedure below.

- Internship providers – Students may not have more than one internship provider at a time.

ACADEMIC COMPONENTS AND EXPECTATIONS

All internships at ITU require enrollment in INT 593. This academic class is taken for one credit hour with part-time internships (up to 20 hours per week) or three credit hours with full-time internships (21 to 40 hours per week). In order to earn a passing grade, students must directly submit assignments listed below to their faculty member, and include: clear identification of their name, university ID number, the graduate program, the internship title, the internship provider's name, and the internship supervisor's name. Assignments may include:

- Description of internship – A presentation of the unique duties and responsibilities the student will perform during the internship. (Note: The internship cannot be a substitution for a paid staff position or a vacant position at the internship provider's organization).

- Mid-term internship report – An initial report by the student on his/her performance and progress in the internship, as well as specific information about the skills and knowledge being acquired relevant to the student's field of study. (Note: Such reports must first be cleared by the internship provider to observe appropriate confidentiality and intellectual property constraints).

- Final internship report – A comprehensive report on topics covered in the mid-term report and supplemented by the student's evaluation of relevance of the internship to the student's academic program, career goals, and potential areas for future study and research beyond the internship.

- Final evaluation form – Submitted directly to the faculty member by the internship provider during the last two weeks of the trimester with the signatures of the internship supervisor and an HR representative of the organization providing the internship.

CONDITIONS FOR ALL STUDENTS

To ensure compliance with ITU's policies, the following conditions apply to all students attending ITU:

- First trimester internships – Internships for the first trimester of study with ITU will be limited to a part-time internship. An exception will be allowed for students who can demonstrate a prior successful internship or training experience related to a degree they earned in the U.S. Evidence of such an experience may include an academic transcript showing a passing grade in an internship course, a report from the institution's internship program showing satisfactory performance, and/or a letter of recommendation from an employer or other evidence that the student was authorized to work for during a period of Optional Practical Training.

- Integrating Academic & Internship Learning (CFL 591) – Students must enroll in the Integrating Academic & Internship Learning (CFL 591) course before beginning their first internship. However, students who apply and are approved for internship their first trimester may take CFL 591 concurrently during that same first trimester.

- Continuous enrollment/attendance – If a student drops below full-time enrollment (Note: See exception below for Annual Vacation) or the internship provider otherwise ends the agreement, the student will not be permitted to continue with the internship.

- Start/End dates – As mentioned above, internships are approved only in conjunction with enrollment in INT 593. For this reason, internships cannot begin sooner than the trimester start date and must end by the trimester end date. No part of the internship may take place during break periods between trimesters.

- Grade Point Average (GPA) requirements – Students must maintain a minimum 3.0 cumulative GPA in their program at ITU to remain eligible for a full time internship. Once official grades have been posted for the prior trimester, any student who holds a cumulative GPA below 2.0 will lose all internship eligibility (i.e., both full-time and part-time), including eligibility for the trimester in progress.

If a student maintains a cumulative GPA below a 3.0, but earns a trimester GPA of 3.0 or higher for the most recent trimester, the student will remain eligible to request a part-time internship for one additional trimester. This applies continuously for each trimester that the student displays progress in improving their GPA by earning a trimester GPA of 3.0 or higher.

A student who has a cumulative GPA between 2.0 and 3.0 will be limited to a part-time internship for one trimester. If the student's cumulative GPA rises to a 3.0 or higher following the posting of grades for that trimester, the student will be eligible to request a full-time internship within posted deadlines.

If that student's term GPA for the most recent trimester is 3.0 or higher but the cumulative GPA remains below 3.0, the student will remain eligible for a part-time internship. If that student's term GPA for the most recent trimester is below 3.0, the student will lose all internship eligibility, including for the trimester in progress.

Note: coursework taken at another institution will not be considered in determining eligibility for an internship in an ITU program.

- Academic performance requirements (INT 593) – A student who receives a grade of "NP" (no pass) in INT 593 will be reduced to part-time internship. If a second grade of "NP" (no pass) is received in INT 593, the internship will be cancelled and the student will be ineligible for future internships at ITU.

- Academic performance requirements (CFL 591) – A student must pass CFL 591 by the end of the trimester in which they complete their first internship or that student will lose all internship eligibility for the next term. Internship eligibility will be restored only if a passing grade has been earned in CFL 591 by the end of the following trimester.

- Maximum internship credit hours – Students are limited to ten total credit hours for INT 593. For each part-time internship (up to 20 hours per week), one credit of INT 593 will be used. For each full-time internship (21 to 40 hours per week), three credits of INT 593 will be used. This limit applies to both new and continuing students. A change in programs or interruption of studies will not reset this limit.

- Change of internship provider – ITU recognizes that unforeseen circumstances may require the change of an internship provider. To allow completion of INT 593, students will be allowed to change their internship provider once per trimester. However, after a second internship request has been submitted in the same trimester, no further changes will be permitted.

A student may not request a change of internship authorization level (i.e. part-time to full-time/full-time to part-time) during the trimester in progress unless the request is the result of an adjustment of eligibility based on GPA and is submitted completely on or before the add/drop deadline.

Students may not change an internship provider after Friday (6:00pm) of the eighth week of the trimester. If an internship ends after the eighth week, the grade in INT 593 will be based on performance up to that point.

ADDITIONAL CONDITIONS FOR STUDENTS ATTENDING ITU ON AN F-1 STUDENT VISA

To ensure compliance with ITU's policies and federal regulations, the following conditions apply to all students attending ITU in F-1 student status:

- Maintaining visa status – If a student violates his/her status, the student's I-20 will be terminated, which will also immediately end the student's internship.

- Eligibility for post-graduate work authorization under Optional Practical Training (OPT) – An F-1 student who receives 12 or more months of full-time CPT is ineligible for post-graduate work authorization under Optional Practical Training (OPT). This includes any full-time CPT a student took at the same degree level

at another school before transferring to ITU. However, part-time CPT is not counted towards this total and should not affect the student's eligibility for post-graduate OPT.

- Annual Vacation – F-1 students are allowed one vacation term, also known as a "annual vacation", after completing a full academic year of study: three consecutive trimesters of full-time enrollment. If a student wishes to take a vacation term after this point, they may reduce their enrollment to part-time (Under 9 credit hours) or take no classes during that trimester. However, if the student wishes to begin or renew an internship during that trimester, they must enroll in INT 593.

- Last Term of Study – An F-1 student who is completing a degree program in the same trimester that an internship is requested is only required to take the number of classes needed to complete the degree. However, these classes must be on-campus, as required by F-1 student visa regulations. F-1 students can submit a request for reduced course load – last trimester.

- Exception for ITU student employees – Students employed by ITU in a position relevant to their academic program do not require an internship/CPT, as they will gain experience in that role. These students will instead take another academic class to maintain full-time enrollment. However, F-1 students who seek to work on-campus more than the 20-hours per week during the trimester must request a full-time internship, enroll in INT 593 for three credit hours, and obtain CPT authorization as required by their visa status.

- Volunteering, observation, and unpaid work – ITU will not allow an F-1 student to engage in volunteer or unpaid work for an internship provider outside of INT 593. Also, such action by a student before or after approved internship dates may result in an immediate loss of the internship and CPT authorization, as well as eligibility for any future internship at ITU. Such action might also be treated as a violation of the student's F-1 visa status, resulting in termination in SEVIS for "unlawful employment".

DOCTORAL PROGRAM POLICY
ADMISSIONS REQUIREMENTS

- Application Requirements: Doctoral applicants must submit their completed application normally 4 months prior to the start of a trimester

- Resume: Four page maximum

- Statement of purpose: A statement of purpose of approximately 1,000 words is required. This statement should address the reasons for seeking the Doctoral degree and how the doctorate will advance personal and career goals. Doctoral programs require a minimum of three years prior to completion. Maximum time for completion is eight years, during which the candidate works under a supervisor, who is also a

member of the panel before which the candidate will defend his or her dissertation.

- Admissions are highly competitive. Applicants are expected to have a cumulative grade point average (GPA) of 3.5 or higher in a relevant, regionally accredited Master's program.
- Official transcripts of all undergraduate and graduate education
- GRE or GMAT score: Applicants are required to take the GRE examination (within 5 years prior to application to the program) and have the test score results sent directly to the university.
- Three academic or professional letters of recommendation attesting to the ability of the applicant to succeed in a Doctoral program are required.
- TOEFL 80 or IELTS 6.5 is required for students from non- English speaking countries.

PROGRAM REQUIREMENTS:

- 60 credit hours beyond Master's degree including
- 30 credit hours of coursework and independent study (42 credit hours for DBA)
- 30 credit hours of dissertation (18 credit hours for DBA)
- Maximum 15 credit hours with grade of B or above may be transferred from Master's or Doctoral level courses of a regionally accredited university, with approval of department chair.
- Passing a qualification exam consisting of written and oral parts is required for advancement to candidacy
- Passing a comprehensive oral examination regarding the dissertation proposal is required as evidence of sufficient preparation for advanced research
- Passing a comprehensive oral defense examination of the Doctoral dissertation
- One or more refereed articles of original work based on the dissertation research should be submitted for publication in an appropriate peer-reviewed journal, approved by the DC.

PROGRAM COMPLETION

Dissertation Advisor

It is the student's responsibility to obtain consent from a faculty member in the student's major department to serve as his/her prospective dissertation advisor as soon as the student is accepted as a Doctoral student. The department chair must approve the advisor and inform the chair of DPC and the University Registrar of the approval. A Doctoral student and his/her dissertation advisor jointly develop a study plan for courses and research in a particular area, and submit it to the chair of the department for approval.

Study Program and Course Work

The student is expected to complete a minimum of 60 credit hours of graduate credit beyond the master's degree. Of these, 30 credit hours (42 credit hours for DBA) may be

earned through coursework or approved independent study, and 30 (18 credit hours for DBA) through the dissertation. All dissertation units are graded on a Pass/No Pass basis.

Qualification Examination

The qualification exam must be taken within three years from the time of admission for full-time students and within four years for part-time students. The qualification exam can be retaken once only. Exam grading will be on a P/NP basis, unless the specific program institutes an alternate form of grading. The qualification examination is in written format only. Students must select three fields, subject to approval, and each field will cover at least three courses.

Admission to Candidacy

A student who passes the qualification examination is considered advanced to candidacy. A Doctoral candidate should promptly request the dissertation advisor to form a Doctoral committee. A Doctoral candidate is required to be registered for the dissertation research course each term until completion of the degree. Failure to so register will result in the requirement that a student apply for reinstatement.

Doctoral Committee (DC)

Upon the student's request, the dissertation advisor will form a DC. The DC will consist of a minimum of three and a maximum of five members, including the dissertation advisor, the department chair and either another member from the relevant department or a qualified expert from outside the University. The dissertation advisor will serve as the chair of DC. The DC will review the proposed dissertation topic, determine any further changes, and approve the research objective.

Comprehensive Oral Examination

After completion of the preparation of the dissertation topic, a Doctoral candidate shall request a comprehensive oral examination. The examination shall make evident sufficient preparation in depth and breadth for advanced research in the proposed dissertation topic. The comprehensive examination should be completed within one year after passing the written qualification examination. A comprehensive examination may be repeated only once, in whole or in part, within six months, at the discretion of the dissertation advisor.

Dissertation Research

The period following the comprehensive examination is devoted to research for the dissertation, although such research may begin before the comprehensive examination is completed. After the DC approves the research topic, the Doctoral candidate shall conduct the dissertation research toward the defined objective.

Publication

One or more refereed articles of original work based on the dissertation research should be submitted for publication in an appropriate peer-reviewed journal, approved by the DC.

Teaching Requirement

The Doctoral Candidate is expected to teach at least one

course in order to demonstrate teaching ability. The teaching assignment should be completed prior to the dissertation defense.

Dissertation Defense
The dissertation must be made available to all members of the Doctoral Program Council one-month prior to the defense. The oral defense shall include a presentation of the dissertation results. The dissertation defense is open to the public, but only members of the DC are entitled to vote. A unanimous vote is required for a successful defense.

Program Completion
At least one month before the degree is to be conferred, the candidate must submit two copies of the final version of the dissertation to the DPC, describing the research in its entirety. The dissertation will not be considered as accepted until approved by the DC and presented for publication in the appropriate academic archival repository. The University reserves the right to evaluate the undertakings and the accomplishments of the degree candidate in total, and award or withhold the degree as a result of its deliberations.

Time Limit for Completing Doctoral Degrees
All requirements for the Doctoral degree must be completed within eight years following acceptance into the Doctoral program.

Exceptional Consideration
Any instance not covered by the above policy will be considered as an exception. Exceptions will be presented to the DPC by the relevant department chair for review. Only the DPC can make decisions regarding exceptions.

Terminal Master's Degree
Students who are not able to complete the dissertation after completing the required number of credit hours of coursework will receive a terminal Master's degree, if 30 credits of PhD (or 42 credits of DBA) have been successfully completed.

INTERNATIONAL STUDENT POLICIES

STARTING A RELATIONSHIP WITH THE INTERNATIONAL STUDENT OFFICE

All international students new to ITU must check in with the International Student Office when they arrive in the country or before they start classes. Checking in allows the International Student Office staff to make sure that the student has all of the necessary documents to start the trimester in status. Check-in for new international students normally occurs at new student orientation. Students with unforeseen circumstances, who cannot attend orientation should contact the International Student Office through ITU's ticket system, explain their situation, and arrange a time to check in during make up orientation sessions.

Students who do not check in with the International Student Office may have their SEVIS record cancelled or terminated if ISO staff cannot confirm that they are attending classes at ITU.

MAINTAINING F-1 STUDENT VISA STATUS

Maintaining legal status is an active, on-going process. Students need to contact the International Student Office about personal and academic situations that might affect their status.

To remain in legal F-1 visa status, the student should follow these four steps:

1) Check in with the International Student Office.

2) Keep your passport and immigration documents valid:

- I-20 must be valid at all times: Any changes to name, program or degree level must be reported to ISO so that an I-20 can be issued to reflect these changes.
- If a student needs additional time to complete his/her program, extensions of the I-20 program end date (on page 1) should be requested 30 days before the program end date listed in the program study section on page 1 of the I-20.
- I-94 should show class of Admissions as "F-1" and admit until "D/S" or "Duration of Status".
- Passport must be valid six months into the future at all times.

  Please note: A student otherwise maintaining lawful F-1 status is not at risk if s/he has an expired F-1 visa, as a valid F-1 visa stamp is needed for the sole purpose of entering the U.S. from abroad.

3) Maintain full-time enrollment. 9 credit hours for Master's students at ITU (unless formally approved by the International Student Office and the Office of the University Registrar).

4) Report an address change by filling out the Change of Address form, within 10 days of moving.

MAINTAINING PERSONAL IMMIGRATION AND STUDENT RECORDS

Students should keep copies of all immigration and student-related documents until they no longer have any plans to reside, work, or study in the United States.

Here is a suggested list of documents:

- current passport
- the admissions letter and any documents showing a change of concentration, major, or program
- diploma for each completed degree
- any U.S. visas
- any I-20 or DS-2019
- the most recent I-94
- any I-797
- a sealed, official transcript for each school attended
- receipt(s) showing payment of the I-901 SEVIS fee
- documents related to any internship courses, such as offer letters, internship cooperative agreements, and internship class assignments
- records of all U.S. addresses with documents proving address of residence

COURSE LOAD INFORMATION FOR INTERNATIONAL STUDENTS

F-1 students must be registered for a full course load (9 credit hours) each trimester. There are two exceptions to this rule: being on an Annual Vacation or Reduced Course Load. Forms for these exceptions can be found here:https://itu.edu/student-resources/forms/

Reduced Course Loads: Students may apply to the ISO for a reduced course load for certain academic difficulties, medical issues, or if they need less than a full course load to complete their final trimester.   Students who are approved for a Reduced Course Load remain responsible for tuition, fees, and grading policies related to classes that began before the student submitted their request and should contact the Office of the University Registrar on these matters.

Annual Vacation: A student is eligible to submit a Request for Annual Vacation after they have completed three consecutive trimesters with a full course load at ITU.

If F-1 students fail to enroll in a full course load without an approved reduced course load or trimester break, their SEVIS record may be terminated or cancelled.

ONLINE COURSE POLICY FOR F-1 STUDENTS

F-1 students mayonly take one online course (3 credits hours) toward their minimum number of credit hours for full-time enrollment during the trimester. This policy also applies to students with other nonimmigrant visa status who are in the process of changing their visa to F-1. See Federal Regulation 8 C.F.R. § 214.2(f)(6)(i)(G)

STUDENT RESPONSIBILITIES

STUDENT CODE OF CONDUCT

All students are expected to abide by ITU's **Student Code of Conduct**, as follows:

ARTICLE I: TERMINOLOGY

1) The term "University" means ITU University.

2) The term "student" includes all persons taking courses, receiving services from University, and pursuing graduate studies at University.

3) The term "faculty member" means any person hired by or contracted with the University to conduct instructional activities.

4) The term "ITU staff" means any person employed by the University, with the exception of student employees.

5) The term "member of the ITU community" includes students, faculty members or ITU staff, and or any other individual associated with the University. The Chief Student Affairs Administrator or designs shall determine a person's status in a particular situation.

6) The term "ITU Premises" includes all land, building, facilities and other property in the possession of or owned, used, or controlled by the University (including parking lots, adjacent streets and sidewalks)

7) The term "judicial body" means any person or persons authorized by the Chief Student Affairs Administrator or designee to determine whether a student has violated the Student Code of Conduct and to recommend imposition of sanctions.

8) The term "judicial Advisor" means an ITU official authorized on a case-by-case basis by the Chief Student Affairs Administrator or designee to impose sanctions upon students found to have violated the Student Code of Conduct. The Chief Student Affairs Administrator or designee may authorize a judicial advisor to serve simultaneously as a judicial advisor, and as the sole member or one of the members of the judicial body. Nothing shall prevent the Chief Student Affairs Administrator or designee from authorizing the same judicial advisor to impose sanctions in all cases.

9) The term "shall" is used in the imperative sense.

10) The term "may" is used in the permissive sense.

11) The "Chief Student Affairs Administrator or designee" is the person designated by the CEO of ITU University to be responsible for administration of the Student Code of Conduct.

12) The term "policy" is defined as the written regulations of the University.

13) The term "organization" means any number of persons who have complied with the formal requirements for University recognition / registration.

ARTICLE II: JUDICIAL AUTHORITY

1) The judicial advisor shall determine the composition of judicial bodies and determine which judicial body shall be authorized to hear each case.

2) The judicial advisor shall develop procedures for administration of the judicial program and for the conduct of hearings, which are not inconsistent with provisions of the Student Code of Conduct.

3) Decisions made by a judicial body and / or judicial advisor shall be final. Pending the normal appeal process. (Unless otherwise is stated).

ARTICLE III: PROSCRIBED CONDUCT
Jurisdiction of the University

The Code Of Conduct applies to student behavior that affects the ITU community, irrespective of where that conduct may occur. Discipline may extend to off-campus activities and locations, when they adversely affect the ITU community and/or pursuit of its objectives.

Conduct – Rules and Regulations

Any student found to have committed the following misconduct may be subject to disciplinary sanctions outlined in Article IV.

1) Acts of dishonesty, including but not limited to the following:

   A) Furnishing false information to any University official, faculty member or office.

   B) Forgery, alteration or misuse of any University document, record or instrument of identification.

   C) Computer piracy, including duplication of computer software, copyright infringement and unauthorized computer entry.

2) Disruption or obstruction of teaching, research, administration, disciplinary proceedings and other University activities, including its public service functions on or off campus, or other authorized non-University activities, when the act occurs on ITU premises.

3) Physical abuse, verbal abuse, threats, intimidation, and harassment including, but not limited to, sexual harassment, coercion and/or other conduct that threatens or endangers the health or safety of any person, either on ITU premises or at any University-sponsored activity.

4) Attempted or actual theft of and/or damage to property of the University or property of a member of the ITU community or other personal or public property.

5) ITU specifically prohibits any organization, chartered or otherwise, officially or in fact, from participating in the activity of "hazing".

6) Gambling on ITU premises, at University functions or through the use of University equipment.

7) Failure to comply with directions of University officials or law enforcement officers acting in performance of their duties and/or failure to identify oneself to these persons when requested to do so.

8) Unauthorized possession, duplication or use of keys to any part of ITU premises, or unauthorized entry to or use of ITU premises.

9) Violation of federal, state or local law on ITU premises or at University-sponsored or University-supervised activities, or other violation of federal, state or local law which has an adverse effect on the ITU community.

10) Violation of published University policies, rules or regulations.

11) Use, possession or distribution of narcotic or other controlled substances, except as expressly permitted by law, or being under the influence of such substances.

12) Illegal or unauthorized possession of firearms, explosives, other weapons or dangerous chemicals on ITU premises or at any University-sponsored activity.

13) Participating in a campus demonstration that disrupts normal operation of the University.

14) Conduct that is disorderly, lewd or indecent; breach of peace; or aiding, abetting or procuring another person to breach the peace on ITU premises or at functions sponsored by the University.

15) Theft or other abuse of computer time, including but not limited to:

   A) Unauthorized entry into a file, to use, read or change contents, or for any other purpose.

   B) Unauthorized transfer of a file.

   C) Unauthorized use of another individual's identification and password.

16) Abuse of the judicial or disciplinary system, including, but not limited to:

   A) Failure to appear before a judicial body or University official.

   B) Falsification, distortion or misrepresentation of information before a judicial body.

   C) Disruption or interference with orderly conduct of a judicial proceeding.

   D) Attempting to influence the impartially of a member of a judicial body prior to, and/or during the course of the judicial proceeding.

   E) Harassment (verbal or physical) and/or intimidation of a member of a judicial body prior to, during and/or after a judicial proceeding.

F) Failure to comply with sanction(s) imposed under the Student Code of Conduct.

ARTICLE IV: JUDICIAL POLICIES
Charges and Hearings

7) Any member of the ITU community may file charges against any student for misconduct. Charges shall be prepared in writing and submitted as soon as possible after the event takes place.

8) The judicial advisor may conduct an investigation to determine if charges have merit and/or if they can be resolved by mutual consent of parties involved on a basis acceptable to the judicial advisor (such as mediation). Such disposition shall be final, and there shall be no subsequent proceedings.

9) All charges shall be presented to the accused students in written form. Chief Student Affairs Administrator or designee shall decide on how they want to follow up with the case. This could go up to an actual hearing.

10) It is up to the Chief Student Affairs Administrator or designee to decide on everything related to the charges brought up against the accused student.

Sanctions

There shall be two major classifications of sanctions that may be imposed for violations of this procedure: Academic and Administrative. Academic sanctions will be defined as those actions related to the course work and grades which are the province of the instructor. Administrative sanctions are concerned with a student's status on campus. The imposition of one variety of sanction will not preclude the additional imposition of the other.

1) The sanctions listed below may be imposed upon any student found to have violated the Student Code of Conduct.

   A) **Warning** – A verbal or written notice to the student that the student is in violation of or has violated University regulations.

   B) **Probation** – A written reprimand for violation of specific regulations. Probation is for a designated period of time and includes the probability of more sever disciplinary sanctions if the student is found to be violating any University regulation(s) during the probationary period.

   C) **Fines** – Fines may be imposed, as determined or approved by the university.

   D) **Restitution** – Compensation for loss, damage or injury. This may take the form of appropriate service and/or monetary or material replacement.

   E) **Discretionary Sanctions** – Work assignments, service to the University or other related discretionary assignments.

F) **Suspension** – Separation of the student from the University for a definite period of time, after which the student is eligible to return. Conditions for readmission may be specified.

G) **Expulsion** – Permanent separation of the student from the University.

2) More than one sanction listed above may be imposed for a single violation.

3) Other than University suspension and University Expulsion, disciplinary sanctions shall not be made part of the student's permanent academic record, but shall become part of the student's disciplinary record.

Academic Sanctions

Faculty members are responsible for determining the type of academic sanction and reporting the incident. Usually a form of "grade modification" will be employed. Before sanctions can be employed, the faculty member must have verified the instances of academic dishonesty by personal observation and/or documentation. In all cases the violation should be reported to The Chief Student Affairs Administrator. Sanctions that may be imposed by the faculty member include but are not limited to those listed below.

A student may be:

1) Reprimanded orally.

2) Lowered grade on assignment, exam, paper, or project involved.

3) Failed in the evaluation instrument (assignment, exam, paper, or project).

4) Reduced in course grade, including possible failure of the course. NOTE: A grade of "F" earned in the course as a result of sanctions for academic dishonesty is final and shall be placed on the transcript.

5) Referred for administrative sanctions. A faculty member may choose to refer a student to The Chief Student Affairs Administrator for disciplinary action in addition to the academic action the faculty member has taken or in lieu of any academic sanction.

6) If the incident happened around final time, then the result is an immediate 'F" in the course followed by other Administrative Sanctions, including NP in other courses taken in the same Trimester, up to expulsion.

Administrative Sanctions

Cheating or plagiarism in connection with an academic program at a campus may warrant expulsion, suspension, probation, or a lesser sanction. Administrative action involving academic dishonesty at ITU is the responsibility of the Chief Student Affairs Administrator according to the Standards of Student Code of Conduct.
The Chief Student Affairs Administrator will respond to:

1) Referrals from the faculty;

2) Flagrant violations of academic standards; and

3) Repeat violations as brought to attention by the faculty or through the centralized reports filed with the Chief Student Affairs Administrator. Repeat violators of the academic dishonesty procedure will face the following sanctions:

A) Students found to have violated the academic dishonesty procedure in two separate incidents may be placed on academic probation, and potentially suspended or expelled from the University;

B) The University will initiate expulsion proceedings for students found to have violated the academic dishonesty procedure in three or more separate incidents. Faculty members will be notified by the Chief Student Affairs Administrator when action has been taken.

Interim Suspension

In certain circumstance, the Chief Student Affairs Administrator, or a designee, may impose an immediate University suspension.

1) Interim suspension may be imposed:

A) To ensure the safety and well-being of member of the ITU community or preservation of University property;

B) To ensure the student's own physical or emotional safety and well-being; or

C) To ensure safety of others if the student poses a definite threat of disruption of or interference with the normal operation of the university, all at the discretion of the Chief Student Affairs Advisor or designee.

2) During the interim suspension, student shall be denied access to ITU premises and/or all other University activities or privileges for which the student might otherwise be eligible, as the Chief Student Affairs Administrator or designee may determine to be appropriate.

Appeals

The accused student may appeal a sanction imposed. The request must be in writing and submitted within the timeframe outlined in the sanction notice. The Chief Student Affairs Administrator or designee may decide to uphold an appeal. Based on the nature of the case, s/he may decide to deny the appeal process.

ACADEMIC GRIEVANCE PROCEDURES

Generally, a grievance is a way for students to raise and seek redress for what they believe to be unfair, improper

or discriminatory decisions, actions, or treatment. This can include claims based on actions, policies, or behaviors that are believed to be unauthorized or unjustified or that adversely affect the status, rights, or privileges of a student. A Non-Academic Grievance is more specifically one that is fundamentally separate and apart from issues specific to a student's research, studies, coursework, testing, results or product. A Non-Academic Grievance can include actions or omissions alleged to be based on race, color, religion, gender, gender identity, sexual orientation, national or ethnic origin, age or disability, or any other characteristic protected by applicable state and/or federal law.

Time Guidelines

The timeframes set forth herein are guidelines. They may be extended by the Director or President, as applicable, in his or her discretion for good cause.

Advisers

A student initiating or participating in a grievance under this procedure may be accompanied by an adviser in any discussion with the Director, the President or their designees, or a grievance or grievance appeal officer under this procedure; any advisor must be a current ITU faculty, staff member or student.

No Retaliation Policy

ITU prohibits retaliation or reprisals against individuals based on their pursuit in good faith of a grievance under this procedure, or their participation in good faith in the grievance process.

STUDENT NON-ACADEMIC GRIEVANCE POLICY

The purpose of this Student Non-Academic Grievance Policy and Procedure is to set forth the process for students to seek a resolution of an issue, complaint, dispute or conflict ("Issue") that is not related or only tangentially related to their academic work ("Non-Academic Issue"). As an example, a Non-Academic Issue is one that might arise in a student's capacity as a student-employee.

Any student who has a Non-Academic Issue and wishes to pursue a Non-Academic Grievance should be able to demonstrate they have first made a reasonable effort to resolve the matter on an informal basis before initiating a formal grievance process or, in rare instances, demonstrate that it is effectively impossible to try to make such an effort.

A Non-Academic Grievance shall be submitted in a written Initial Report to the Office of Student Services ("OSS"). The student should set forth in writing the substance of the complaint, the grounds for it, the evidence on which it is based, and the efforts taken to date to resolve the matter. Upon receipt, OSS shall appoint an administrative staff member to assist the student in the grievance process. The assigned administrator will begin by confirming that reasonable efforts have been made to seek resolution, including the administrator facilitating informal efforts to

resolve the issue between relevant parties. A demonstrated lack of good faith effort by any party attempting to resolve complaints informally, may be considered with all other factors to reach an ultimate decision on the merits of any grievance.

In the event these or prior informal efforts fail to address the issue, the student may request that the process move to a grievance hearing. Except where contravened by law, the request for a grievance hearing must occur within 45 days of the Initial Report. It must be made in writing to either: (a) the assigned administrator, or (b) the OSS, or (c) through the online ticketing system. Once a written request to escalate to a formal grievance hearing has been received, the ITU Grievance Committee will be asked to review the Non-Academic Issue. This committee will consist of representatives from Academic Advising, Faculty, Student Services, the Office of the University Registrar, and the Office of the Provost, along with the assigned administrator on the Issue. If the Issue involves an international student, a representative from the International Student Office ISO will also be included on the committee.

The Grievance Committee may request further written or oral submissions from any relevant party, may review materials as it deems appropriate, and shall thereafter deliberate and vote upon a decision regarding the Non-Academic Issue and, absent extraordinary circumstances, create a written statement of decision.

In the event any involved party finds the committee's decision unsatisfactory, they may appeal the decision to the President of the University. The request for an appeal should be filed in writing via the online ticketing system within 5 business days of the issuance of the committee decision. An unreasonable delay in filing the appeal may be grounds for rejection of that appeal.

Upon receiving the request for appeal, the Grievance Committee shall provide the President's Office with all documents, submissions, statements, materials along with its written statement of decision. The President shall begin consideration of the materials and may, in his/her discretion, request further information as may be appropriate. The President will then consider the matter and then accept, reject and/or propose amendment to the Committee's decision. That decision and the reasons therefor (the "President's Report") shall be tendered, in writing to the Committee within 15 business days, absent extraordinary circumstances. The Grievance Committee shall, within five business days of receiving the President's Report fully reconsider its assessment ab initio and then re-submit an amended decision, in writing, to the President who shall review the amended decision, and then make a final and conclusive ruling in writing. ITU students and stakeholders may also submit a complaint to the Bureau of Private Postsecondary Education (BPPE).

If, but only if, the President is a material party to the Non-Academic Issue, and if a party seeks an appeal of the decision of the Grievance Committee, the appeal will be

directed instead to the Executive Committee of the Board of Trustees, who may designate an appropriate person to execute the responsibilities of the President in adjudicating the appeal of the Non-Academic Issue, as set forth above.

ACADEMIC INTEGRITY

ITU is dedicated to learning and research, and hence is committed to truth and accuracy. Integrity and intellectual honesty in scholarship and scientific investigation are, therefore, of paramount importance. These standards require intellectual honesty in conducting research, writing of research results and relations with colleagues. Academic misconduct includes cheating, plagiarism, falsification of data, etc.

ACADEMIC DISHONESTY POLICY

ITU is committed to creating an environment where student achievement is championed and celebrated. Because the university values academic integrity as an essential component of academic excellence, students are expected to be truthful and ethical in their academic work. Commitment to academic integrity is the responsibility of every student and faculty member at ITU.

Faculty and students come from a variety of backgrounds and cultures, giving rise to different understandings of moral and ethical behavior. Faculty should clearly state well-defined standards to reduce uncertainty and clarify expectations. Academic dishonesty is defined as: an act of deception in which a student claims credit for the work or effort of another person or uses unauthorized materials or fabricated information in any academic work. Academic dishonesty is a violation of the ITU 'Student Code of Conduct' and will not be tolerated and might lead to suspension and expulsion.

Acts of academic dishonesty include, but are not limited to, the following:

- Cheating (unauthorized copying or collaboration on a test or assignment, or the use or attempted use of unauthorized materials);
- Tampering (altering or interfering with evaluation instruments and documents);
- Fabrication (falsifying experimental data or results, inventing research or laboratory data or results for work not done, or falsely claiming sources not used; fabricating or falsifying documentation to try to change a course grade);
- Plagiarism (representing someone else's words, ideas, artistry, or data as one's own, including copying another person's work, including published and unpublished material, and material from the Internet, without appropriate referencing, presenting someone's else's opinions and theories as one's own, or working jointly on a project, then submitting it as one's own);
- Or assisting (assisting another student in an act of academic dishonesty, such as taking a test or doing an assignment for someone else, changing someone's grades or academic records, or inappropriately disturbing exams to other students).

CAMPUS POLICIES

CAMPUS ALCOHOL POLICY

Since the consumption of alcoholic beverages is prohibited, alcoholic beverages may be consumed on University premises only during an event being sponsored or hosted by a campus individual, university-recognized group, department, or office that get approval by the University President or the Provost office. The event must operate within state and local laws as provided by the Department of Alcohol and Beverage Control (ABC).

It is the policy of ITU to maintain a drug-free workplace and campus. The workplace and campus are presumed to include all ITU premises where the activities of the University are conducted. The unlawful manufacture, distribution, dispensation, possession and/or use of controlled substances, or the unlawful possession, use, or distribution of alcohol is prohibited on the ITU campus, in the workplace, or as part of any of the University's activities.

For approval of the detailed protocol on serving alcohol on campus, all of the following conditions shall prevail:

- The chair of the event and other officers or representatives of the event sponsor (21 years of age or older) who will be present throughout the event, who will refrain from consuming alcoholic beverages
- The monitoring and serving of alcohol shall be under the direct supervision of the chair of the event and other representatives of the event.
- It is the responsibility of the department to ensure that no alcohol is distributed to persons under the age of 21. Alcohol will only be served to individuals who are 21 or older with a valid, government issued photo identification.
- If there will be attendees at the event who are under the age of 21 years, the event sponsor must have a plan in place to ensure that these guests will not be served alcohol. (e.g., ID cards must be shown upon entering the venue and wristbands must be distributed.)
- Self-service of alcohol is not allowed in any location on the campus.
- Anyone who looks to be under the influence of alcohol and unable to exercise care for one's own safety or that of others should not be served alcohol and the Department of Facilities Development & Operations may be notified if there are further questions or concerns.
- Event sponsor should note that they may also be held responsible for serving alcohol to persons who drive while intoxicated.
- Event sponsor are encouraged to reduce the consumption of alcohol at least 1 hour prior to the scheduled ending time of the event.

- No open containers of alcohol may be present on campus at any time. All alcohol must be served, opened, and disposed of by staff members who are over 21 years of age.
- Event sponsor must properly secure all leftover beverages
- Alcoholic beverages shall only be consumed in the approved designated area.
- Alcohol is not permitted to be served unless suitable Equally Attractive Non-Alcoholic Beverages (EANAB's) and food shall be made available at all functions when alcoholic beverages are served.

If immediate assistance is needed or an emergency occurs, inform Security and call 911. In order to obtain approval to serve alcoholic beverages on campus, please contact the Department of Facilities Development & Operations at operations@itu.edu to retrieve the proper form and listing of procedures.

UNIVERSITY LOST & FOUND POLICY

International Technological University's Lost & Found box is located within the Security Office. When items are found, they are logged onto a log that is attached to the Lost & Found box and held for thirty days. Unclaimed items will be disposed after the thirty days. If possible, the Operations Office will make every effort to contact the owner of an item by phone or email, if the owner of the item can be identified.

Exemptions to the Policy:

- High value items will be logged onto the Lost & Found log but will be stored in the operations office. When a High value item is being claimed, Security will contact the Operations Staff member and they will arrive to verify ownership prior to release. High value items include but not limited to: driver's licenses, state/federal identification cards, ATM/debit/credit cards, checks, checkbooks, wallets, cell phones, and high value electronic items. High value electronic items include but are not limited to laptops, iPods, and mp3 players.
- Food and/beverage containers turned into Lost and Found will be disposed of at the end of the day in which it was found.
- Any item deemed unsanitary will be disposed of immediately.

In order to claim an item in Lost and Found the owner must provide a physical description of the item and current photo ID. The owner will be required to sign the item out once ownership has been established.

Any questions regarding Lost and Found items should be directed to the Operations Office at operations@itu.edu.

PARKING POLICY

International Technological University at the 2711 North First Street Campus has a very limited private parking lot. We offer a free "first-come, first-serve" parking lot that is monitored

by campus security staff 24/7. The University is not responsible for any damages that may occur to a personal vehicle while parked at the 2711 North First Street Campus. Parking in adjacent private parking lots to the campus is prohibited and may be subject to towing & impound.

Student Parking

The University currently does not utilize any type of parking pass for any portion of any trimester for the students. The University does not allow for overnight student parking. Any vehicle found on campus without prior authorization to be on campus overnight may be subject to towing. Due to the nature of our limited parking, International Technological University students are encouraged to take public transportation utilizing their Valley Transit Authority Commuter Pass.

Employee Parking

The University currently does not utilize any type of parking pass for any portion of any trimester for employees. The University does allow for short-term overnight parking on a case-by-case basis with approval from the Facilities Development and Operations Office.

Towing Services

The University utilizes Campbell Towing at 1461 Terminal Ave San Jose, CA 95112.

> » Phone: (408) 295-7490
>
> » Office Hours: Monday-Friday 8AM-5PM

Special Parking Policy

Drivers using parking designated for disabled persons must display a valid state issued placard, license plate, or other form of identification recognized by state or national authority.

DIVERSITY POLICY

ITU firmly believes that personal diversity in all its aspects is essential to our ability to accomplish our mission. Diversity embodies all those differences that make us unique individuals and includes people of different race, ethnicity, culture, sexual orientation, gender, religion, age, personal style, physical ability as well as people of diverse opinions, perspectives, lifestyles, ideas and thinking. We value the differences in views and perspectives and the varied experiences that are part of a diverse organization. Diversity enriches and broadens our university, which in turn leads to more creative and meaningful programs.

For the same reasons, ITU values professional diversity. Academic professionals and faculty, administrators, and students, from all disciplines, from both the public and private sectors, from all economic strata, and from the least experienced to the most seasoned are vital to maximizing our experience. Only by drawing and retaining a diverse employee and contractor base will we guarantee success of our university as well as our respective professional pursuits. Therefore, ITU is committed to creating and maintaining a culture that promotes and supports diversity throughout our organization.

NONDISCRIMINATION POLICY

ITU is committed to the most fundamental principles of academic freedom, equality of opportunity, and human dignity. This requires that decisions involving students and employees be based on individual merit and free from invidious discrimination of all forms, whether or not legally prohibited.

ITU's policy is to fully comply with applicable federal and state nondiscrimination and equal opportunity laws, orders and regulations. ITU will not discriminate in programs and activities against any person because of race, color, religion, sex, national origin, ancestry, age, marital status, handicap, unfavorable discharge from the military, or status as disabled veteran or veteran of Vietnam era. This nondiscrimination policy applies to admission, employment, access to and treatment in University programs and activities.

Complaints of invidious discrimination prohibited by university policy shall be resolved exclusively within existing ITU procedures.

SEXUAL HARASSMENT POLICY

Sexual harassment is legally defined to include any unwanted sexual gesture, physical contact, or statement that is offensive, humiliating, or interfering with required tasks or career opportunities at ITU. Sexual harassment is prohibited under federal and state discrimination laws and the regulations of the Equal Employment Opportunity Commission.

ITU will not tolerate sexual harassment of students or employees and will take action to provide remedies when such harassment is discovered. The University environment must be free of sexual harassment in work and study. Appropriate sanctions will be imposed on offenders in a case-by-case manner to ensure ITU is free of sexual harassment. ITU will respond to every reported sexual harassment complaint.

WHISTLEBLOWER POLICY

I.   Summary of Policy

This policy governs the reporting and investigation of allegations of suspected illegal or improper activities concerning the financial assets of the University, and the protection of whistleblowers from retaliation. It describes the procedures for investigating known or suspected illegal or improper activities and addressing complaints of retaliation for raising such issues.

II. Policy

ITU has a responsibility for the stewardship of University resources and the private support that enables it to achieve its mission. The University's internal controls and operating procedures are intended to detect and to prevent illegal or improper activities relative to its financial assets. However, intentional and unintentional violations of laws, regulations, policies and procedures may occur and may constitute illegal or improper activities. The University has a responsibility to investigate and report to appropriate parties allegations of suspected illegal or improper activities, and to protect

those employees who, in good faith, report these activities to the appropriate authority.

A ITU employee may not:

1) Retaliate against an employee who has made a protected disclosure or who has refused to obey an illegal or improper order, nor

2) Directly or indirectly use or attempt to use the official authority or influence of his or her position for the purpose of interfering with the right of an employee to make a protected disclosure to the University.

It is the intention of the University to take whatever action may be needed to prevent and correct activities that violate this policy.

III. Procedure

A) Filing a Report of Suspected Illegal or Improper Activities Relative to Financial Assets

1) Any person may report allegations of suspected illegal or improper activities. Knowledge or suspicion of illegal or improper activities may originate from academic personnel, staff or administrators carrying out their assigned duties, internal or external auditors, law enforcement, regulatory agencies, and customers, vendors, students or other third parties.

2) Allegations of suspected illegal or improper activities should be made in writing so as to assure a clear understanding of the issues raised. Such reports should be factual and contain as much specific information as possible.

3) Normally, a report by an ITU employee of allegations of a possible illegal or improper activity should be made to the reporting employee's immediate supervisor or other appropriate administrator or supervisor within the department. However, when the whistleblower believes there is a potential conflict of interest, such reports may be made to another University official who has responsibility over the department in question or the authority to review the alleged illegal or improper activity on behalf of the University. Should the alleged illegal or improper activities involve the President, Executive Vice President, or another Vice President, such reports may be made to the Chair of the Audit Committee of the Board of Trustees (c/o Board of Trustees, International Technological University).

4) When a person reports allegations of suspected illegal or improper activities to an appropriate authority, the report is known as a protected disclosure. University employees and applicants for employment who make a protected disclosure are protected from retaliation.

5) The Audit Committee may enlist outside legal, accounting or other advisors, as appropriate, to conduct any investigation of complaints regarding financial statement disclosures, disclosure concerns or

violations, accounting, internal accounting controls, auditing matters or violations of the University's policies.

B) How to report improper acts

If any employees have information regarding possible violations of state or federal statutes, rules, or regulations, or violations of fiduciary responsibility, call:

1) Office of the President – 888-488-4968 ext 300

2) Human Resources office – 888-488-4968 ext 280

3) California State Attorney General's Whistleblower Hotline – 800-952-5225. The Attorney General will refer your call to the appropriate government authority for review and possible investigation.

4) Report can be submitted through the suggestion box in the front desk area or an anonymous email from ITU website.

C) Protection from Retaliation

Any employee who believes he or she has been subjected to or affected by a retaliatory conduct for

1) Reporting suspected illegal or improper activity, or

2) For refusing to engage in activity that would result in a violation of law, should report such conduct to the appropriate supervisory personnel (if such supervisory personnel is not the source of or otherwise involved in the retaliatory conduct). Any supervisory employee who receives such a report, or who otherwise is aware of retaliatory conduct, is required to advise the Human Resources Manager of any such report or knowledge of retaliatory conduct. If the employee believes that reporting such conduct to the appropriate supervisor is for any reason inappropriate, unacceptable or will be ineffectual, or if the report to the supervisor has been made and the retaliatory conduct has not ended, the employee should report the incident directly to an Executive Vice President, the President, or the Chair of the Audit Committee of the Board of Trustees. The University will use its best efforts to protect whistleblowers against any form of retaliation.

It cannot guarantee confidentiality, however, and there is no such thing as "unofficial" or "off the record" reporting. The University will keep the whistleblower's identity confidential, unless

1) The person agrees to be identified;

2) Identification is necessary to allow the University or law enforcement officials to investigate or respond effectively to the report;

3) Identification is required by law; or

4) The person accused of illegal or improper activities is entitled to the information as a matter of legal right in disciplinary proceedings.

ALUMNI SERVICES

STAYING CONNECTED WITH ITU

The ITU Alumni Association allows alumni to actively participate in the ITU community, stay in touch with classmates and faculty, and remain involved in ITU developments. The alumni association provides career, volunteer, and networking opportunities and keeps alumni updated on the progress and needs at ITU. This association offers many exciting events and helpful services, and all alumni are encouraged to join. To learn more about the ITU alumni association, please visit www.itu.edu/alumni, and join the mailing list.

Catalog

DEGREE PROGRAMS AND REQUIREMENTS

Departments and programs are listed alphabetically. Curriculum and courses are listed under each program.

For the most current course offerings by trimester, see the online Course Schedule.

PREREQUISITES

Prerequisites for courses should be noted carefully; meeting these requirements is the responsibility of the student.

COURSE NUMBERING SYSTEM

Each course is assigned an alphabetical code along with a three-digit number. The course code is defined by a descriptor for course types or programs:

- ACT (Accounting)
- AMS (Applied Mathematics)
- BIO (Bio-Management)
- BUS (Business, Non-specific)
- CEN (Computer Engineering)
- CFL (Classroom Field Learning)
- CSC (Computer Science)
- DGA (Digital Arts)
- EEN (Electrical Engineering)
- EMG (Engineering Management)
- ERP (Enterprise Resource Planning)
- FIN (Finance)
- HCM (Health Care Management)
- HRM (Human Resource Management)
- IDS (Interdisciplinary Sciences)
- INB (International Business)
- INT (Internship)
- MBN (Master of Business Administration, Thesis)
- MGT (Management)
- MIS (Information System Management)
- MKT (Marketing)
- SWE (Software Engineering)

The level of the course is designated by the course number:

Course Type	Number	Description
Beginning Graduate Courses	500-599	Graduate-level courses
Internships	591-593	Internships and internship-related courses
Advanced Graduate Courses	600-699	Graduate-level courses intended primarily for mid and upper-level graduate students.
Capstone and Thesis	690-699	Graduate-level research and/or development projects conducted on an individual or group basis.
Doctoral-Level Courses	700-899	Doctoral-level courses
Doctoral Thesis & Research	900-999	Thesis and Dissertation Research.

BUSINESS ADMINISTRATION

MISSION

In order to become a **center of distinction**, the Department of Business Administration strives to prepare its students and graduates with the knowledge and practical skills to serve as business and industrial leaders. We believe this aspiration is achieved through collaboration with our high quality faculty and ongoing engagement with our communities.

INSTITUTIONAL LEARNING OUTCOMES (ILOS)

ILO #1: Problem Solving

ILO #2: Critical Thinking

ILO #3: Communication literacy

ILO #4: Collaboration and Teamwork

ILO #5: Technical Literacy

ILO #6: Research Skills and Information Literacy

ILO #7: Individual Responsibility

MASTER OF BUSINESS ADMINISTRATION PROGRAM

The Business Administration program is designed as a balanced preparation for managerial careers in business. The program provides the students a solid foundation in the following concentrations MBA, Business Analytics, and Healthcare Management that will be as valuable ten years from now as it is today. The University's location in the heart of Silicon Valley provides its MBA students with exposure to the unique entrepreneurial success in this region. The MBA faculty has many years of experience in starting companies, managing corporations, directing advanced product development, and consulting for major companies. The Business program requires successful completion of 36 credit hours.

Inbound and Outbound Exams:

Beginning Spring 2016, all new students are required to take the Inbound exam with Peregrine Academic Services. The Inbound exam is required to be taken in the first trimester attending ITU. The exam is considered a mandatory assignment in the core overview course MGT 503 Organizational Leadership Theories. For this reason, all new students are required to take MGT 503 in their first trimester. Students admitted prior to Spring 2016 are encouraged to take the exam when they enroll in MGT 503.

In addition, all new students are required to take the Outbound exam with Peregrine Academic Services. The Outbound exam will be taken in the capstone course, either MGT 690, Pitching a Business Plan to Venture Capitalists, MBN 697, Master Thesis, BUA 690 Simulation and Optimization for Business Analytics, or HCM 690 Healthcare

Innovation Management Project. The Outbound exam is also a mandatory assignment in the capstone course. Students admitted prior to Spring 2016 are encouraged to take the exam when they enroll in the capstone course. The benefit of taking the Inbound exam is to test students' knowledge of business topics when they enter the Business program, while the benefit of taking the Outbound exam is to test their knowledge upon graduation. Students may include the progress made from the Inbound to the Outbound on their resume or portfolio.

Exams will be taken once and the exam score will not affect the GPA or Graduation qualification. The exam score does not affect credit earned for the course. Any student who does not take the Inbound exam will be assigned a grade of Incomplete and subject to the ITU Incomplete grade policy. Any student who does not take the Outbound exam, will not be eligible for graduation. The Inbound and Outbound exams are REQUIRED and are not OPTIONAL. Information on how to take the exams will be provided in the course related to the Inbound or Outbound exam. Both Inbound and Outbound exams will have a fee which is currently $34 per exam. Information on how to take the exam will be included in the course syllabus. Students admitted prior to Spring 2016 are encouraged to take the exam.

PROGRAM LEARNING OUTCOMES (PLOS)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

PLO #1: Justify the usage of core business theories to solve problems in the business environment. (mapped to ILO 1: Problem Solving.)

PLO #2: Appraise critical thinking models to make effective business decisions. (mapped to ILO 2: Critical Thinking.)

PLO #3 (I): Construct business documents clearly, concisely, and analytically.
(II) Illustrate effective speaking skills in groups and in public. (Both (I) and (II) are mapped to ILO 3 Communication literacy.)

PLO # 4: Assemble teams for business projects using effective group dynamics.(mapped to ILO 4 Collaboration and Teamwork.)

PLO #5: Illustrate in depth knowledge of key technical functions for business to work efficiently (mapped to ILO 5 Technical Literacy.)

PLO #6: Identify and apply research methods to understand current business practices. (mapped to ILO 6 Research Skills and Information Literacy.)

PLO # 7: Model sound ethical social responsibility. (mapped to ILO 7 Individual Responsibility.)

CAREER OPPORTUNITIES

ITU's Business Administration program can prepare a student for a career in Accounting, ERP, Finance, Healthcare Management, Human Resources, Information Systems, International Business, Management, Marketing, and Project Management. Students may work as an Accounting Manager, Business Analyst, Consultant – Strategy, Financial Analyst, CFO, Global Analyst, Healthcare Analyst, Treasurer, SAP Technical Senior Manager, SAP Business Analyst, Market Strategist, Marketing Specialist, HR Manager, Data Analyst, Marketing Manager, Product Manager, and Program Manager.

PROGRAM REQUIREMENTS

- Required Courses
    - » 4 Core Courses: 12 Credit Hours
    - » 1 Capstone course: Thesis or Project: 3 Credit Hours
    - » Internship: 1 Credit Hour
- Elective courses: 11-20 Credit Hours
    - » Internship: 1-9 Credit Hours
    - » Cross Disciplinary course: Up to 3 Credit Hours (counts as Elective)
    - » Transfer Credits: Up to 9 credit hours from a graduated program of a regionally accredited school (counts as Elective)
- 36 Total Credit Hours

GRADE POINT AVERAGE (GPA)

A minimum 3.0 cumulative GPA is required for granting of the Master's degree.

MASTER OF BUSINESS ADMINISTRATION CONCENTRATIONS

- Business Analytics
- Healthcare Management

MASTER OF BUSINESS ADMINISTRATION (MBA)

The MBA provides the students a solid foundation in various business subjects. With the MBA, you can see your future as a leader and innovator at your workplace. An MBA can offer your profession the enhancement that it needs. It gives students the flexibility to modify their study according to their educational and professional interests.

EMPHASIS LEARNING OUTCOMES (ELOS)

The ELOs are intended to improve student learning in the following areas: analytical skills, communication, critical thinking, ethical reasoning, global position, information technology, and the legal systems. Upon completion of the MBA, graduates will:

ELO #1: Identify analytical skills applying problem-solving, business analysis, and data management to support decision-making process.[Mapped to PLOs 1,2,5,6]

ELO #2: Determine strengths in areas, such as effectiveness, self-awareness, management, and communication.[Mapped to PLOs 3,4,6,7]

ELO #3: Explain the value of information technology and how it can enhance professional performance.[Mapped to PLOs 3,5,6]

ELO #4: Illustrate the required skills to integrate ideas from numerous disciplines to develop business plans.[Mapped to PLOs 2,3,4,7]

ELO #5: Create business management methods to help development and control in a changing environment. [Mapped to PLOs 1,2,3,4,5,7]

TRANSFER COURSES

If students pass four parts of the CPA exam, they are eligible to apply for a transfer of 3 courses, equivalent to 9 credit hours. If students pass three parts of the CPA exam, they are eligible to apply for a transfer of 2 courses, equivalent to 6 credit hours. If students pass two parts of the CPA exam, they are eligible to apply for a transfer of 1 course, equivalent to 3 credit hours. If students pass one part of the CPA exam, they will not be eligible to apply for transfer of any course

SAP JOINT RECOGNITION AWARD

Upon completing 3 of the following Enterprise Resource Planning courses with a grade of B or above, the student is awarded a joint recognition award from ITU and SAP University Alliances.

- » ACT 603 Accounting Information Systems/ERP - ITU/SAP University Alliance
- » ERP 509 Introduction to ERP Systems Using SAP - ITU/SAP University Alliance
- » ERP 510 ABAP - Advanced Business Application Programming - ITU/SAP University Alliance
- » ERP 511 Enterprise Portal Technology Using NetWeaver - ITU/SAP University Alliance
- » ERP 512 Enterprise Procurement Processes (MM) - ITU/SAP University Alliance
- » ERP 513 Sales Order Management with ERP - ITU/SAP University Alliance

MASTER OF BUSINESS ADMINISTRATION PROGRAM REQUIREMENTS

- » 4 Core courses for a total of 12 credit hours

REQUIRED CORE COURSES

- » MGT 503 Organizational Leadership theories
- » FIN 534 Financial and Economic Analysis
- » MKT 551 Competitive Marketing Strategies
- » MIS 527 Technology and Operations Management: Creating value
- » 1 Capstone course: Business Project or Thesis for a total of 3 credit hours

CAPSTONE COURSE

- » MBN 697 MBA Thesis
- » OR
- » MGT 690 Pitching a Business Plan to Venture Capitalists

Students can focus on any Business subject by completing at least 4 courses in the following areas:

Accounting, ERP/SAP, Finance, Information Systems Management, Management, Marketing, Human Resource Management, or Project Management, The thesis topic should be on the selected focus.

Choose 7 Business Elective courses of the following courses for a total of 21 credit hours

2 recommended MBA courses for a total of 6 credit hours

- » BUS 520 Emerging technologies for product development
- » BUS 521 Management of Technology and Innovation

ELECTIVE COURSES

- » ACT 500 Financial Accounting
- » ACT 501 Forensic Accounting
- » ACT 502 International Accounting
- » ACT 504 Tax Accounting Principles
- » ACT 600 Managerial Accounting
- » ACT 601 Cost Accounting
- » ACT 602 Intermediate Accounting
- » ACT 603 Accounting Information Systems/ ERP - ITU/SAP University Alliance
- » BUS 500 Project Management Frameworks
- » BUS 501 Strategic Planning and Portfolio Management
- » BUS 502 Project Management and Leadership
- » BUS 503 Project Management - Agile Approach

- » BUS 504 Contract Management and Financial Planning
- » BUS 509 Leading and Changing Change
- » BUS 510 Regulation, Governance Ethical and Social Responsibility
- » BUS 516 Principles of quality management
- » BUS 517 Organization Culture and Diversity
- » BUS 519 Organizational Leadership and change
- » BUS 520 Emerging technologies for product development
- » BUS 521 Management of Technology and Innovation
- » BUS 600 Research Methods
- » BUS 688 Special Topics (1-3 Credit Hours)
- » BUS 689 Independent Study (1-3 Credit Hours)
- » ERP 509 Introduction to ERP Systems using SAP - ITU/SAP University Alliance
- » ERP 510 ABAP - Advanced Business Application Programming - ITU/ SAP University Alliance
- » ERP 511 Enterprise Portal technology using NetWeaver - ITU/SAP University Alliance
- » ERP 512 Enterprise procurement processes (MM) - ITU/SAP University Alliance
- » ERP 513 Sales order management with ERP - ITU/SAP University Alliance
- » FIN 515 Managerial Finance
- » FIN 516 Entrepreneurial Finance
- » FIN 517 Financial Institutions
- » FIN 518 Financial and Socially Responsible Investing
- » FIN 519 Corporate Valuation
- » FIN 520 Investment Management
- » FIN 521 International Financial Management
- » FIN 522 Behavioral Finance
- » FIN 523 Macroeconomic Theory
- » FIN 526 International Economics
- » FIN 604 Securities Analysis
- » FIN 605 Financial Derivatives and Risk Management
- » FIN 606 Corporate Finance
- » FIN 607 Mergers and Acquisitions
- » HRM 528 Human Resource Management

- » HRM 529 Organizational Development
- » HRM 530 Employment law for business
- » HRM 533 Strategic compensation: issues and opportunities
- » HRM 535 Human Resources and Information Technology
- » INB 553 Fundamentals of International Business
- » INB 554 International Financial Markets
- » INB 556 Global Strategic Management
- » INB 558 Global Marketing and Strategy
- » INB 559 International Business Management
- » MGT 560 Principles of Management
- » MGT 564 Principles of Public Relations
- » MGT 566 Production and Operations Management
- » MGT 567 Quality Control Management
- » MGT 569 Strategic Operations Management
- » MGT 571 Critical Thinking Strategies in Decision Making
- » MGT 572 High-Technology Entrepreneurship
- » MGT 573 International Management
- » MGT 575 Project Management
- » MGT 577 Project risk management
- » MGT 578 Business Communications
- » MGT 579 Business Ethics
- » MGT 580 Business Law
- » MGT 581 Managing Emotions, Managing Self and Others
- » MGT 582 Team and Group Dynamics
- » MGT 583 Global Entrepreneurship and Innovation
- » MGT 584 Supply Chain Management (Previously MKT 584)
- » MGT 593 Intrapreneurship – Innovation from Within
- » MGT 608 Business Statistics
- » MGT 611 Lean Six Sigma
- » MGT 612 Advanced Project Management
- » MIS 537 Management Information Systems
- » MIS 538 Business Database Applications
- » MIS 539 Business Telecommunications
- » MIS 540 Information Resource Management

- » MIS 541 Managing Global Information Systems Projects
- » MIS 542 Information Systems Innovation
- » MIS 543 Human-Computer Interaction
- » MIS 544 Business Decision Support Systems
- » MIS 545 Data Mining and Business Intelligence
- » MIS 546 Data Science for Business
- » MIS 547 Software Development Process Management
- » MIS 548 Knowledge Management
- » MKT 582 Marketing Management
- » MKT 583 Entrepreneurial Marketing
- » MKT 585 International Marketing
- » MKT 586 Marketing Research
- » MKT 588 Consumer Behavior
- » MKT 589 E-commerce
- » MKT 590 Marketing with Social Media
- » MKT 591 Advertising Strategy
- » MKT 592 Supplier/Seller Management
- » MKT 613 Advanced Marketing

INTERNSHIP

- » CFL 591 Integrating Academic and Internship Learning (2 Credit Hours)
- » INT 593 Part-time/Full-time Internship (1-3 Credit Hours)

BUSINESS ANALYTICS CONCENTRATION

Over the last few years, the field of Business Analytics has known a remarkable growth. Business Analytics Professionals help organizations decrease overall costs, and better support the customer and the solutions necessary to stay competitive in international economy.

International Technological University offers an MBA in Business Analytics Concentration, which prepares the students to be responsible for recognizing business needs, and to operate as a liaison between business people and technology people who know how to create solutions for business problem.

BUSINESS ANALYTICS OFFERS FIVE AREAS OF SKILL:

Technical: The technical courses offer the Business Analytics Professionals the education, proficiencies and capabilities to know what technology can do.
Organizational / Process: The Business Analytics Professionals will be given a chance to build up understanding and proficiencies in the fields of organizational change management, business process analysis, business process improvement, and enterprise strategy and planning.

Practical Reasoning: Courses in this area will develop the Business Analytics Professionals capability to efficiently conceptualize, apply, study, create, and assess the collected information.

Administration / Management / Leadership: The courses in these areas will discuss the understanding, proficiencies, and capabilities necessary to manage work and to encourage and support individuals and teams to complete project tasks and objectives.

Communication: Communication is important for the Business Analytics Professionals. The courses will consist of written and verbal practical communication, active listening and understanding, customer service, and team work.

The Business Analytics will prepare the students to take the following certificates: Certification of Competency in Business Analysis (CCBA), and Certified Business Analysis Professional (CBAP).

EMPHASIS LEARNING OUTCOMES (ELOS):
The Business Analytics aims to help students to graduate with the ability to:

ELO #1: Identify situations to learn from the application of Decision Sciences practices. [Mapped to PLOs 2,5,7]

ELO #2: Design systems to mechanize data collection and data mining that can deeply influence the success of a business. [Mapped to PLOs 1,2,3,4,5,6]

ELO #3: Explain the main features of information technology principles and tools, with their application in a business setting. [Mapped to PLOs 2,3,4,5,7]

ELO #4: Determine appropriate data analytics methodologies to support critical thinking for decision making. [Mapped to PLOs 2,3,6,7]

ELO #5: Illustrate effective communication skills that help the presentation of analysis outcomes. [Mapped to PLOs 2,3,4,6,7]

BUSINESS ANALYTICS REQUIREMENTS

» 4 Core courses for a total of 12 credit hours
REQUIRED CORE COURSES

» MGT 503 Organizational Leadership theories
» FIN 534 Financial and Economic Analysis
» MKT 551 Competitive Marketing Strategies
» MIS 527 Technology and Operations Management: Creating value

CAPSTONE COURSE
1 course for a total of 3 credit hours

» BUA 690 Simulation and Optimization for Business Analytics

BUSINESS ANALYTICS COURSES
Business Analytics Professionals are required to use data, competencies, and capabilities that meet all areas of proficiency when performing their primary job duties. Business Analytics courses are presented as inter-related courses that meet all areas of proficiency.

Choose 7 Business Analytics courses from the following elective courses (including up to 9 credit hours internship) for a total of 21 credit hours

2 recommended Business Analytics courses for a total of 6 credit hours

» BUA 500 Principles of Business Analytics
» BUA 501 Quantitative Analysis

BUSINESS ANALYTICS ELECTIVE COURSES

» BUA 500 Principles of Business Analytics
» BUA 501 Quantitative Analysis
» BUA 503 Game Theory, Business Strategy, and Thinking Strategically
» BUA 504 Data Warehousing and Visualization
» BUA 505 Predictive Analytics for Business Strategy
» BUA 506 Developing Value Through Business Analysis Applications
» BUA 507 Ethical Business Decision-Making
» BUA 508 Risk Analytics
» BUA 509 Web Analytics
» BUA 510 Data Science Applications with R or Python
» BUS 518 Applied Statistics
» BUS 520 Emerging technologies for product development
» BUS 521 Management of Technology and Innovation
» BUS 688 Special Topics (1-3 Credit Hours)
» BUS 689 Independent Study (1-3 Credit Hours)
» ERP 509 Introduction to ERP Systems using SAP - ITU/SAP University Alliance
» FIN 525 Econometrics
» MGT 567 Quality Control Management
» MGT 572 High-Technology Entrepreneurship

» MIS 537 Management Information Systems

» MIS 538 Business Database Applications

» MIS 540 Information Resource Management

» MIS 542 Information Systems Innovation

» MIS 543 Human-Computer Interaction

» MIS 544 Business Decision Support Systems

» MIS 545 Data Mining and Business Intelligence

» MIS 546 Data Science for Business

» MIS 547 Software Development
Process Management

» MIS 548 Knowledge Management

» MKT 586 Marketing Research

INTERNSHIP

» CFL 591 Integrating Academic and
Internship Learning (2 Credit Hours)

» INT 593 Part-time/Full-time
Internship (1-3 Credit Hours)

HEALTHCARE MANAGEMENT CONCENTRATION

The Healthcare Management helps students learn the competencies to meet the challenges of today's health care system, while looking for innovative answers for tomorrow.

Healthcare management is one of the fastest growing careers. ITU's MBA in Healthcare Management prepares students to play a serious role in the industry, by practicing effective leadership skills that support the business insights.

The Healthcare Management curriculum builds on the established strength of management practices, as the manager's role in diverse healthcare settings continues to grow. The Healthcare major draw on a rich variety of elective courses, including courses in behavioral theories, clinical research, biomedical sciences, and information technology. The Healthcare Management will give students great opportunities for development. Earning that Master's degree with ITU will equip graduates with the necessary skills and knowledge to work in a variety of health-care-related environments.

EMPHASIS LEARNING OUTCOMES (ELOS):

The Healthcare Management aims to help students to graduate with the ability to:

ELO #1: Identify and assess important factors such as tools, processes, products, and technologies to successfully operate in the pharmaceutical, medical devices, and healthcare industries.
[Mapped to PLOs 3,5,6]

ELO #2: Determine the essential components for operations, strategic planning, knowledge management, and decision support in the pharmaceutical, medical devices, and healthcare industries.
[Mapped to PLOs 2,3,4,5,7]

ELO #3: Explain ways to improve the environment in which the pharmaceutical, medical devices, and healthcare industries function, such as innovation, security, privacy, safety, and ethics. [Mapped to PLOs 3,4,5,7]

ELO #4: Summarize the effect of applying healthcare management theories and research to current problems and issues in the pharmaceutical, medical devices, and healthcare industries.
[Mapped to PLOs 1,5,6]

ELO #5: Create frameworks to increase the effectiveness of the pharmaceutical, medical devices, and healthcare industries.
[Mapped to PLOs 2,3,4,6,7]

HEALTHCARE MANAGEMENT REQUIREMENTS
4 Core course for a total of 12 credit hours

REQUIRED CORE COURSES

» MGT 503 Organizational Leadership theories

» FIN 534 Financial and Economic Analysis

» MKT 551 Competitive Marketing Strategies

» MIS 527 Technology and Operations
Management: Creating value

CAPSTONE COURSE
1 course for a total of 3 credit hours

» HCM 690 Healthcare Innovation
Management Project

The MBA in Healthcare Management concentrates on the following industries: Pharma (Suggested careers: pharmacist, Pharma quality, Pharma drug testing, and clinical trial management), Medical Device (Suggested careers: quality management, and testing), and Healthcare Delivery (Suggested careers: independent solo and group clinical practices, hospital and clinic administration, wellness consultants, Dentist Assistant, Dietician/Nutritionist, Physical Therapist and medical software trainers).

Choose 7 Healthcare courses from the following elective courses (including up to 9 credit hours internship) for a total of 21 credit hours.
2 recommended Healthcare courses for a total of 6 credit hours.

Recommended Healthcare Management Courses

» HCM 509 Scientific Writing and
Research for Healthcare

» HCM 511 Concepts of
Healthcare Management

ELECTIVE HEALTHCARE MANAGEMENT COURSES

If students choose the Pharma industry, they need to complete 4 to 6 of the following courses. In case the students complete 9 credit hours of internship in the Pharma industry, they need to take 1 to 3 of the following courses:

» BIO 500 Clinical Research Management

» BIO 501 Modern Medicine and Biology

» BIO 506 Biotech industry fundamentals

» BIO 510 Ethics in Medical Research

» HCM 509 Scientific Writing and
Research for Healthcare

» HCM 510 A Regulatory
Overview and Compliance

» HCM 511 Concepts of
Healthcare Management

» HCM 513 Innovating Biomedical Technology

» HCM 531 Complementary and
Alternative Medicine

» HCM 534 Financial Management
for Healthcare Organizations

» HCM 535 Data Analytics
Applications in Healthcare

» BUS 520 Emerging technologies
for product development

» BUS 688 Special Topics (1-3 Credit Hours)

» BUS 689 Independent Study (1-3 Credit Hours)

» MGT 575 Project Management

If students choose the Medical Devices industry, they need to complete 4 to 6 f the following courses. In case the students complete 9 credit hours of internship in the Medical Devices industry, they need to take 1 to 3 of the following courses:

» BIO 500 Clinical Research Management

» BIO 501 Modern Medicine and Biology

» BIO 506 Biotech industry fundamentals

» BIO 510 Ethics in Medical Research

» HCM 509 Scientific Writing and
Research for Healthcare

» HCM 510 A Regulatory
Overview and Compliance

» HCM 511 Concepts of Healthcare
Management HCM 513 Innovating
Biomedical Technology

» HCM 534 Financial Management

for Healthcare Organizations

» HCM 535 Data Analytics
Applications in Healthcare

» BUS 520 Emerging technologies
for product development

» BUS 688 Special Topics (1-3 Credit Hours)

» BUS 689 Independent Study (1-3 Credit Hours)

» MGT 575 Project Management

If students choose the Healthcare Delivery industry, they need to complete 4 to 6 of the following courses. In case the students complete 9 credit hours of internship in the Healthcare Delivery industry, they need to take 1 to 3 of the following courses:

» BIO 506 Biotech industry fundamentals

» HCM 509 Scientific Writing and
Research for Healthcare

» HCM 511 Concepts of
Healthcare Management

» HCM 515 Health Information Technology

» HCM 519 Healthcare Ethics

» HCM 520 Healthcare Leadership, Patient
Safety and Quality Improvement

» HCM 525 Principles of Managed Care

» HCM 529 Mental Health and Wellbeing

» HCM 531 Complementary and
Alternative Medicine

» HCM 534 Financial Management
for Healthcare Organizations

» HCM 535 Data Analytics
Applications in Healthcare

» BUS 520 Emerging technologies
for product development

» BUS 688 Special Topics (1-3 Credit Hours)

» BUS 689 Independent Study (1-3 Credit Hours)

» MGT 575 Project Management

INTERNSHIP

» CFL 591 Integrating Academic and
Internship Learning (2 Credit Hours)

» INT 593 Internship (1-3 Credit Hours)

DOCTOR OF BUSINESS ADMINISTRATION

In the face of increasing competition, it is no longer sufficient to work harder and faster. Companies call upon people with advanced degrees. It is in this context that the International Technological University (ITU) Business School offers a Doctor of Business Administration (DBA).

The degree of Doctor of Business Administration (DBA) is a research doctorate that focuses upon business practice, and the application of theory rather than on the development of new theory. The DBA requires significant coursework beyond that required at the master level. It is a professional doctoral program intended for Executives, Senior managers, Consultants, Advanced students, and Instructors of business who want to expand their knowledge and skills.

The program develops the skills to analyze, practice, and research to equip graduates with an understanding of management thoughts and practices, and of real-world business principles and practices. As an international business school, ITU bridges the gap between learning and its application.

ITU's Doctor of Business Administration delivers a powerful program designed to enhance the student's critical thinking, analytical skills, and leadership abilities, and enable them to develop an expertise in conducting and understanding research, methodology, and evaluation.

PROGRAM LEARNING OUTCOMES (PLOS)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

> PLO #1: Appraise the theoretical knowledge and relate it to use in business practice. [Mapped to ILOs 3,6]
>
> PLO #2: Relate existing academic contributions to the practice of management in industry. [Mapped to ILOs 6,7]
>
> PLO #3: Generate a greater level of effectiveness as a professional in managing technology, innovation and related organizational change. [Mapped to ILOs 2,5,7]
>
> PLO #4: Select the appropriate research methodology, which supports the desired dissertation outcomes. [Mapped to ILOs 3,6]
>
> PLO #5: Formulate original research, which includes research design, tools and structure. [Mapped to ILOs 5,6,7]

ADVISORY COMMITTEE

To guide students through the first phase of the degree program, an advisory committee of at least three faculty members with appropriate terminal degrees will be assigned.

The advisory committee also may serve as the Dissertation Committee.

PROGRAM REQUIREMENTS

To be awarded the DBA degree, you must successfully complete 60 credit hours, consisting of 42 credit hours of course work, and 18 credit hours of doctoral dissertation. All DBA students should have earned a Master's Degree before admission to the DBA program.

Pursuit of the DBA involves two main components:
Coursework: includes 9 credit hours of foundation courses, 15 credit hours of business core courses, and 18 credit hours of electives, totaling 42 credit hours.

Dissertation: concludes the program with a significant scholarly research project, requiring a minimum of 18 credit hours. Submission of the dissertation is 65,000 to 80,000 words. Although research papers, reports, and examinations may be required in doctoral seminars, the major assessment points in the DBA program are the qualifying examination, taken after the foundation core and Business core courses are completed.

You must successfully complete all required courses before you are allowed to present a dissertation proposal and officially advance to candidacy. To fulfill the degree requirements, your dissertation must be completed and defended successfully within eight years of entry into the program. The students are assigned a Dissertation Committee. Students work closely with their dissertation committee members through the remainder of their doctoral program.

Students will submit the final draft of their thesis to ProQuest Dissertation Publishing. The Research Librarian is available to answer publication questions and assist students in this process.

GRADE POINT AVERAGE (GPA)

A minimum 3.0 cumulative GPA is required for granting of the doctoral degree.

ADMISSION TO CANDIDACY

A student who passes the qualification examination is considered as a DBA candidate.
A DBA candidate should promptly ask his/her Advisor to form a doctoral committee.

DOCTORAL COMMITTEE

On the student's request, the Advisor will form a Doctoral Committee. The committee will consist of at least five members, including the Advisor, the Department Chair and at least another member from the Business department. The committee must also include at least one member from outside the department, preferably from outside the University. Either the Advisor or Department Chair will serve as the chair of the committee.

The Doctoral Committee will review the proposed dissertation topic, determine any further changes, and approve the research objective.

CORE COURSES

- Foundation Core Courses: 9 Credit Hours
    - » BUS 800 Writing and Research Methods
    - » BUS 801 Quantitative Research Analysis
    - » BUS 802 Qualitative Research Analysis
- Business Core Courses: 15 Credit Hours
    - » BUS 804 Management and Organizational Theory
    - » BUS 807 Emerging Issues in Strategic Decision Making
    - » BUS 813 Seminar in Organizational Behavior Research with Emphasis on Leadership

QUALIFYING EXAMINATION

The qualification exam is required to take within two years from the time of admission for full-time students and three years for part-time students. The qualification exam can be retaken once only. The qualification examination will be provided in written.

Qualifying exams will be administered upon completion of all required foundation and business core course work. This integrative examination will test your mastery of the literature in your area by satisfactory performance on this examination.

Taken after the foundation and Business core curriculum. Written Exam in four areas:

- Foundations area,
- Two research areas,
- Business Core area.

ELECTIVES AND SEMINARS

You must choose six of ITU's MBA elective courses (different than the ones taken in the MBA program; exceptions to this requirement can be made by the Academic Quality Committee) OR six of the following DBA courses closely related to your dissertation research topic. (18 Credit Hours)

- » BUS 700 Management Practice and Organizational Behavior
- » BUS 703 Leadership Behavior and Motivation
- » BUS 710 Current Issues in Accounting Research
- » BUS 713 Multinational Business Finance
- » BUS 720 International Information Technology Management
- » BUS 726 Seminar in Organizational Behavior Research
- » BUS 728 Seminar in Strategy and Innovation
- » BUS 729 Leadership Behavior and Conflict Resolution
- » BUS 730 Technology, Innovation, and Entrepreneurship

DISSERTATION RESEARCH PROJECTS

- Doctoral Dissertation: 18 Credit Hours
    - » BUS 901 Doctoral Dissertation

You may register for BUS 901 Doctoral Dissertation only after having first completed all required foundation courses and having passed the qualifying examination. Students begin the final phase of their studies immediately after the successful oral defense of the proposal. Working closely with their committee, students conduct their research project and develop their dissertation, achieving the highest levels of scholarship.

The dissertation must include original research that is focused either on expanding the methodological scope of the content area, developing new theories, or confirming theoretic models. Research methods that may be employed include field experiments, surveys, and case studies. Successful completion of the dissertation is the final step in the program.

DISSERTATION RESEARCH

The period following the comprehensive examination is devoted to research for the dissertation, although such research may begin before the examination is completed. After research topic proved by the Doctoral Committee, the doctoral candidate should conduct the dissertation research toward the objective defined.

DISSERTATION DEFENSE

The dissertation document must be made available to all members of the doctoral program council one-month prior to the defense. The oral defense shall consist of a presentation of the dissertation results and the defense. The dissertation defense is open to the public, but only members of the Dissertation Committee have a vote. The dissertation defense passes through unanimous vote.

DISSERTATION PROPOSAL

The critical work is a formal written proposal for dissertation research. This proposal must include a clear statement of the problem to be researched and a survey of the relevant literature. The proposal must specify the research methods, data collection, and data analysis techniques in detail. The methods to be employed must be appropriate, reliable, and appropriate for the measures taken.

PROPOSAL DEFENSE

The defense is an oral examination, limited to no more than three (3) hours. The student may be directed to rework portions of the proposal and repeat this examination only once.

PUBLICATION

One or more refereed articles based on the dissertation research must be accepted for publication in international academic journals, or other journals approved by the Doctoral Committee.

PROGRAM COMPLETION

At least one month before the degree is to be conferred, the candidate must submit to Doctoral Program Council of the School two copies of the final version of the dissertation describing the research in its entirety. The dissertation will not be considered as accepted until approved by the Doctoral Committee and publication acceptance. Each member of the Doctoral Committee must sign-off the doctoral dissertation to indicate approval.

The University reserves the right to evaluate the undertakings and the accomplishments of the degree candidate in total, and award or withhold the degree as a result of its deliberations.

TEACHING REQUIREMENT

The Doctoral Candidate is recommended to teach at least one regular course in order to show teaching capability. The teaching assignment must be completed before the dissertation defense.

TIME LIMIT FOR COMPLETING DEGREES

All requirements for the doctoral degree must be completed within eight years following acceptance for the DBA program. Extensions will be allowed only in unusual circumstances and must be approved in writing by Doctoral Program Council of ITU.

EDUCATIONAL METHOD

Each course involves intensive reading, independent study, assignment and/or examination. There will also be a series of research workshops. These workshops provide the face-to-face consultation and discussion between supervisors and candidates.

TERMINAL MASTER DEGREE:

Students who are not able to complete the dissertation after completing the 42 credit hours course work will receive a Terminal Master's degree. The Terminal degree is usually found in professional fields or academic areas where research is not the priority.

COURSE DESCRIPTIONS
ACT (ACCOUNTING)
ACT 500 FINANCIAL ACCOUNTING (3)
Prerequisites: None
This course provides an introduction to basic theory and methods of financial accounting. It is designed to offer managerial users the foundations of accounting concepts. The course helps the students understand financial statement information. Focus will be on accounting for assets (e.g., Accounts Receivable, Inventories, Property, Plant and Equipment, Intangible Assets), liabilities (e.g., Bonds, Deferred Taxes) and owners' equity. Focus will be also on the presentation of the income statement through Net Income, revenues and expenses. Class sessions develop the understanding of the different steps of the accounting cycle, and of the financial statements that give the managers the ability to use them for decision-making.

ACT 501 FORENSIC ACCOUNTING (3)
Prerequisites: None
This course explores the forensic accountant's role in today's economy. The course is designed to enhance a student's understanding of the emerging field of forensic accounting. The course is structured to enhance the ability of students to think critically and to develop the knowledge, skills and attitudes necessary to compete effectively in the rapidly changing world of accounting using the traditional method of detecting fraud and using the current technology. By the end of the course, students should be able to understand the causes of fraud and white-collar crime, examine the types of fraud and fraud schemes, explore methods of deterring and detecting fraud, and examine the financial impact to businesses and the economy.

ACT 502 INTERNATIONAL ACCOUNTING (3)
Prerequisites: None
The knowledge of accounting requirements and the influence of environmental factors on accounting systems both nationally and internationally becomes important to the accounting professional. Topics of financial accounting for international operations, multinational managerial accounting and control, comparative international accounting, international reporting issues, and international taxation are examined. The focus of the course is to solve the problems related to accounting for multinational corporations doing business in a global environment. This course covers the topics of currency translation and foreign currency gains and losses and accounting for international accounting organizations.

ACT 504 TAX ACCOUNTING PRINCIPLES (3)
Prerequisites: None
This course introduces federal tax law, including the preparation of individual income tax form 1040 and related schedules. Tax accounting principles, such as the measurement of income, asset exchanges, capital transactions, and business expenses are examined. Topics include corporate income tax, subchapter S, dividends, and liquidating distributions. The course also provides tax knowledge through identification of significant differences between tax and financial accounting.

ACT 600 MANAGERIAL ACCOUNTING (3)
Prerequisites: ACT 500, or equivalent
This course introduces the students to the principles of managerial accounting, which is the internal use of accounting information to manage modern firms, including planning, analysis, and decision-making. This course focuses on information generated by internal accounting information systems to evaluate organizational performance, methods to evaluate financial alternatives, and create financial plans. Topics will include interpretation of financial statements, cost behavior, cost allocation, budgets and cost control. Other topics such as decentralization, product costing, job and process costing, break-even analysis, and absorption costing will also be discussed.

ACT 601 COST ACCOUNTING (3)
Prerequisites: ACT 500, or equivalent
This course applies cost accounting concepts and accounting tools to make management decisions. Students learn to use cost accounting to evaluate and make strategic business formulation, research and development, budgeting, production planning, pricing, and provide information for management accounting and financial accounting. Other topics include financial statements, concept of depreciation and inventory methods, cash flows, business valuation, working capital, cost behavior, cost allocation, budgets, and control systems.

ACT 602 INTERMEDIATE ACCOUNTING (3)
Prerequisites: ACT 500, or equivalent
This course will provide a comprehensive review of the accounting process that discussed in Financial Accounting (ACT 500). Students will learn and deepen their understanding of the preparation of classified financial statements. Students will also learn other information and apply analytical tools in making both business and financial decisions. This course will also include topics related to cash flows, accounting for a company's financing and investing activities and related tax accounting; primary current assets, current and long term liabilities; amortization of bond premiums and discounts, journal entries associated with issuance of preferred, common stocks, and treasury stocks, and declaration of dividends; owners' equity and earnings per share; and time value of money. Students will study how to record various financial transactions and understand the impact on the usefulness of the information provided for decision-making. During coverage of these topics, discussion will include a development of the understanding of full and fair disclosures based on GAAP, ethical and moral implications, and the related concept of transparency.

ACT 603 ACCOUNTING INFORMATION SYSTEMS/ERP (3)
ITU/SAP University Alliance
Prerequisites: ACT 500, or equivalent
This course addresses the development and use of accounting information systems for managerial control and external reporting, focusing on reporting objectives, management needs, documentation, security, and internal controls.
The course will cover concepts and principles of financial accounting fundamentals and how to identify measure and report on the financial effects of economic events on enterprises. Topics include accrual accounting concepts; preparation, understanding and analysis of financial statements; accounting for sales and cost of sales and procurement of materials.
The course will focus on designing computer systems to perform accounting functions, and extensive use of applications of different microcomputer accounting software packages.
This course will prepare the student to understand the basic structure and procedures of financial and management accounting in the SAP System and to maintain master data and perform essential function in General Ledger, Account Payable, Account Receivable, Cost Center Accounting and Internal Orders and to describe how Financial and Management Accounting interact with other in SAP process.

The course will be covered in 6 weekend classes as per the schedule. The course is presented in lecture format and hands-on problem solving exercises.

BIO (BIO-MANAGEMENT)
BIO 500 CLINICAL RESEARCH MANAGEMENT (3)
Prerequisites: Any Biology background: Academic or Professional
This course is designed to create an in-depth understanding of the clinical research methodologies including the regulatory aspects of clinical research. This course will help you to understand and apply scientific principles to the implementation of clinical research whether it is investigator-initiated, or industry-sponsored study. The student will learn to design and present a concept sheet for a Phase I/II and Phase II/III clinical trial. Also addressed in this course are different types of study design, their relative strengths and limitations, and proper choice of study design. The student will also learn to systematically implement the research protocol and evaluate the integrity of the clinical research outcome. In this course, students learn to apply knowledge of data management, information management and scientific communication. Students will explore opportunities to demonstrate professionalism and accountability in the implementation of research studies through applying management.

BIO 501 MODERN MEDICINE AND BIOLOGY (3)
Prerequisites: None
In this course, students will explore the cross-pollination of ideas and advances in biology and how they transform medicine, both at the bedside and in drug development. Many of the advances in biology have radically transformed the understanding of disease states and how medicine is practiced. For example, genomic sequencing is now being widely adopted as a method for diagnostics as well as for drug development. Bioinformatics is another area where huge data management and mining is paving way to understand the complex biological pathways and signaling mechanisms in cells and organs. Other advance in the field of computer science and algorithm development have been adopted to unravel these complex connections and arrive at a better understanding of cellular and molecular physiology. Physical and mechanical innovations drive devices that have better resolution in the areas of imaging for diagnostics.

BIO 506 BIOTECH INDUSTRY FUNDAMENTALS (3)
Prerequisites: None
This course will introduce students to biotechnology, its principle, and application. A solid knowledge of basic molecular biology is required to gain a complete understanding of the concept and its application. Biotechnology has a broad reach – from agriculture, to biofuels, waste management, medical, forensics, and food. Students will learn to apply modern biological principles and understand the trends in modern medicine, food, and green technologies. By the end of the course, students should be able to critically assess current and future applications of biotechnology in agriculture, drug development and environmental management. This course is a prerequisite course for students in Healthcare Management, and Bio

Management streams. Students will benefit immensely if they enroll in this course first before taking any of the other advanced courses. A background in junior-level chemistry and biology is recommended.

BIO 510 ETHICS IN MEDICAL RESEARCH (3)
Prerequisites: None
This course will inform students about the basic principles essential to making educated decisions about ethics in medical research. Understanding the basic principles is critical before conducting clinical research activities. Topics include: historical perspectives, federal regulations, Institutional Review Board (IRB) approval, conflicts of interest, informed consent, the HIPAA Privacy Rule, and AAHRPP accreditation.

BUA (BUSINESS ANALYTICS)

BUA 500 PRINCIPLES OF BUSINESS ANALYTICS (3)
Prerequisites: None
Principles of Business Analytics course introduces students to the broad business analytics field with a strong emphasis on practical outcomes which can be directly applied to a business environment. It provides a brief outline of existing theories, technologies and applications which support the modern decision-making process which is to a large extent, data-driven. In this course, students will have an opportunity to work with tools they are already familiar with such as MS-Excel to design and develop the best analytics solutions for existing business problems. Upon completion of this course, students will be able to identify and formulate any business problem that has a potential to be transformed using analytic solutions, perform the necessary tasks to implement it, describe the tools that have been used in the process and identify the business value of the outcomes of the analytics and appreciate its role in Business Process Management.

BUA 501 QUANTITATIVE ANALYSIS (3)
Prerequisites: None
Quantitative analysis course introduces students to the main modeling and simulation strategies in quantitative analysis field with a strong emphasis on practical outcomes which can be directly applied to a business environment. It provides a brief outline of existing theories, technologies and applications which support the modern decision-making process which is to a large extent, data-driven. In this course, students will have an opportunity to work on tools like Excel and advanced add-ons, that helps with performing advanced analysis techniques such as regression and forecasting. Upon completion of this course, students will be able to identify any business problems that can be potentially modeled and simulated and judge whether an optimal solution exists, understand the important issues in their implementation, describe the tools that have been used in the process from their frameworks to the techniques used, determine the business value of outcomes of the quantitative analysis and also appreciate its role in Business Process Management.

BUA 503 GAME THEORY, BUSINESS STRATEGY AND THINKING STRATEGICALLY (3)
Prerequisites: None
The focus of this course is the use of game theory to define

the most likely outcome of business situations, especially where there is a communication between two or more decision makers to build business strategy. In addition, students will be introduced to methods in strategic thinking and its connections with current game theory to resolve strategic business problems. Students will need skill at numerical reasoning for this course.

BUA 504 DATA WAREHOUSING AND VISUALIZATION (3)
Prerequisites: None
This course discusses the principles of data warehousing, design and implementation along with related software tools. Topics consists of data warehouse architecture, dimensional model design, physical database design, data integration and visualization, and data warehouse administration. The course also builds core skills for visual study of data among students. Trends and tools in data visualization will be explained with a special focus on recognizing patterns and trends from large datasets. Knowledge in database management recommended.

BUA 505 PREDICTIVE ANALYTICS FOR BUSINESS STRATEGY (3)
Prerequisites: None
This course explains information technology, modeling methods and data sciences to familiarize students with the field of predictive analytics. Prior course work in data warehousing and visualization will add to this course, which builds on assessing data within the business context, understanding data trends and risk assessment. Through this course, students will learn how to build reliable predictive models for developing business strategy geared at organizational competitive advantage.

BUA 506 DEVELOPING VALUE THROUGH BUSINESS ANALYSIS APPLICATIONS (3)
Prerequisites: None
This course discusses the role that the business analysis plays in exploring and visualizing outcomes to create better outcomes, thereby creating organizational value. Students will be equipped with different tools and application knowledge to drive winning stakeholder outcomes through ongoing business analysis.

BUA 507 ETHICAL BUSINESS DECISION MAKING (3)
Prerequisites: None
This course introduces the ethical issues involved in the "big data" world and its effects on strategic business decisions. In studying real life case studies, existing practices and issues with developing trends, students understand the ethical dilemmas related to data identity, privacy, ownership and organizational reputation. This in turn will prepare the students to make more informed and ethical decisions related to organizational data.

BUA 508 – RISK ANALYTICS (3)
Prerequisites: None
This course builds statistics and data modeling with a focus on risk theory and management. Students gain exposure to present trends in enterprise risk logical methods. This enables students to understand and implement risk

management structures in the organizational environment. Major risk categories such as financial risk, strategic risk and operational risk will be covered along with analytical methods to these risk groups.

BUA 509 – WEB ANALYTICS (3)
Prerequisites: None
The Internet is one of most powerful tools of business today. This course develops practices to analyze qualitative and quantitative data from website. Related topics, such as text mining and web mining will also be covered. In addition, this course provides students with the tools to drive constant enhancement of online experiences to customers; both current and future. Topics include Google Analytics and A/B Testing. Incoming traffic characteristics such as client browser, language, computer attributes and geolocation will also be covered.

BUA 510 DATA SCIENCE APPLICATIONS WITH R OR PYTHON (3)
Prerequisites: None
This course focuses on implementation of business analytics problems using a structured programming language such as R or python. Examples of descriptive and predictive business analytics problems such as linear regression, decision analysis, forecasting will be used and implemented using R and Python programming languages. Basic ideas of implementation of an algorithm in R, are discussed. Concepts such program I/O, reading data and visualization of the data, exceptions, conditional statements and statistical packages will be discussed. The course emphasizes hands-on experience and implementation of business analysis ideas in R and Python using pre-existing libraries. It is recommended that students be familiar with basic ideas in statistical modeling and business analytics to maximize the learning outcome of this course.

BUA 690 SIMULATION AND OPTIMIZATION FOR BUSINESS ANALYTICS (3) - Capstone course
Prerequisites: MGT 503; Completion of 27 credit hours in the program
Decision making is a critical part in any business. Business Analytics provides solutions to businesses worldwide with the advanced analysis techniques and tools. Optimization and simulation are two such methods that are being used in many business environments that involve decision making. In this course students will be able to examine and identify the classical and modern optimization techniques used in today's business environment. Few areas where these techniques can be used are selection of portfolio in finance, transportation industry, resource allocation of any industry, and minimizing the advertising cost in marketing. Focused on linear and the nonlinear programming techniques and their application in business environment and modern simulation and optimization techniques, this course helps students understand the need and use of decision making using these techniques.

BUS (BUSINESS)
BUS 500 PROJECT MANAGEMENT FRAMEWORKS (3)
Prerequisites: None
This course is designed to be the main structure related to the Project Management fundamentals for students who look to understand, practice, and improve the project execution process. This is based on the best practices and methods of project management implemented, such as PRINCE, PMI, PMBOK, and Microsoft Framework. This is to run projects in an agile organization toward effective implementation and efficient achievements.

BUS 501 STRATEGIC PLANNING & PORTFOLIO MANAGEMENT (3)
Prerequisites: None
This course is designed to interpret the strategic values and vision of the enterprise's portfolio management. The process is to recognize the company plan and strengthens its service offered in strategic business plan. The course's objective is to explain how a Project Management Oriented Business is able to divide the strategic planning into operational goals, which are attained by each division. Service analysis measures performance in the light of the company strategy and the business environment, with the goal of choosing and performing services that generate greatest value while incurring least risk for the business.

BUS 502 PROJECT MANAGEMENT & LEADERSHIP (3)
Prerequisites: None
This course is an overview of project management with an emphasis on leadership and team building. The first part focuses on the traits of successful leaders and the dos and don'ts for building effective teams. The second part introduces the project management framework and the different steps of the project management process. The third part describes how leadership practices can affect key management aspects of the project, such as scope, time, cost, human resources, stakeholders and communications. This course will also provide the basic knowledge necessary to prepare for the ASQ CQIA, ASQ CMQ, PMI CAPM or PMI PMP certification examination. Students who sign up for these exams will receive extra credit for their final grade.

BUS 503 PROJECT MANAGEMENT - AGILE APPROACH (3)
Prerequisites: None
This course provides students with the knowledge and tools to manage projects by providing an overview of the basics of agile project management. It provides the theory and core methodology students will need to manage projects or participate on project teams that are time sensitive and require agile project management principles. This course does not make use of any project management software application, but instead focuses on the conceptual understanding that students need to know in order to successfully manage a project in a fast paced technical environment.

BUS 504 CONTRACT MANAGEMENT & FINANCIAL PLANNING (3)
Prerequisites: None
This is a practical course about designing contracts and analyzing the project budget related to milestones achievement and deliverables scheduling. Students will learn about the project scope and implementation phases that are needed to design the required activities and charter agreement. In addition, they will learn about the Project/

Program Evaluation and Review Technique (PERT), Planned Value (PV), Earned Value (EV), Actual Cost (AC), Budget At Completion (BAC), Estimate To Complete (ETC), Estimate At Completion (EAC), and Variance At Completion (VAC).

BUS 509 LEADING AND MANAGING CHANGE (3)
Prerequisites: None
This class will focus on individual, team, and organizational leadership and will provide students with the foundation for exploring and developing their own individual leadership style. Major areas to discuss are leadership, values, ethics, and decision-making. Change and a leader's goal is to continually improve and look forward and provide the positive changes for the organization; being the visionary is critical to success in any organization and a key attribute for any organizational leader.

BUS 510 REGULATION, GOVERNANCE, ETHICAL AND SOCIAL RESPONSIBILITY (3)
Prerequisites: None
The overall goal of this course is to better prepare students to become responsible business leaders. In this class, students explore the relationship between business and society, and argue that to create a business that will endure business leaders must take into account the needs of the broader society, as well as those of their employees and other stakeholders. The major areas of study in this class will include: business ethics, the legal regulation of business, corporate governance, and corporate social responsibility.

BUS 516 PRINCIPLES OF QUALITY MANAGEMENT (3)
Prerequisites: None
This course covers the philosophy and concepts of quality management with an emphasis on tools and techniques of quality management for continual improvement in quality and productivity. Students learn techniques to improve organization performance and competitiveness.

BUS 517 - ORGANIZATIONAL CULTURE AND DIVERSITY (3)
Prerequisites: None
As organizations become increasingly diverse, the importance of understanding diversity, and its influences in the organizational culture become more essential. This course offers students a thorough understanding of diversity, beyond cultural diversity. Students planning to be managers and leaders of global organizations will learn in this course how to build and implement broad organizational diversity plans. In addition, students will become aware of the legal and ethical effects of building diverse initiatives and of the factors that build an effective organizational culture.

BUS 518 APPLIED STATISTICS (3)
Prerequisites: None
The course covers topics from both introductory and advanced level courses in statistics with the purpose of preparing students for classes in Business Analytics and Data Mining, and also for students who expect to be using statistics for their research. The course is designed to cover foundation topics in the first one-third of the classes, and classical multivariate statistical methods in the second two-thirds. The introductory part cover topics as: probability theory, distributions on different types of random variables, sampling and sampling distributions, hypothesis testing, statistical inferences, one and two-sample procedures, assessing goodness of fit, analysis of variance, linear least squares, correlation and regression, sample size, analysis of variance, and non-parametric statistics. The topics covered in the latter 2/3 of the course are classical multivariate methods and cover topics as: multivariate normality, comparison of multivariate means, matrix algebra, principal component analysis, discrimination and classification, linear multivariate regression, analysis of co-variance, canonical correlation. Optional topics are support vector machines, and model evaluation and selection. Also, Bayesian statistics is of interest for its widespread use. Upon completion of this course, the students is expected to demonstrate an understanding of the principles of probability theory in classical multivariate statistical analyses, and should be able to think critically about data and models, and to draw conclusions from such analyses.

BUS 519 ORGANIZATIONAL AND LEADERSHIP CHANGE (3)
Prerequisites: None
This course explores and analyzes the concept of leaderships including such topics as leadership theory, changing leadership roles, power, decision-making, empowerment, vision, communication, diversity, and ethics. The course provides a balance perspective of theory and practice as it surveys the major theories and research on leadership and managerial effectiveness in formal organizations.

BUS 520 - EMERGING TECHNOLOGIES FOR PRODUCT DEVELOPMENT (3)
Prerequisites: None
This course discusses emerging technologies in the area of product development. Ongoing economic constraints, declining margins, volatile supply chains and other market factors have been instrumental in hastening the adoption of technologies in industries seeking sustained competitive advantages. Concepts discussed in the context of product development are critical thinking for problem definition, resource utilization, optimization and allocation, managing variability in development work, understanding and managing economic performance measures, capacity management, quality management and harnessing people and technology for successful product development. Emerging technologies range from innovations in ERP systems, Internet of Things, Virtual Reality, 3D Printing, and the use of Artificial Intelligence for product design and technical specifications. Lastly, Big Data Analytics will be briefly discussed in relation to creating customized product solutions and reinventing the value chain in the quest for ongoing competitive advantage.

BUS 521 – MANAGEMENT OF TECHNOLOGY AND INNOVATION (3)
Prerequisites: None
Technology and Innovation are the two pillars of the world we live in. This course will teach students about managing both technology and innovation for sustained competitive advantage and value creation. Through understanding the interconnected nature of technology and innovation, students

will understand the impacts of well-managed technology and innovations on other allied concepts such as wealth creation, social and human capital, and knowledge management among others. Lastly, and importantly, this course aims to provide students tools to manage technology and innovation beyond conventional methods using case studies and other strategic frameworks.

BUS 600 RESEARCH METHODS (3)
Prerequisites: None
This course introduces students to research methodology with focus on statistical techniques and the interpretation of results. Students will be provided with the foundation to understand and apply research methods via class lectures and hands-on practice. Students will perform literature search and review, create a working research model and hypotheses, compile a questionnaire, use multivariate statistics to analyze data, and form conclusions based on the results.

BUS 688 SPECIAL TOPICS (1-3)
Prerequisites: None
This course offers a relatively new subject that is not currently available in the catalog, but will be of great relevance to Business Administration. It consists of lectures, readings, homework, presentations and projects determined by the instructor.

BUS 689 INDEPENDENT STUDY (1-3)
Prerequisites: None
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

BUS 700 MANAGEMENT PRACTICE AND ORGANIZATIONAL BEHAVIOR (3)
Prerequisites: None
This course discusses individuals and groups behavior within organizations. It focuses on leadership, team creation, change management and ongoing enhancement processes. Topics consist of change business practices and development, decision making, needs and incentive, interpersonal communications, human knowledge, morale, ethical and the value of work life. The students will learn essential, inventive, and pioneering proficiencies in day-to-day financial, prepared, realistic, and decision-making international economy. They will also learn how to build up theories, views, and principles of organizational behavior to study difficult conditions, recognize problems, and distinguish important achievement issues. In addition, they will understand how to assess resolutions and build up proper suggestions. It will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior.

BUS 703 LEADERSHIP BEHAVIOR AND MOTIVATION (3)
Prerequisites: None
This course examines theories of action and motivation as they relate to discourse and ethical behavior and explores their application to everyday activities in business. The course discusses theoretical and practical aspects of motivation and action on the individual, group, and organizational

levels. Moving beyond conventional positivist treatment of organizational and ethical behavior, this course focuses on an interpretive approach that integrates biological, anthropological, linguistic, philosophical, and systems perspectives in a trans-disciplinary fashion. It will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior.

BUS 710 CURRENT ISSUES IN ACCOUNTING RESEARCH (3)
Prerequisites: None
This is an interdisciplinary course. The readings draw from finance and economics (market effectiveness, bounds to arbitrage, and behavioral finance), and from the accounting literature (equity estimation, earnings management, and analyst behavior). In addition, the course will concentrate on present issues in accounting research. The topics include accounting history, ethics, and international accounting.

BUS 713 MULTINATIONAL BUSINESS FINANCE (3)
Prerequisites: None
This course studies the international financial situation within which international and financial institutions work. It also explains the concepts and practices of global financial management. Currency options, forwards, futures, and operating exposures are taught to help students build up main proficiencies in running transaction exposures to exchange rate risk. In addition, the course explains global financing plans and interest rate tools such as futures, options, and swaps, which describe international investment strategies. The aim of the course is to teach students to assess the global financial and monetary structure, to examine and resolve issues occurring in the global financial functions of a firm, to utilize the theories of exchange rate and interest rate risk management and to create global financing and investment strategies.

BUS 720 INTERNATIONAL INFORMATION TECHNOLOGY MANAGEMENT (3)
Prerequisites: None
This course explains the usage of technology in developed and developing countries. The course will review the use of technology as a deliberate and strategic competitive advantage. It will discuss precise transnational problems in implementing and using technology, including cross-cultural explanations of technology, the result of infrastructure on technology, and the accomplishment of difficult information technology projects in various countries.

BUS 726 SEMINAR IN ORGANIZATIONAL BEHAVIOR RESEARCH (3)
Prerequisites: None
This course focuses on the organization's capability to compete over the long term. It discusses individual, group, and organization involvements raising efficiency and quality, enhancing competitiveness, increasing proficiencies, improving morale, and renewing dedication to employee participation. It will include both the scientific and systems view of behavioral science knowledge. It will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior.

BUS 728 SEMINAR IN STRATEGY AND INNOVATION (3)
Prerequisites: None
This seminar introduces the innovation of new technology to build new business forms, products, and services. The course demonstrates that innovation is accountable for the stable enhancement in consumers' normal of living all over history. Essential innovation makes new markets and enhances the value of products while decreasing prices. Firms leading the innovation have a tendency to control world markets and support the global competitiveness of their own economy. Therefore, innovation contributes to firms' achievement, economic expansion, and consumer well-being. This seminar will help students to understand the problems, challenging perspectives, research techniques, main answers, and unanswered issues in the area of innovation strategy.

BUS 729 LEADERSHIP BEHAVIOR AND CONFLICT RESOLUTION (3)
Prerequisites: None
This course studies conventional theories that leaders utilize to analyze and effectively resolve conflicts that arise on interpersonal and organizational levels. In addition, new conceptual approaches are discussed that emphasize creativity, identity, and meaning-making within a critical hermeneutic framework, linking linguistic, cultural, philosophical, and ethical elements; and enable new strategies for negotiation and conflict resolution within business and community settings. The critical hermeneutic participatory research conversation will be the preferred approach used for its capacity to reframe situations, reach new understandings, and generate new possibilities in conflict resolution.

BUS 730 TECHNOLOGY, INNOVATION, AND ENTREPRENEURSHIP (3)
Prerequisites: None
This course discusses the function of technology and innovation of competitive business. Students will learn processes for developing and maintaining managerial change and innovation with methods for managerial design and learning. In addition, the course discusses problems with a variety of phases in the entrepreneurial procedure. Topics demonstrated by case studies, consist of new venture formation, marketing requirements, the business plan, ethics issues, economics of the business and financial support sources. The course also teaches students how to outline research questions focusing on the origin causes of general issues in innovation.

BUS 800 WRITING AND RESEARCH METHODS (3)
Prerequisites: None
This is a doctoral level course. This course brings together knowledge gained from core areas in business and will help students perform research in these topics and thereby provide the foundation to become academic researchers capable of contributing on the cutting edge of research in business areas, particularly within the area of expertise and research interests. The following are 6 core business areas this course will focus on: 1) Business Finance; 2) Micro Economics; 3) Business Management & Organization; 4) Business Marketing; 5) Business Information Systems; 6) Business Legal & Ethical issues; and 7) Business Topic (TBD).

BUS 801 QUANTITATIVE RESEARCH METHODS (3)
Prerequisites: None
This course offers topics in survey and experimental design and data; statistical analysis including variance analysis, multiple regression, linear model, and factor analysis; and time series study. Students will learn how to understand the statistical results included in academic papers and articles. In addition, they will learn how to relate these techniques using statistical software through practical analysis of research data sets.

BUS 802 QUALITATIVE RESEARCH METHODS (3)
Prerequisites: None
This course provides students with the doctoral level principles of social science/business practices research and the relationship between theory and methods. Particular attention will be placed on qualitative research methodologies. Topics that will be covered include conceptualization and measurement, ethical research techniques, survey design, content analysis, and field studies. Course assignments will be used to apply the methods learned and complement the theoretical knowledge gained from the lectures.

BUS 804 MANAGEMENT AND ORGANIZATIONAL THEORY (3)
Prerequisites: None
This course invites students to discover the most progressive thinking about organizations with proven classic theories and effective business practices. The course will provide students and prospective managers with the opportunity to examine contemporary organizational designs and theories, and to focus on companies that are successfully using these design concepts in a highly dynamic environment. Students will also examine, diagnose, and solve real-life organizational problems using current organizational situations.

BUS 807 EMERGING ISSUES IN STRATEGIC DECISION MAKING (3)
Prerequisites: None
This course brings together knowledge gained from the various functional areas in business administration in ways that will enhance the student's strategic decision making skills, both at the personal and organizational level. Students will be expected to bring current case studies and or readings to each class meeting in order to discuss the most current and salient points of strategic decision-making. This course also reinforces the following overarching, integrative doctoral program outcomes so that at its completion all students will be able to: 1) Demonstrate high level proficiency for problem solving, decision-making, self-directed learning, coaching, mentoring, and critical thinking skill applications in organizational settings when interacting in a leadership capacity; 2) Utilize the appropriate theoretical foundations and contributions of strategic decision-making researchers when actively participating in the development of strategic business planning; 3) Understand the use and application of statistical measures for strategic decision-making contributions to overall organizational productivity; 4) Conduct doctoral level research for making life-long contributions through publication and conference presentations in the integrative discipline of strategic decision-making; and 5) Demonstrate

capability to electronically locate, retrieve, and integrate strategic decision-making information resources.

BUS 813 SEMINAR IN ORGANIZATIONAL BEHAVIOR RESEARCH WITH EMPHASIS ON LEADERSHIP (3)
Prerequisites: None
This course presents a comprehensive, integrative, and practical focus on leadership in new era organizations. It is based on an organizing framework, which shows how key components work together to form a holistic view of leadership within organizations. The course presents definitions and new perspectives of leadership that have emerged in a global era. It provides students the opportunity to review major concepts and theories of leadership; an exploration of the historical underpinnings and current concepts and practice of shared leadership; the impetus for organizational leadership; leadership and culture; inclusion; capacity-building and leadership development; and finally, the new responsibilities of organizational leadership through social activism.

BUS 901 DOCTORAL DISSERTATOIN (18)
Prerequisites: None
Students may start the dissertation research only after completing all required coursework and passing the qualifying examination. Students will then organize, prepare, present, and defend their completed DBA dissertation paper.

CFL (CLASSROOM FIELD LEARNING)
CFL 591 INTEGRATING ACADEMIC & INTERNSHIP LEARNING (2)
Prerequisites: None
This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591(can be taken concurrently) in order to be eligible to enroll in INT 593.

ERP (ENTERPRISE RESOURCE PLANNING)
ERP 509 INTRODUCTION TO ERP SYSTEMS USING SAP (3)
ITU/SAP University Alliance
Prerequisites: None
Introduction to ERP using SAP is prerequisite course for students who want to pursue other ERP courses. This course is designed for students to get a basic understanding of all the functional departments that exist in a business scenario. It gives an idea about how these functional departments work and how they are integrated in ERP systems to avoid duplication of work, and to provide efficiency and effective use of resources. This course is a general overview of the SAP ERP System concepts and tools. It introduces SAP as one of the ERP systems and explains how the fundamental business processes interact in SAP ERP in the functional areas of Sales and Distribution, Materials Management, Production Planning, Financial Accounting, Controlling, Human Capital Management, Project Systems, and Enterprise Asset Management. The course is presented in lecture format with open discussion and hands-on problem solving exercises.

ERP 510 ABAP - ADVANCED BUSINESS APPLICATION PROGRAMMING (3)
ITU/SAP University Alliance
Prerequisites: None
ABAP is the language for programming SAP's Web Application Server, part of SAP's NetWeaver platform for building business applications. This course introduces the ABAP language environment, including the syntax checking, code generation and runtime system, and various features of ABAP Programming. Though this course starts from basics it's useful if students have basic programming knowledge with object oriented concepts and knowledge of relational database design. Students will get hands-on experience with scenarios, which will be discussed and worked on, in class on SAP system. Students will be given programming tasks to work on.

ERP 511 ENTERPRISE PORTAL TECHNOLOGY USING NETWEAVER (3)
ITU/SAP University Alliance
Prerequisites: None
SAP NetWeaver is SAP's integrated technology platform and is the technical foundation for all SAP applications since the SAP Business Suite. SAP NetWeaver is marketed as a service-oriented application and integration platform. SAP NetWeaver provides the development and runtime environment for SAP applications and can be used for custom development and integration with other applications and systems.

ERP 512 ENTERPRISE PROCUREMENT PROCESSES (MM) (3)
ITU/SAP University Alliance
Prerequisites: None
Today's enterprises face increasingly complex procurement processes. This course introduces the external procurement process. During the course, the students go through the entire procurement process with its typical steps – purchase requisition, purchase order, goods receipt, and entry of incoming invoice and payment. The students get to work on SAP course will quickly build through each of these concepts using Fitter Snacker case study or Quazi case study and configuration so that by the final day of class, each student will have hands on configuration experience in procurement processes. In doing so, the students will focus on different aspects and become acquainted with additional functions.

ERP 513 SALES ORDER MANAGEMENT WITH ERP (3)
ITU/SAP University Alliance
Prerequisites: None
This course introduces the sales order management process with the SAP ERP Central Component. During the course, the students learn the entire sales order process starting from a sales inquiry, entering sales orders, creating outbound deliveries, posting goods issue and invoicing the customer and entering the incoming payment. The course will quickly build through each of these concepts and configuration using the Quazi Computer case study and by the final day of class, each student will have fully walked through the Sales and Distribution process using the SAP system. In doing so, the students will focus on different aspects and become acquainted with additional functions in the sales order management process chain.

FIN (FINANCE)

FIN 515 MANAGERIAL FINANCE (3)
Prerequisites: None
The course teaches the students financial concepts and tools necessary for effective business planning. Topics include formation of interest rates, income taxes, working capital management, cost of capital, financial forecasting, external sources of capital, company valuation, and bankruptcy.

FIN 516 ENTREPRENEURIAL FINANCE (3)
Prerequisites: None
This course approaches the topic of entrepreneurial finance from a startup or early stage business owner's perspective. The course assumes that the student has a modest or no background in finance, accounting, or economics. The classroom discussions together with the textbook are used to develop a foundation for understanding the practice of finance and financial decision-making under company startup conditions. We work together to create a basic understanding of the financial concepts, statements, and tools, as well as financial planning required to start a business or advance an early stage company. The financial plan explores the uses of financial analytics and integrating financial proforma statements with the business plan. The course learning process includes examining the roles of capital and its sources for startups and early stage companies; reviewing financing alternatives such as debt, equity, and credit as sources of working capital for entrepreneurs; and exploring other innovative techniques for financing a new venture. Implicit in these areas are the topics of mastering the concepts of revenue generation, operational costs, profitability, and cash flow. Students will explore a variety of financial analytical concepts such as ratios, time value of money, and capital budgeting to assist us with our entrepreneurial financial planning and decision making. The course concludes with a discussion on structuring financial liquidity events for investors.

FIN 517 FINANCIAL INSTITUTIONS (3)
Prerequisites: None
In the Fall of 2007, the US and other international financial markets experienced a major crash proceeded by record stock market highs. In this course students examine the products, markets policies, investment products, and financial institutions that precipitated this global event. Students will draw on a combination of finance research journals, Internet articles, as well as other international finance textbooks to further supplement our understanding of the Finance Markets and Institutions. Our course utilizes several contemporary journal publications to build a rich discussion on the topics of financial markets and institutions, as well as financial objectives and strategies impact on international business expansion.

FIN 518 FINANCIAL AND SOCIALLY RESPONSIBLE INVESTING (3)
Prerequisites: None
Socially responsible investing is a course that examines one of the fastest growing areas in the global financial markets. The global financial crisis of the 2000s have shown that socially responsible investments (SRIs) have a place in building financially sound investment portfolios while doing social good. The course utilizes financial and global macroeconomics to support developing the basic investment mechanics and strategies. The initial objective of this course is to develop students' qualitative and quantitative skills for understanding the basic principles of socially responsible investing.

FIN 519 CORPORATE VALUATION (3)
Prerequisites: None
The focus of this class is on making investment decisions in real (as opposed to financial) assets. It will acquaint the student with the widely used ideas that have revolutionized the practice of valuation during the past few decades. By the end of the course, students should be comfortable in answering the question: What is a real asset - a new product, a new project, a division, or a company - worth?

FIN 520 INVESTMENT MANAGEMENT (3)
Prerequisites: None
This course offers the basics of investment management. Quoted and private equity investments and entrepreneurial finance are the focus of the topics. This course introduces market and portfolio perspectives, starting with the discounted cash flow methods to the concept of term structure in the valuation of risk-free cash flows, including forward rates and valuing risky or uncertain cash flows. The course prepares students to identify various investment products. Both real world and theoretical views are discussed.

FIN 521 INTERNATIONAL FINANCIAL MANAGEMENT (3)
Prerequisites: None
This course provides students with the framework for making corporate financial decisions in an international environment. Topic include: measurement of currency exposure and of currency risk. In addition, topics about the decision to undertake a global financing program, exchange and capital market, capital budgeting analysis for foreign direct investment, and the value of target firms for cross-border acquisitions are discussed. The course will examine different aspects of the foreign exchange market, the role of governments, and the central banks. The main focus is on the markets for spot exchange, currency forwards, options, swaps, international bonds, and international equities. Multinational financial transactions create unique challenges due to the market complexity, the exchange rate, and the political risks.

FIN 522 BEHAVIORAL FINANCE (3)
Prerequisites: None
The theories of finance and investment have focused on financial tools to characterize and quantify wealth creation and its associated risks. These tools have assisted investors to compute asset price and make investment decisions. In this course, we study the psychological influences of investor behaviors. Students examine the behavioral biases that people have when making purchasing, budgeting, or investing decisions. The class will also discuss Dual Motive Theory in terms of Ego/Empathy and greed/positive financial impact to understand how brain functions can impact financial behavior and relationships.

FIN 523 MACROECONOMIC THEORY (3)
Prerequisites: None
This course discusses basic principles and theories of macroeconomics, and components and measurement of production, income, and other key economic variables of the U.S. domestic economy. The course focuses on the analysis of the interrelationship among leading, lagging, and coincident indicators; key economic variables; and fiscal and monetary policy within the framework of the business cycle. Students will practice using publicly available economic data and conduct analyses of the state of the economy, forming an educated guess about its future direction, and applying that knowledge for decision-making in the context of their particular business activity.

FIN 525 ECONOMETRICS (3)
Prerequisites: None
This course covers concepts of econometrics and their practical applications for business and economics. From single and multivariable models under classical assumptions, the course moves on to study models that exhibit the problems of multicollinearity, heteroscedasticity, and autocorrelation. In addition, specification errors, and identification problems in single equations and in simultaneous equation systems are also studied. Students will learn how to use an econometric software package to run models to simulate and solve practical problems in the field of business and economics.

FIN 526 INTERNATIONAL ECONOMICS (3)
Prerequisites: None
This course examines basic principles and theories of international economics (the standard trade model and the Heckscher-Ohlin theory); international trade policies (tariff and non-tariff barriers); balance of payments, foreign exchange markets, and exchange rate determination; and the relationship between exchange rates, current accounts, and the economy as a whole, including fiscal and monetary policies in an open-economy.

FIN 534 FINANCIAL AND ECONOMIC ANALYSIS (3)
Prerequisites: None
This course discusses criteria and methods to evaluate the net benefits of investments projects and, once selected for implementation, the best way for a firm to fund such projects, in a way that cash flow is optimized. The course explores the following topics: financial ratios and financial statements, valuation techniques using time value of money tools, evaluating and selecting investment in long-term assets, determination of financial mix (capital structure) to fund long-term investments, short-term financial planning, working capital management, and short-term cash flow planning and forecast.

FIN 604 SECURITIES ANALYSIS (3)
Prerequisites: FIN 515, or equivalent
Security Analysis is about understanding the characteristics of and influences on financial securities, as well as making investment decisions. This course draws on the work of Berk & DeMarzo (2007), Copeland, Shastri, & Weston (2010), Fabozzi, and Modigliani & Jones (2010) to explain, validate, and build on the early theoretical securities pricing work of Bronzin (1907) and Bachelier (1914). This foundation is augmented by the investment theories of Working (1934), Kendall (1953), Osborne (1959, 1962), Markowitz (1952), Fisher (1907, 1930), Keynes (1920) et al. in asset pricing and valuation; as they have played important roles in the development of modern theories in securities analysis. The class knowledge base is brought up to date with the debates regarding CAPM, APT, and other asset pricing and analytical models.

FIN 605 FINANCIAL DERIVATIVES AND RISK MANAGEMENT (3)
Prerequisites: FIN 515, or equivalent
Derivatives provide users an opportunity to mitigate risk, as well as increase financial returns. They also have a dark side where they can be prone to misuse and abuse. Derivative theory and risk management offers us a framework, together with a set of analytical techniques, for characterizing risks and determining the valuation of an asset, investment, and opportunity. The objective of this course is to become familiar with the basic building blocks of derivatives: forward contracts, future contracts, options, and swaps. Students build on this foundation with the creation of derivative strategies and risk management techniques. Students develop asset including option pricing models from a variety of financial theorists.

FIN 606 CORPORATE FINANCE (3)
Prerequisites: FIN 515, or equivalent
Corporate Finance brings together the academic rigor and practitioner perspectives on making business and economic decisions. The course will draw on a combination of finance research journals, Internet articles, and other finance publications to supplement the understanding of the discipline. The course utilizes several contemporary publications to build a rich discussion on the topics of finance, as well as how to develop financial objectives. Class time will provide the opportunity for collaborative discussions, exchanges of the impact of Finance on business concepts and globalization opportunities, and the interactive use of finance applications, models, and analytical tools.

FIN 607 MERGERS AND ACQUISITIONS (3)
Prerequisites: FIN 515 and ACT 600, or equivalents
M&A are a powerful tool for building competitive advantage. In a global marketplace it offers strategic advantages for business expansion relative to corporate assets, products, technology & IP, as well as marketing distribution channels among other financial benefits. In this course were develop skills for the obligatory financial analysis of M&As. Students examine a full range of business dynamics and strategy considerations regarding M&As and reach beyond analysis to the synthesis of M&A issues to develop a framework for successful M&A planning, implementation, and post M&A activities.

HCM (HEALTH CARE MANAGEMENT

HCM 509 – SCIENTFIC WRITING AND RESEARCH FOR HEALTHCARE (3)
Prerequisites: None
Through this course, students will become aware of medical language and standard medical terms used in medical journals, grant applications and others. The course enables

students to be on par with other medical professionals through their written communication. Topics discussed in this course are healthcare related documentation, access to healthcare journals and databases for research purposes.

HCM 510 A REGULATORY OVERVIEW & COMPLIANCE (3)
Prerequisites: Any Biology background: Academic or Professional
This course will offer a summary of the drug development procedure. The emphasis will be on drug development science, regulation, and business from the U.S. standpoint. Most the lectures will be a concise educational outline of today's subject, followed by dialogue of a main scientific publication that highlights the significant theories covered.

HCM 511 CONCEPTS TO HEALTHCARE MANAGEMENT (3)
Prerequisites: None
This course provides a dynamic introduction to the health sector. In addition it provides an overview of concepts and issues related to healthcare leadership. While the emphasis will be on the American system, a global context will be developed. The basic elements of insurance and payment, service delivery, and life sciences products will be described, and put in the context of the unique economic structure of the sector. The intense challenges of the sector will be explored, as well as both the ethical issues presented and the opportunities that emerge. Through the examination of management topics and healthcare situations, the student will explore the skills and knowledge needed to be successful in a diverse healthcare environment. Topics include organizational design as it relates to the uniqueness of healthcare organizations, managing professionals, and diversity in the workplace. Public policy and technological and practice development as drivers of change will be also addressed.

HCM 513 INNOVATING BIOMEDICAL TECHNOLOGY (3)
Prerequisites: None
This course is recommended for students who are entrepreneurially inclined and would like to develop products and services for biomedical application. It is highly recommended for students with EE or CE majors. They will learn the medical device/application market trends and regulations for product development. The course is designed to provide students with entrepreneurial spirit to get hands-on experience in developing knowledge, kindling innovative thinking and designing products in the bioscience/biomedical arena. Working in groups or teams, students will learn to research market trends, gap analysis and market needs to develop a concept or design a product. They will also learn to research Intellectual Property and patent databases to further develop their concept and avoid IP infringement pitfalls that are bound to arise.

HCM 515 HEALTH INFORMATION TECHNOLOGY (3)
Prerequisites: None
In this course, students will experience a huge amalgamation of information drawn from geography, biology, sociology and economics. This information requires acquiring skills in these discipline and to have certain ethical and moral obligations to put this knowledge to use to derive something tangible for future generations. Biological management

goes beyond the formal education in physics, chemistry or biology to understand the very essence of what it means to be inhabitants of the planet. The basic objective of this course is to create a new environmental awareness.

HCM 519 HEALTHCARE ETHICS (3)
Prerequisites: None
This course invites students to explore issues in medical ethics from a personal and professional career perspective. Materials will include case studies of actual situations encountered by healthcare administrators and providers in the United States. Emphasis will be on learning useful approaches and practical principles for decision-making. This course provides an overview of legal doctrine and critically assessing public policy issues. Duties assigned as per healthcare law such as the duty to treat, informed consent, and malpractice liability, and selected issues in bioethics such as the right to die, physician-assisted suicide, and organ transplantation are dealt in detail. Importance of financing and delivery issues such as insurance coverage and care towards patient are studied.

HCM 520 HEALTHCARE LEADERSHIP, PATIENT SAFETY AND QUALITY IMPROVEMENT (3)
Prerequisites: None
This course is designed to address patient safety and quality improvement challenges in providing quality healthcare. Drawing from actual case studies the course explores areas where patient safety is liable to be compromised and find solutions for improvements. With a complex and diverse background of patients and healthcare providers, communication and understanding culture issues is of paramount importance. The course will explore the need for effective communication and tools to meet this need. The course will follow various case studies in patient's safety as a way to understand and analyze the underlying problems, possible flaws in the systems, designing and improving quality systems to deliver the highest patient safety possible. Case studies from various countries will be part of the course so the student can understand the international implication of quality systems.

HCM 525 PRINCIPLES OF MANAGED CARE (3)
Prerequisites: None
This course invites you to learn about the principles of managed healthcare systems in the United States. Topics covered include: health insurance, network contracting, provider payment, management of utilization and quality, and laws and regulations. Spot quizzes will identify learning transfer and possible gaps. Both interim midterms and a comprehensive exam will ensure overall paced learning. Special attention will be paid to the details of and latest news about the federal Patient Protection and Affordable Care Act of March 2010.

HCM 529 MENTAL HEALTH AND WELLBEING (3)
Prerequisites: None
This course invites students to explore issues in mental health and wellbeing from a personal and professional career perspective. Topics will include materials on support organizations (both local and online), self-care activities, and

current important issues. Emphasis will be on learning useful approaches.

HCM 531 COMPLEMENTARY AND ALTERNATIVE MEDICINE (3)
Prerequisites: None

Modern medicine is evidence-based, scientifically rationalized, and follows a reductionist approach while many of the alternative medicines are not. However, there is an increasing body of scientific work related to the systematic study of alternative medicine in disease states. Students will investigate the research findings to understand, rationalize, and develop a higher order of thinking to how to benefit from the adoption of these practices and integrate them with modern medicine. Healthcare cost and health management can be more effective with the integration of the old with the new, forging new paths for management of disease and developing new paradigms for a healthy life.

HCM 534 FINANCIAL MANAGEMENT FOR HEALTHCARE ORGANIZATION (3)
Prerequisites: Basic Knowledge of Financial and Managerial Accounting or equivalent

In this course, students will learn the basics of budgeting and accounting for health, and not-for-profit organizations. Readings, real-world case studies, and lectures students will know how to use financial information in organizational development, application, control, recording, and analysis. In addition, the course emphases are on managerial accounting. Topics include time value of money, capital budgeting, cash budgets, operating budgets, break-even analysis, indirect cost allocation, variance analysis, and long-term financing.

The course also emphases on financial accounting. Topics include the preparation and analysis of financial statements (balance sheet, income statement, and cash flow statement), government accounting, and ethics in financial management. Topics explain financial management of working capital and investment decision models, long term capital structure and mergers and acquisitions of health care organizations. Course's contents will include cases about a range of health care organizations (hospitals, managed care, health centers, physician, home health organizations, etc.)

HCM 535 DATA ANALYTICS APPLICATIONS IN HEALTHCARE (3)
Prerequisites: None

This course focuses on application of data science and analytics techniques to concepts and problems in healthcare. Data analytics in general and in the context of healthcare in particular involves many steps including data generation, data extraction, data analysis, visualization and reporting. An overview of these data analytics stages will be provided as they apply to healthcare industry. A review of basic predictive analytics concepts such as statistical learning using regression techniques, classifiers and decision trees will be given. Application of these techniques to healthcare issues such as patient monitoring, preventive diagnosis, personalization of treatment for patients will be discussed. The students will learn and analyze the impact of data

analytics in planning, process efficiency, and resource management in healthcare industry.

HCM 690 HEALTHCARE INNOVATION MANAGEMENT PROJECT (3)
Prerequisites: MGT 503; Completion of 27 credit hours in the program

This course focuses on using the knowledge obtained throughout the healthcare management core and elective courses in implementing a comprehensive project. The nature of the project will be interdisciplinary and students with different background and skills are encouraged to participate in the project. The project is inspired from real-life scenarios found in the healthcare management industry. The students will form a team that each will tackle different aspect of the project. An example of a project could be a medical device product development project that requires a market survey, business plan development, design specification document, cost and budgeting, manufacturing/implementation plan. The goal of this course is to expose students to real-life product cycle and provide hands-on experience with an industrial project while emphasizing development of soft skills such as teamwork in a classroom setting.

HRM (HUMAN RESOURCE MANAGEMENT)
HRM 528 HUMAN RESOURCE MANAGEMENT (3)
Prerequisites: None

This course examines the principles of human resource management, including recruiting, hiring, orienting, training, developing, disciplining, and rewarding employees. The course provides a management-oriented exploration of human resource management, structure, functional applications, and labor management relations. This course is a humanistic and legal analysis of organizations, focusing on the role of human resource management. There will be an examination of managers and leaders within organizations and their responsibility to maximize performance and make decisions based on ethical criteria. The class will also discuss Dual Motive Theory in terms of Ego/Empathy and ethical/unethical behavior to understand how brain functions can impact human behavior and relationships.

HRM 529 ORGANIZATIONAL DEVELOPMENT (3)
Prerequisites: None

This course reviews training, employee and organizational development techniques that the organizations use to build group and individual skills. Topics include linking identified needs to business objectives, developing an implementation plan, implementing the plan using a variety of modalities, and assessing results. The students will use a hands-on approach to evaluate organizational needs for employee development. The overarching objective of this course teaches students to assess, develop, facilitate, and evaluate a training program. We will also discuss Dual Motive Theory in terms of Ego/Empathy and self/other behavior to understand how brain functions can impact human behavior and relationships.

HRM 530 EMPLOYMENT LAW FOR BUSINESS (3)
Prerequisites: None

This course emphasizes federal employment statutes. Cases are used to illustrate the various federal courts' interpretation.

Federal agencies such as Equal Employment Commission and Department of Labor are studied. Topics on the employment law provide a comprehensive analysis of federal and state laws, which affect the human resource function, including equal employment opportunity, wage and overtime payment, and employment agreements. The course focuses on applying employment laws to develop programs that enable organizations to act positively in meeting both company and work force needs, trying to resolve workplace disputes, prevent litigation, and implement personnel policies and practices in conformity with applicable law.

HRM 533 STRATEGIC COMPENSATION: ISSUES AND OPPORTUNITIES (3)
Prerequisites: None
This class addresses the need for strategically focused compensation systems aligned to the business objectives and examines the related factors that impact employee motivation and productivity in a variety of settings and industry sectors. The course will examine and analyze the various components of compensation systems in contemporary organizations in understanding how and why they add and sustain shareholder and/or stakeholder value.

HRM 535 HUMAN RESOURCES AND INFORMATION TECHNOLOGY (3)
Prerequisites: None
This course offers the students the best practices in use of technology in the human resources field. Topics include the use of human resources information systems, web-based human resources used to develop and support the various functional areas of human resources.

INB (INTERNATIONAL BUSINESS)
INB 553 FUNDAMENTALS OF INTERNATIONAL BUSINESS (3)
Prerequisites: None
This course provides an introduction to globalization and the cultural, economic, political, and legal environments of international business. The course helps students understand international trade, the role of the government in trade, and have an understanding of the international financial system. It will familiarize students with concepts of international strategy, marketing products in the international arena, and international staffing policy.

INB 554 INTERNATIONAL FINANCIAL MARKETS (3)
Prerequisites: None
This course analyzes the international financial markets. Topics include foreign currency, international money markets, banking, and capital markets. The course helps students understand the basics of international finance, the foreign exchange market, exchange rate determination, and currency derivatives. The foundation of understanding foreign exchange management, the world financial markets and institutions will be covered.

INB 556 GLOBAL STRATEGIC MANAGEMENT (3)
Prerequisites: None
This course examines the fact of globalization, and how managers in multinational firms struggle with a complex and rapidly changing international economic environment. The course introduces the business skills of understanding and managing strategic issues in international environment. It will also focus the understanding of the need for awareness of a change in organizations' internal and external environments.

INB 558 GLOBAL MARKETING AND STRATEGY (3)
Prerequisites: None
This course is an introductory survey of global marketing. Students will learn the mechanism of the decision-making process, and challenges of going global. The culture, legal, political, geographic, technological, and economic influences will be examined in the development of a comprehensive global marketing strategy. The student will gain a perspective of the trade operations mechanism and develop skills that will enhance their participation in a global economy.

INB 559 INTERNATIONAL BUSINESS MANAGEMENT (3)
Prerequisites: None
Understanding management in the global business context is the primary focus of this course. The relationship between national culture and management practice is examined by identifying the opportunities and challenges facing global business in the 21st century. Students develop cross-cultural management skills, learn new ways for conducting international operations, and explore how culture influences management within a global business market. Skills developed in this course include critically thinking about the course topics by writing and speaking of key issues in management practices; working in teams to contribute to group projects and exercises; and building a personal network with business professionals and practitioners using social networks, public forums, and community involvement.

INT (INTERNSHIP)
INT 593 PART-TIME/FULL-TIME INTERNSHIP (1, 3)
Prerequisites: CFL 591, can be taken concurrently
This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A maximum of 10 credit hours earned in INT 593 may be applied toward the Master's Degree graduation requirements.

MBN (MASTER OF BUSINESS ADMINISTRATION, CAPSTONE THESIS)
MBN 697 MBA THESIS (3)
Prerequisites: MGT 503; Completion of 27 credit hours in the program
Students should select a topic and work with an advisor to complete their thesis paper. The thesis concludes the program and should be taken after all other courses. The students will prepare an independent thesis and defend it before a committee composed of a number of faculty designated by the chair of the MBA program.

MGT (MANAGEMENT)

MGT 503 ORGANIZATIONAL LEADERSHIP THEORIES (3)
Prerequisites: None

The course will provide an in-depth examination of organizational leadership. This course will explain the principles, strategies and elements of effective organizational leadership. Leadership theories are examined in the context of contemporary, global and matrix organizational environments. Students will get the essential knowledge and skills to be efficient in these varied organizational contexts. Students will build an understanding of the work of organizations and the leaders' roles at all levels to enhance organizational performance. In addition, the course will discuss human behavior in organizations, the role of leaders as they move from strategic to tactical implementation, and leading organizational change.

MGT 560 PRINCIPLES OF MANAGEMENT (3)
Prerequisites: None

This course features traditional management principles such as planning, managing, leading and controlling. Two textbooks will be utilized during the trimester: one for theory & practical tactics of management, and another for self and other-awareness of people principles of management. Students will read and discuss the two texts and engage in classroom activities and business writing. There will be individual and group written essay, and oral presentation assignments. The class will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior and relationships.

MGT 564 PRINCIPLES OF PUBLIC RELATIONS (3)
Prerequisites: None

This course invites students to learn the language of the field of public relations. Also, students will learn to distinguish between the field of public relations and its related fields: marketing, advertising, public affairs, publicity, and propaganda. Students will compile actual research data about a hypothetical public relations campaign. Students will apply basic public relations principles to case studies. For the final exam, students will deliver effective public relations presentations. Students must come to class with their computers. Students should submit their resumes to the ITU EMS (ems.itu.edu) before the first class.

MGT 566 PRODUCTION AND OPERATIONS MANAGEMENT (3)
Prerequisites: None

This course will help students to understand theories, problems and methods applicable to the operations of various business organizations. The focus is on decision making in operational areas such as: facility conditions and use, control and manage resource inputs and outputs, types of transformation procedures, and performance evaluations. This course is relevant to people interested in designing and managing production and business processes, and those who manage interfaces between operations and the other business functions. The body of knowledge encompassed in this course will provide the basis for linking corporate strategy to its production and operations management.

MGT 567 QUALITY CONTROL MANAGEMENT (3)
Prerequisites: None

This course focuses on the understanding of effective quality management. It provides the basic quality concepts and the benefits of a quality approach for an organization. It addresses teamwork by explaining the various team types, the roles and responsibilities of their members and the team-building dynamics. The basic quality and quality management tools are described in the context of problem solving and data analysis for continuous quality improvement. The course discusses various statistical concepts and tools, and how they are applied for process monitoring, control, and improvement. It also analyzes the key elements of customer and supplier relationship and their impact on quality for the organization. The course follows the Body of Knowledge (BOK) for the Quality Process Analyst certification of the American Society for Quality (ASQ) and prepares for the certification examination.

MGT 569 STRATEGIC OPERATIONS MANAGEMENT (3)
Prerequisites: None

This course provides an overview of Strategic Operations Management with emphasis on the four core themes of operations strategy, a vital topic for any company's objectives: strategy, innovation, services, and supply. We will cover the intrinsic and extrinsic factors within an organization's operations, including the input of: Capital, Technology, Energy, and Know-how; and the output of the final product/service for the customer. It will also cover the big picture of Strategic Operations including; supply management, innovation, sustainability, and human resources. Additionally, this course will cover managing strategic operations within organizations including; managing the transformation process, managing quality, managing inventory, capacity and scheduling management, and managing service operations.

MGT 571 CRITICAL THINKING STRATEGIES IN DECISION MAKING (3)
Prerequisites: None

This course provides students opportunities for analysis, synthesis, prescription, and application of critical thinking and decision making within the organization. Emphasis is placed on preparing managers who can deal clearly, rationally, and creatively with a diverse workforce and dynamic workplace. This course equips students with concrete skills in critical thinking and decision making that will allow them to identify and solve organizational problems, as well as provide strategic direction. This course will also discuss Dual Motive Theory in terms of Ego/Empathy and ethical/unethical behavior to understand how brain functions can impact human behavior and relationships.

MGT 572 HIGH-TECHNOLOGY ENTREPRENEURSHIP (3)
Prerequisites: None

This course is offered for those planning to undertake an entrepreneurial career in starting and building an international company in the high-technology area. A special effort is made to take advantage of ITU's proximity

to the entrepreneurial community in Silicon Valley with its fundamental international business thrust. An integrative business plan for a new company in the technology arena is an integral part of the course. Topics covered include: addressing new business opportunities, global trends, high technology, business model design, start ups, venture capital process and tools. This course will cover the basics of building a business plan to meet emerging needs. Concepts and techniques of social entrepreneurship will provide the foundation for learning and communicating.

MGT 573 INTERNATIONAL MANAGEMENT (3)
Prerequisites: None
This course studies the role of managers in global markets. Topics include the external economic and political environment, international strategic planning, partnerships, global human resource management, managing technology, product and service design, ethics and leadership. The course utilizes innovative techniques and case study analysis from a variety of national, and multinational firms.

MGT 575 PROJECT MANAGEMENT (3)
Prerequisites: None
This course provides an overview of project management history, culture, methodologies, leadership and strategic planning. The course introduces important tools, such as work breakdown structure, scheduling, earned value analysis, and risk management. Case studies from a variety of organizational settings are discussed. The course discusses the 5 processes that must be done for project success: Define, Organize, Execute, Control and Close. The strategic implications of projects will be considered with respect to the organizational vision. This course follows the Project Management Body of Knowledge (PMBOK) of the Project Management Institute (PMI) and prepares for the examinations for the Certified Associate in Project Management (CAPM) or the Project Management Professional (PMP) certifications. The course focuses on the concepts and tools of the different project management elements. It first sets the project management framework and describes the different steps in the project management process. Next, all the key management aspects of a project are addressed: integration, scope, time, cost, quality, human resources, communications, risk, procurement and stakeholder.

MGT 577 PROJECT RISK MANAGEMENT (3)
Prerequisites: None
After a brief overview of the project management framework and processes, this course explains how risk management is integrated into the different knowledge areas of a project. The course then addresses the six elements of risk management: risk management planning, risk identification, qualitative risk analysis, quantitative risk analysis, risk response planning, and risk monitoring and control. In this context, the course explores the project management techniques and approaches to identify, and analyze the full range of project risks for successful project risk management outcomes. The various concepts and tools are illustrated by examples and case studies. This course will also emphasize the communication requirements that successful project managers use to manage risk and uncertainty.

MGT 578 BUSINESS COMMUNICATIONS (3)
Prerequisites: None
Communication is an essential component in every career and life task. This class is intended to provide background and guidelines on what is good communication in a business setting. Activities will be punctuated by theories, attitudes and behaviors of researchers, educators, or business leaders regarding essential communications and leadership practices. There will be frequent opportunities to interact, write on concepts, and present original contributions through the class community environment. It will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior and relationships.

MGT 579 BUSINESS ETHICS (3)
Prerequisites: None
This course introduces ethical decision-making in business environment. It examines the individual, organizational, and macro level issues. The course does not attempt to determine correct ethical action. In the complex business environment in which managers confront ethical decision-making there is no absolute right or wrong answer in most cases. Since there is no general agreement on the correct ethical business norms, critical thinking and relevant decision making are examined. It will also discuss Dual Motive Theory in terms of Ego/Empathy and ethical/unethical behavior to understand how brain functions can impact human behavior and relationships.

MGT 580 BUSINESS LAW (3)
Prerequisites: None
Business law reviews issues with the legal problems confronting businesses such as court procedures, contracts and property law. Other topics include court systems, litigation, and alternative dispute resolution; constitutional and administrative law; tort law and, product liability; contract law and, agency law; business organizations; and government regulation of businesses including antitrust law, employment law, and securities regulation.

MGT 581 MANAGING EMOTIONS, MANAGING SELF AND OTHERS (3)
Prerequisites: None
This course will describe the aspects of Emotional Intelligence and managing yourself and others, starting with self-awareness, empathy, and regulating emotions for self and others to sustain healthy and authentic relationships. Other aspects include positive and negative emotional contagion, EI's effect on morale, leading and professionalism. It will include a review of Dual Motive Theory, understanding how brain functioning of ego and empathy can impact behavior and relationships. Finally, the class will study evaluations of cognitive, emotional and social competencies and scholarly research showing how humans flourish.

MGT 582 TEAM AND GROUP DYNAMICS (3)
Prerequisites: None
Team and Group Dynamics are an essential component in every career and life task. In this course, students will learn and apply the skills required for effective teamwork that applies in many industries. Our activities will be punctuated by theories, attitudes and behaviors of researchers, educators

or business leaders regarding essential teams and group dynamics. There will be frequent opportunities to interact, write on concepts, and present original contributions through the class community environment.

We will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior and relationships.

MGT 583 GLOBAL ENTREPRENEURSHIP AND INNOVATION (3)
Prerequisites: None
This course focuses on methods and know-how of effectively managing innovation and entrepreneurship. Throughout the trimester the theory and practice of managing innovation in small and large companies will be discussed. Topics such as strategies, business models, risks, fund raising techniques are explained. The course emphasizes learning and practical issues through readings, case analyses, written assignments and in-class discussion. The case studies will include companies from around the world that have been successful in innovating repeatedly and those who were not able to re-invent and hence failed. The assignment will combine both strategy and implementation of innovation and entrepreneurship so students can critically evaluate approaches to managing innovation and entrepreneurship and provide practical help in this context.

MGT 584 SUPPLY CHAIN MANAGEMENT (3)
Prerequisites: None
The business world today is becoming increasingly global and complex. The overall success of an organization relies more and more on the efficiency and effectiveness of its supply chain. Having a superior product means nothing unless it is delivered to customers on time and in perfect condition. With the strategic combination of people, tools, processes and technologies, effective supply chain management can boost customer service, improve bottom line and enable an organization to successfully compete in the global marketplace.
Formerly known as, MKT 584 "Supply Chain Management" August 2015 - July 2016.

MGT 593 INTRAPRENEURSHIP – INNOVATION FROM WITHIN (3)
Prerequisites: None
This course speaks directly to the needs of an organization seeking to create an innovative business opportunity within the existing structure of the organization. The methods from this class are widely used by the most successful innovators in start-ups as well as established companies. This class will present the differences between entrepreneurship and intrapreneurship. Innovation and creativity are key components of intrapreneurship.

MGT 608 BUSINESS STATISTICS (3)
Prerequisites: Calculus, Algebra II, or equivalent
Recommended: Previous knowledge of Calculus, Algebra II, or equivalent
With many unfamiliar concepts and complex formulas, business statistics can be confusing and demotivating experience for students that do not have a strong mathematics background. They can have trouble recognizing the importance of studying statistics and making connections between business problems and the statistical tool that can be used to solve them. This seventh edition of Business Statistics: For Contemporary Decision Making has been designed to provide students with better explanations and examples thus providing a smoother path to understanding and the ability to choose the correct techniques to apply for a given problem.

MGT 611 LEAN SIX SIGMA (3)
Prerequisites: Previous knowledge of Calculus, Algebra II, or equivalent
Six Sigma is a proven methodology for solving problems in many areas of business, science, and industry. It is essentially a structured approach to the scientific method of problem solving based on the DMAIC acronym (Define, Measure, Analyze, Improve, and Control). The methodology helps in design, development, monitoring, and evaluation of processes, products, or services. The Six Sigma methodology incorporates business process, statistical, quality, and project management principles and practices with a goal of creating a systematic and data-driven decision making environment. Many successful companies utilize the principles of Six Sigma to meet growing customer expectations and to deliver better products and services in today's competitive marketplace. This course covers an overview of the Six Sigma principles, process, and implementation, and provides required information for taking Six Sigma Green Belt or Black Belt certification examination.

MGT 612 ADVANCED PROJECT MANAGEMENT (3)
Prerequisites: MGT 575, or equivalent
This course offers a study of the human and the operational sides of project management. The human side includes discussion on negotiating and conflict management, leveraging diversity, and selling project management. The operational side includes scope control techniques, risk management, and organizing for success. The students will learn how to effectively engage the project team, deal with the inevitable conflicts, and use intellectual and cultural diversity to encourage creative problem solving.

MGT 690 PITCHING A BUSINESS PLAN TO VENTURE CAPITALISTS (3) – CAPSTONE PROJECT
Prerequisites: MGT 503; Completion of 27 credit hours in the program
In today's extremely competitive world of raising money for startup companies, it is absolutely critical to have an effective and well-conceived pitch deck that compliments the project's vision and strategy. Only 1 of every 200 business plans submitted to venture capitalists (VCs) gets funded, so it is vital to present a well thought-out presentation that includes all of the elements that VCs (or any type of potential investor) will be looking for in deciding whether to invest in your company or not. Whether the student is interested in starting their own company someday, wants to work for a startup, or just wants to learn more about venture capital, Silicon Valley and startups in general, this will be a great opportunity to discover how startup companies have successfully raised money. All new students are required to take Outbound exam with Peregrine Academic Services. The Outbound exam is required to be taken in the capstone course, either MBN

697 Master Thesis or MGT 690 Pitching a Business Plan to Venture Capitalists. Taking the Outbound exam will have a fee which is currently $34. The Outbound exam is REQUIRED not OPTIONAL. Information on how to take the exams will be included in the course syllabus. Any new student who does not take the Outbound exam, will not be eligible for graduation. Current students are encouraged to take the exam.

MIS (MANAGEMENT INFORMATION SYSTEM)

MIS 527 TECHNOLOGY AND OPERATIONS MANAGEMENT: CREATING VALUE (3)
Prerequisites: None
The course explains the design, management, and development of technology and operating systems. It explores diverse quantitative problems that occur often in the business environments. It discusses how such problems can be properly solved with a join business insight and technology tools. Topics such as capacity management, service operations, organized decision making, limited optimization and simulation are included. This course teaches the model of complex business situations and the tools to enhance business performance. This course offers an outline of the field of operations technology. A managerial perception is assumed and highlight is placed on the understanding of how technologies for manufacturing, distribution, and service developments are used for competitive advantage.

MIS 537 MANAGEMENT INFORMATION SYSTEMS (3)
Prerequisites: None
This course explains the concept of managing information systems as a part of a broader socio-technical system and their impacts on people and processes in the business environment. Critical thinking is an important and essential part for the understanding of important issues associated with the management aspects of information systems. The course focuses on how the organization has used and can use its information resources to best serve its needs.

MIS 538 BUSINESS DATABASE APPLICATIONS (3)
Prerequisites: None
This course provides a basic overview of the concepts, principles, skills and techniques of business database systems and of database application system development. The course provides an approach to the design and use of databases for business applications. The study focuses on query languages and application generation. Use of database software applications are a necessity in current business environments.

MIS 539 BUSINESS TELECOMMUNICATIONS (3)
Prerequisites: None
This course offers an overview of communications technology used in many business applications - local area network, wide area network, broadband network, wireless, and voice network. The course helps the students understand the role of internet protocols. In addition, it provides training to analyze network requirements, design, and implement local area networks.

MIS 540 INFORMATION RESOURCE MANAGEMENT (3)
Prerequisites: None
This course explains the concept of viewing information systems resources from a strategic resource standpoint. The course will provide pragmatic tools for implementing the IRM within the organization. Topics will include Information System outsourcing, total cost of ownership, Information System planning and strategic analysis, management of IT human resources, traditional project management theory, and project management techniques. It will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior and relationships.

MIS 541 MANAGING GLOBAL INFORMATION SYSTEMS PROJECTS (3)
Prerequisites: None
This course helps the students learn how to plan and manage global information systems projects by focusing on initiating, planning, executing, controlling and closing projects. Topics such as integration, scope, timing, cost, quality, human resource, technology, communications, risk, and procurement are discussed. The students will learn how to monitor project plans and communicate reports to clients. The course will have a team project that will require students to conduct literature review or survey of current practices in the industry.

MIS 542 INFORMATION SYSTEMS INNOVATION (3)
Prerequisites: None
This course provides the tools and the skills to leverage emerging information technologies in order to create new business opportunities for both new entrepreneurial ventures and traditional firms. The course helps the students to understand, evaluate, and apply difficult topics such as new innovative and entrepreneurial information technologies.

MIS 543 HUMAN-COMPUTER INTERACTION (3)
Prerequisites: None
This course focuses on key factors in Human-Computer interaction. Topics include design elements, test procedures, experimental tools, and human-computer environments contributing to the development of successful user interfaces are discussed. Additionally, research topics will be explored in the areas of design principles, methodologies, implementation, and evaluation of user interfaces.

MIS 544 BUSINESS DECISION SUPPORT SYSTEMS (3)
Prerequisites: None
Focus of this course is to study decision making process in business environment. Managerial role in decision making and steps involved in the process will be discussed. Theoretical modeling of decision making and practical applications will be explored using Microsoft Excel and/or other software packages. Part of the course, decision support models such as break-even analysis, goal seeking, linear programming, decision tree analysis, statistical modeling, etc. will be used in defining decision support systems to address various business scenarios.

MIS 545 DATA MINING AND BUSINESS INTELLIGENCE (3)
Prerequisites: None
This course teaches the students business potential of big data and analytics, data warehousing, how to develop and retain data warehouses, and how to use this data for business benefit and as a source for business intelligence. Business intelligence is the use of logical software devices to study big data about an organization and its competitors in business planning and decision-making. In developing data warehouses, the course will teach the students the inter-relationships among operation, decision support structures, plan and the removal and cleaning process used to create a high quality data warehouse. Data mining theories and the use of data mining devices and techniques for decision-making and for creating business intelligence are discussed.

MIS 546 DATA SCIENCE FOR BUSINESS (3)
Prerequisites: None
Data Science for Business introduces the fundamental principles of data science, and walks the student through the "data-analytic thinking" necessary for extracting useful knowledge and business value from the data they collect. The course provides examples of real-world business problems so the student will not only learn how to improve communication between business stakeholders and data scientists, but also learn how to intelligently participate in and manage their company's data science projects. This course will help the student discover how to think data-analytically and fully appreciate how data science methods can support business decision-making.

MIS 547 SOFTWARE DEVELOPMENT PROCESS MANAGEMENT (3)
Prerequisites: None
This course helps the students to understand the software development process at both the project and organization levels. In addition, it provides the students with the tools to analyze software cost and schedule transaction issues, and teaches them how to apply the principles and techniques to practical situations. Topics include statistical decision theory, and software risk management.

MIS 548 KNOWLEDGE MANAGEMENT (3)
Prerequisites: None
Knowledge management (KM) is considered a competitive resource in organizations that promotes innovation, improves efficiency and effectiveness, and provides a sustainable competitive advantage in today's global environment. This course acquaints the student with organizational and managerial issues and examines Knowledge Management process and systems for supporting KM. Principles of developing systems for KM are explored. System architectures, tools and techniques, and their use in capturing, storing, locating, evaluating, disseminating, and using information and knowledge will be discussed. Application of these principles and techniques through the use of information/communication technologies is studied in the context of their impact on organization.

MKT (MARKETING)

MKT 551 COMPETITIVE MARKETING STRATEGIES (3)
Prerequisites: None
This course presents ways of finding new marketing opportunities, and enhancing marketing performance. Competitive marketing strategy describes how firms identify opportunities to create customer value and communicate this value efficiently. The key issue is to understand the drivers of greater customer and creating competitive advantage in the marketplace. The course explains the efficiency of strategic marketing decisions. The course offers strategy development by discussing important analysis of various cases from consumer, supplier, and technological markets; production and service businesses for-profit and non-profit sectors. Students will learn how to build a marketing plan.

MKT 582 MARKETING MANAGEMENT (3)
Prerequisites: None
This course presents an approach to understand and manage the marketing function. The students will learn how to develop a written marketing plan to determine and integrate elements of a marketing strategy. Topics include market segmentation, positioning and research; product decisions; pricing; channels of distribution; advertising; promotion; new product development; and marketing budgets. The course will introduce the role of marketing in the U.S. economy and the interaction of marketing with specific business functions and with society.

MKT 583 ENTREPRENEURIAL MARKETING (3)
Prerequisites: None
This course provides entrepreneurs with an understanding of marketing for new and small enterprises. It addresses marketing strategies. The Students will apply marketing concepts, such as creating and nurturing relationships with new customers, suppliers, distributors, employees and investors. This course brings together theory and practice to develop a comprehensive entrepreneurial business marketing plan.

MKT 585 INTERNATIONAL MARKETING (3)
Prerequisites: None
The course presents to the students the major factors of the international marketing decisions. The student will learn about the forces that influence the global marketing environment. The course introduces students to principles, policies, procedures, ethics, and techniques used in efficient and effective international market. International product, price, promotion, and distribution issues are discussed.

MKT 586 MARKETING RESEARCH (3)
Prerequisites: None
The broad objective of the course is to provide a fundamental understanding of marketing research methods employed by well-managed firms. The course is aimed at the manager who is the ultimate user of the research and thus is responsible for determining the scope and direction of research conducted. In the course, we will cover the types of research design, techniques of data collection and data analysis. Emphasis will be on the interpretation and use of results rather than on the mathematical derivations. The course focuses on helping

managers recognize the role of systematic information gathering and analysis in making marketing decisions, and develop an appreciation for the potential contributions and limitations of marketing research data. This course examines the role of marketing research within the overall marketing program and within the company or organization seeking research information. It describes the research process and identifies the most common and potent research methods and techniques while providing an opportunity to learn by applying them to a class field project.

MKT 588 CONSUMER BEHAVIOR (3)
Prerequisites: None

This course focuses on how to assess customer behavior and interprets this knowledge into marketing strategies. Topics include customer satisfaction and dissatisfaction, and the role of quality, TQM, and cycle time. In addition, the course introduces concepts such as, motivation, perception, knowledge, attitude, and culture on customer decision-making. The course is designed for students interested in consumer, service, high-tech, or not-for-profit marketing. This course evaluates consumer or customer behavior in the marketplace. This course will help future and current consumer oriented professionals, service oriented performers in the high technology or non-profit sectors. The course will also discuss Dual Motive Theory in terms of Ego/Empathy and ethical/unethical behavior to understand how brain functions can impact human behavior and relationships.

MKT 589 E-COMMERCE (3)
Prerequisites: None

This course provides introduction to e-Commerce and related subjects. The course will cover e-Commerce infrastructure and its related technologies. Various business models used in e-commerce will be discussed in the lecture. The student will have knowledge of e-commerce when s/he finishes this course.

MKT 590 MARKETING WITH SOCIAL MEDIA (3)
Prerequisites: None

In this course, students will gain the knowledge and skills to effectively use social media to market their business. The Social Media Marketing course will teach students the basics of content creation and management for social media including blogs, podcasts, and posts. Students will be introduced to the most popular platforms such as Facebook, Twitter, YouTube, LinkedIn, and Pinterest. Students will learn which platforms are the best fits for their company and metrics for measuring social media marketing success. This course will also address the legalities of social media, search-engine optimization, and crowd sourcing.

MKT 591 ADVERTISING STRATEGY (3)
Prerequisites: None

This course will teach the students the new world of Marketing Communication, and the importance of advertising and e-advertising. Topics include analyzing advertising campaigns, advertisements in a structured way, brand equity through advertising strategy, advertising effectiveness and creativity, and end-to-end advertising strategy campaign.

MKT 592 SUPPLIER/SELLER MANAGEMENT (3)
Prerequisites: None

This course will explain all aspects of outsourcing, including planning, finding the right vendor, and negotiating effectively. Topics include relationship building, creating a culture of cooperation, and skills in dealing with vendors. The course will teach the buying and selling processes that corporations use in business-to-business transactions. The focus of the course is on the concept of selling, improving value, and meeting the needs of clients through effective questioning, analysis, sales planning and presentations. The students will learn the major phases of the sales process, the sales objectives for each phase, the client needs, and the solutions' presentation. It will also discuss Dual Motive Theory in terms of Ego/Empathy and self/other behavior to understand how brain functions can impact human behavior and relationships.

MKT 613 ADVANCED MARKETING (3)
Prerequisites: MKT 582, or equivalent

The course will explain the importance of marketing, which include market research, competitor analysis and the consumer analysis. The student will explore the marketing process, and concept. In addition, the course will provide a study of the relationship between the marketing mix, and the changing business environment.

FACULTY

Amal Mougharbel, PhD,
Université de Corse Pascal Paoli,
Business Management, Department Chair

CORE FACULTY

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*Computer Information, Core
Faculty and Assistant Chair*

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Rahimian, Esmail, PhD, California Coast
University, Management

Tehrani, Nik, PhD, Northcentral University,
E-Commerce

DEPARTMENT OF COMPUTER SCIENCE

MISSION

The Department of Computer Science strives to prepare its graduates for successful careers as computer scientists or software engineers in all fields of society that experience computerization in any form and in the software industry.

INSTITUTIONAL LEARNING OUTCOMES

ILO #1: Problem Solving

ILO #2: Critical Thinking

ILO #3: Communication literacy

ILO #4: Collaboration and Teamwork

ILO #5: Technical literacy

ILO #6: Research skills and Information literacy

ILO #7: Individual Responsibility

MASTER OF SCIENCE IN COMPUTER SCIENCE

Computer Science is the science of computation using a programmable computing machine, of developing the programs for the computation, developing algorithms for solving computational problems, of acquiring, storing, managing data and information needed in those computations, and of estimating or predicting the feasibility and time constraints of arriving at solutions.

Graduate programs in computer science (CS) differ from undergraduate programs not so much in the topics they cover but in the depth in which the topics are covered. The student has to master deep knowledge of algorithms, operating systems, compilers, internals of databases, visual and sound recognition, robotics, and - in general – has to acquire sufficiently well-founded theoretical knowledge to contribute to computerization in fields not yet known.

ITU's curriculum for a MSICS is concerned with the theoretical as well as the practical issues of CS. The theoretical basis must be mastered because CS has a strong relation to mathematical and algorithmic thinking. An essential portion of a computer scientist's work consists of understanding and researching algorithms, as well as developing new ones.

This curriculum prepares the graduates for successful careers in the demanding and ever-growing job market in all fields of society that experience computerization in any form, be it web page design, IT security, software development in medicine, education, business administration, robotics, Internet of Things, and more. A solid knowledge of the computer science principles underlying all computerization and program development, augmented by training in

leading edge practical skills will enable graduates to play leadership roles in industry as well as to pursue PhD degrees. The development of this graduate curriculum has taken the recommendations of the Joint Task Force on Computing Curricula of the IEEE Computer Society and the Association for Computing Machinery of August 2004 into consideration.

PROGRAM LEARNING OUTCOMES (PLOs)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

PLO #1: Lead and organize Information Technology (IT) implementations at companies and institutions. (Mapped to ILO #1, ILO #3, ILO #4, ILO #5, ILO #7)

PLO #2: Invent and improve algorithms for storing, accessing, processing, and analyzing collected data. (Mapped to ILO #1, ILO #2, ILO #5, ILO #6)

PLO #3: Invent real time computation methods for analysis and processing of data in robotics (optical, sound, and other real time data from digital sensors). (Mapped to ILO #1, ILO #2, ILO #5, ILO #6)

PLO #4: Create innovative and useful features to modern operating systems (multiprocessor, multiprocessing, distributed). (Mapped to ILO #2, ILO #3, ILO #4, ILO #6)

PLO #5: Contribute to research and development of algorithms in all areas that are now and in the future subject to computerization. (Mapped to ILO #1, ILO #2, ILO #3, ILO #4, ILO #5, ILO #6, ILO #7)

PLO #6: Clearly explain Computer Science concepts in research, development, and educational institutions. (Mapped to ILO #2, ILO #3, ILO #5, ILO #6)

PLO #7: Show proficiency and skills in the most important areas of state of the art computer science. (Mapped to ILO #1, ILO #3, ILO #5)

CAREER OPPORTUNITIES

Computer scientists often work in organizations that develop new technologies and algorithms. Examples include: pattern recognition and signal processing for self-driving cars, artificial intelligence, and data mining. The development of new algorithms often requires a deep understanding of mathematics including knowledge in certain areas of abstract algebra for developing new encryption technologies or counteracting attempts at breaking them. They often work doing research in computer science, as well as working as information technology consultants in banking, insurance companies, and higher education.

PROGRAM REQUIREMENTS

- **Required Courses**
  - » 4 Core Courses: 12 Credit Hours
  - » 1 Capstone course: Thesis or Project: 3 Credit Hours
  - » Internship: 1 Credit Hour
- **Elective courses: 11-20 Credit Hours**
  - » Internship: 1-9 Credit Hours
  - » Cross Disciplinary course: Up to 3 credit hours (counts as Elective)
  - » Transfer Credits: Up to 9 credit hours from a graduated program of a regionally accredited school (counts as Elective)
- **36 Total Credit Hours**

GRADE POINT AVERAGE (GPA)
A minimum 3.0 cumulative GPA is required for granting of the Master's degree.

REQUIRED CORE COURSES
- » CSC 501 Discrete Structures
- » CSC 502 Principles of OS and Distributed Systems
- » CSC 620 Programming Language Theory
- » CSC 680 Advanced Computer Algorithms

REQUIRED CAPSTONE COURSE

- » CSC 690 Capstone Project

  OR

- » CSC 695 Master's Thesis

ELECTIVE COURSES
Electives from the MSCS curriculum must be chosen so that the total number of credit hours in the MSCS program is at least 36.

- » AMS 510 Linear Algebra
- » AMS 512 Applied Mathematics Methods
- » AMS 520 Optimization Techniques
- » AMS 530 Numerical Analysis
- » AMS 540 Discrete Mathematics
- » AMS 552 Probability, Statistics, and Reliability for Engineers
- » AMS 620 Advanced Optimization Techniques
- » AMS 722 Advanced Applied Mathematics Methods
- » AMS 750 Abstract Algebra

- » CEN 540 Network Security Techniques
- » CEN 542 Digital Image Processing
- » CEN 551 Computer Architecture
- » CSC 511 OO Programming with C++
- » CSC 515 I-Phone Application Development
- » CSC 518 OO Programming with Java
- » CSC 519 Android Application Development
- » CSC 520 Python Programming
- » CSC 522 R Language Programming
- » CSC 525 HTML/CSS Programming
- » CSC 527 Mobile Web Development
- » CSC 530 JavaScript Programming
- » CSC 532 Client Programming with JS/jQuery
- » CSC 535 Server Programming with PHP
- » CSC 545 Programming In GO
- » CSC 550 Big Data
- » CSC 560 Introduction to Data Science
- » CSC 570 Web Security Fundamentals
- » CSC 580 Computer Algorithms
- » CSC 625 Advanced HTML5
- » CSC 631 Data Mining
- » CSC 633 Machine Learning
- » CSC 650 Big Data Analytics (CPO) (SAS or SPSS)
- » CSC 682 Graph Algorithms
- » CSC 688 Special Topics (1 to 3 Credit Hours)
- » CSC 689 Independent Study (1 to 3 Credit Hours)
- » CSC 730 Cryptography and Cryptanalysis
- » CSC 750 Coding Theory
- » SWE 510 Information Security Countermeasures
- » SWE 520 Principles of Ethical Hacking
- » SWE 530 Cloud Computing Security
- » SWE 535 Cloud and Virtualization Security (CPO)
- » SWE 560 Principles of Database Systems
- » SWE 561 Cloud Computing
- » SWE 562 Oracle Database Management/Administration
- » SWE 570 Internet of Things Architecture and Security

- » SWE 600 Advanced Software Engineering
- » SWE 610 Ruby on Rails
- » SWE 615 Angular JS
- » SWE 620 Scala Programming
- » SWE 633 Software Refactoring
- » SWE 640 Artificial Intelligence
- » SWE 688 Special Topics (1 to 3 Credit Hours)
- » SWE 689 Independent Study (1 to 3 Credit Hours)

INTERNSHIP

- » CFL 591 Integrating Academic and Internship Learning (2 Credit Hours)
- » INT 593 Part-time/Full-time Internship (1-3 Credit Hours)

MASTER OF SCIENCE IN INFORMATION AND CYBERSECURITY

Hardly a day goes by when we don't hear about hacking of bank records or data bases, penetration into sensitive government and business information and the damage this causes to our economy and security.

ITU's MSICS curriculum offers a holistic education in a variety of security technologies that goes beyond what the thousands of training courses in Cybersecurity offer in order to combat this development, such as network security, risk and data management, preventative measures, computer ethics, digital signatures, and cryptography. The curriculum gives you the technical knowledge to take on a diverse set of industry-specific challenges.

Once you graduate from this program you will be a thoroughly educated Cybersecurity professionals with practical skills and in high demand. You will understand the core problems behind Cybersecurity and will develop solutions from the ground up.

PROGRAM LEARNING OUTCOMES (PLOs)

Upon completion of this program, graduates will be able to:

PLO #1: Secure organizations' on-premise and cloud-based computing resources. (mapped to ILO #1, ILO #2, ILO#5, ILO#6)

PLO #2: Demonstrate in depth knowledge of ICS techniques to provide leadership for effective solutions to security problems. (mapped to ILO #1, ILO #3, ILO #4, ILO #7)

PLO #3: Have sound knowledge of IS techniques that play a role in organizational processes and decision-making. (mapped to ILO #2, ILO #4, ILO #5, ILO #7)

PLO #4: Communicate effectively risk management issues and their impacts to a variety of audiences. (mapped to ILO #1, ILO #3, ILO #5, ILO #6)

PLO #5: Understand the legal and appreciate the ethical importance of ICS for individuals as well as organizations. (mapped to ILO #3, ILO #6, ILO #7)

PLO #6: Business enabler in organizations such as finance, insurance, healthcare, e-commerce, and mail services. (mapped to ILO #1, ILO #2, ILO #4, ILO #7)

PLO #7: Work as security expert in federal agencies for whom Cybersecurity is of highest importance such as DOD, DHS, and FBI. (mapped to ILO #1, ILO #5, ILO #6, ILO #7)

CAREER OPPORTUNITIES

Information Technology (IT) Security Analyst, IT Security Operations, Information Security Analyst, Information Security Engineer, Network Security Analyst, SSA IT Specialist, Cybersecurity Analyst, Cybersecurity Advisor, Cybersecurity Researcher, Cybersecurity Data Analyst, Information System Security Officer (ISSO), and more.

PROGRAM REQUIREMENTS

- Required Courses:
  - » 4 Core Courses: 12 Credit Hours
  - » 1 Capstone course: Project or Thesis: 3 Credit Hours
  - » 1 Internship: 1 Credit Hour

- Elective courses: 11-20 Credit Hours
  - » Internship: 1-9 Credit Hours
  - » Cross Disciplinary course: Up to 3 credit hours (counts as Elective)
  - » Transfer Credits: Up to 9 credit hours (counts as Elective)

- 36 Total Credit Hours

GRADE POINT AVERAGE (GPA)
A minimum 3.0 cumulative GPA is required for granting of the Master's degree

REQUIRED CORE COURSES

- » ICS 501 Introduction to Cybersecurity
- » ICS 502 Cyber Attack Countermeasures

- » ICS 601 Advanced Cybersecurity
- » ICS 680 Theory of Cryptographic Systems
- • Capstone courses
  - » ICS 690 Capstone Project

    OR
  - » ICS 695 Master's Thesis

ELECTIVE COURSES

Electives from the MSICS curriculum must be chosen so that the total number of credit hours in the MSICS program is at least 36.

- » AMS 510 Linear Algebra
- » AMS 512 Applied Mathematics Methods
- » AMS 520 Optimization Techniques
- » AMS 530 Numerical Analysis
- » AMS 540 Discrete Mathematics
- » AMS 552 Probability, Statistics, and Reliability for Engineers
- » AMS 620 Advanced Optimization Techniques
- » AMS 722 Advanced Applied Mathematics Methods
- » AMS 750 Abstract Algebra
- » CEN 540 Network security techniques
- » CEN 542 Digital Image Processing
- » CEN 551 Computer Architecture
- » CSC 501 Discrete Structures
- » CSC 502 Principles of OS & Distributed Systems
- » CSC 505 The UNIX/Linux OS
- » CSC 509 C Programming
- » CSC 511 OO Programming with C++
- » CSC 512 Data Structures
- » CSC 515 iPhone Application Development
- » CSC 518 OO Programming with Java
- » CSC 519 Android Phone Application Development
- » CSC 520 Python Programming
- » CSC 522 R Language Programming
- » CSC 525 HTML/CSS Programming
- » CSC 527 Mobile Web Programming
- » CSC 530 JavaScript Programming
- » CSC 532 Client Programming with JS/jQuery
- » CSC 535 Server Programming With PHP
- » CSC 545 Programming In GO
- » CSC 550 Big Data
- » CSC 560 Introduction to Data Science
- » CSC 570 Web Security Fundamentals
- » CSC 580 Computer Algorithms
- » CSC 620 Programming Language Theory
- » CSC 625 Advanced HTML5
- » CSC 631 Data Mining
- » CSC 633 Machine Learning
- » CSC 650 Big Data Analytics (CPO-SAS/SPSS)
- » CSC 670 Network & Data Security
- » CSC 680 Advanced Computer Algorithms
- » CSC 682 Graph Algorithms
- » CSC 720 Formal Methods
- » CSC 730 Cryptography & Cryptanalysis
- » CSC 750 Coding Theory
- » ICS 520 Personal Computer Security
- » ICS 525 Principles of Ethical Hacking
- » ICS 550 Security Policies
- » ICS 620 Computer Malware
- » ICS 630 Digital Forensics Technology
- » ICS 688 Special Topics
- » ICS 689 Independent Study
- » SWE 500 Software Engineering
- » SWE 510 Information Security Countermeasures
- » SWE 520 Principles of Ethical Hacking
- » SWE 530 Cloud Computing Security
- » SWE 535 Cloud and Virtualization Security (CPO)
- » SWE 560 Principles of Database Systems
- » SWE 561 Cloud Computing
- » SWE 562 Oracle Database Management/Administration
- » SWE 570 Internet of Things Architecture and Security
- » SWE 600 Advanced Software Engineering
- » SWE 610 Ruby on Rails
- » SWE 615 Angular JS
- » SWE 620 Scala Programming
- » SWE 633 Software Refactoring
- » SWE 640 Artificial Intelligence

INTERNSHIP

- » CFL 591 Integrating Academic and Internship Learning (2 Credit Hours)
- » INT 593 Part-time/Full-time Internship (1-3 Credit Hours)

MASTER OF SCIENCE IN SOFTWARE ENGINEERING

Software Engineering is an established discipline that comprises requirement analysis, design, construction, testing, as well as the economics, and management issues of the creation and maintenance of software. A Software Engineer has the special knowledge and skills necessary to develop and maintain large, complex software systems. A Software Engineer approaches all of these problems in a pragmatic and organized way and is concerned with the theoretical and practical aspects of technology, cost, and social impact of effective and efficient software.

Degree programs in software engineering have many courses in common with computer science. However, when it comes to techniques concerned with the reliability of software and with developing and maintaining software that is correct from the start of its development, the engineering knowledge and experience provided in SE programs go beyond what general CS programs provide. It is considered a necessity by many professionals and educators in the SE field that students of SE should participate in the development of software to be used in earnest by others.

ITU's curriculum for a MSSE is concerned with the technical and management issues of SE, but primary emphasis is placed on the technical aspects of building and modifying high quality software systems. It thus allows the students to prepare for careers in businesses that build and sell computers and/or software, in Internet based companies, electronic business organizations, diverse research and development laboratories, aerospace companies, banks, and insurance companies. The development of this graduate curriculum has taken the recommendations of the Joint Task Force on Computing Curricula of the IEEE Computer Society and the Association for Computing Machinery of August 2004 into consideration.

PROGRAM LEARNING OUTCOMES (PLOs)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

PLO #1: Be able to identify and apply current and emerging software engineering technologies required for the creation of reliable, predictable, well-engineered software systems. (Mapped to ILO #1, ILO #2)

PLO #2: Be able to utilize multiple programming paradigms, including object-oriented, functional, logic, and emerging programming technologies. (Mapped to ILO #1, ILO #2)

PLO #3: Show understanding of SE principles and practices as described in the SWEBOK, and other emerging software development processes. (Mapped to ILO #5, ILO #6)

PLO #4: Have sufficient skills in human factors to be able to interact with stakeholders from multiple disciplines on the systems engineering level. (Mapped to ILO #3, ILO #7)

PLO #5: Have working skills in SE management including team building, leadership, project planning, selection of tools and processes appropriate to a project. (Mapped to ILO #1, ILO #4)

JOB POSSIBILITIES

Jobs within software engineering include, but are not limited to: Software Development Engineering, Software Applications Engineering – analysis, design, construction, testing, as well as the economics, and management issues of the creation and maintenance of software. A Software Engineer has the special knowledge and skills necessary to develop and maintain large, complex software systems.

PROGRAM REQUIREMENTS

- Required Courses
  - » 4 Core Courses: 12 Credit Hours
  - » 1 Capstone course: Thesis or Project: 3 Credit Hours
  - » Internship: 1 Credit Hour
- Elective courses: 11-20 Credit Hours
  - » Internship: 1-9 Credit Hours
  - » Cross Disciplinary course: Up to 3 Credit Hours (counts as Elective)
  - » Transfer Credits: Up to 9 credit hours from a graduated program of a regionally accredited school (counts as Elective)
- 36 Total Credit Hours

GRADE POINT AVERAGE (GPA)
A minimum 3.0 cumulative GPA is required for granting of the Master's degree.

REQUIRED CORE COURSES

- » SWE 500 Software Engineering
- » SWE 600 Advanced Software Engineering
- » SWE 602 Software Requirements Elicitation

» SWE 680 Software Architecture

REQUIRED CAPSTONE COURSE

» SWE 690 Capstone Project

OR

» SWE 695 Master's Thesis

ELECTIVE COURSES

Electives from the MSSE curriculum must be chosen so that the total number of credit hours in the MSSE program is at least 36.

» AMS 510 Linear Algebra

» AMS 512 Applied Mathematics Methods

» AMS 520 Optimization Techniques

» AMS 530 Numerical Analysis

» AMS 540 Discrete Mathematics

» AMS 552 Probability, Statistics, and Reliability for Engineers

» AMS 620 Advanced Optimization Techniques

» AMS 722 Advanced Applied Mathematics Methods

» CSC 501 Discrete Structures

» CSC 502 Principles of OS and Distributed Systems

» CSC 505 The UNIX/Linux OS

» CSC 509 C Programming

» CSC 511 OO Programming with C++

» CSC 512 Data Structures

» CSC 515 iPhone Application Development

» CSC 518 OO Programming with Java

» CSC 519 Android Phone Application Development

» CSC 520 Python Programming

» CSC 522 R Language Programming

» CSC 525 HTML/CSS Programming

» CSC 527 Mobile Web Programming

» CSC 530 JavaScript Programming

» CSC 532 Client Programming with JS/jQuery

» CSC 535 Server Programming With PHP

» CSC 545 Programming In GO

» CSC 550 Big Data

» CSC 560 Introduction to Data Science

» CSC 570 Web Security Fundamentals

» CSC 580 Computer Algorithms

» CSC 620 Programming Language Theory

» CSC 625 Advanced HTML5

» CSC 631 Data Mining

» CSC 633 Machine Learning

» CSC 650 Big Data Analytics (CPO-SAS/SPSS)

» CSC 670 Network and Data Security

» CSC 680 Advanced Computer Algorithms

» CSC 682 Graph Algorithms

» CSC 688 Special Topics (1 to 3 Credit Hours)

» CSC 689 Independent Study (1 to 3 Credit Hours)

» CSC 720 Formal Methods

» CSC 730 Cryptography and Cryptanalysis

» CSC 750 Coding Theory

» CSC 760 Advanced Topics in Data Science

» ICS 501 Introduction to Cybersecurity

» ICS 520 Personal Computer Security

» SWE 510 Information Security Countermeasures

» SWE 520 Principles of Ethical Hacking

» SWE 525 Version Control Tools/GIT

» SWE 530 Cloud Computing Security

» SWE 535 Cloud and Virtualization Security (CPO)

» SWE 540 SQA/Manual Testing

» SWE 542 SQA/manual/auto/perf Testing

» SWE 544 SQA/Software Testing Tools

» SWE 561 Cloud Computing

» SWE 562 Oracle Database Management/Administration

» SWE 570 Internet of Things Architecture and Security

» SWE 610 Ruby on Rails

» SWE 615 Angular JS

» SWE 620 Scala Programming

» SWE 633 Software Refactoring

» SWE 640 Artificial Intelligence

» SWE 688 Special Topics (1 to 3 Credit Hours)

» SWE 689 Independent Study (1 to 3 Credit Hours)

INTERNSHIP

» CFL 591 Integrating Academic and Internship Learning (2 Credit Hours)

» INT 593 Part-time/Full-time Internship (1-3 Credit Hours)

COURSE DESCRIPTIONS

CSC (COMPUTER SCIENCE)

CSC 501 DISCRETE STRUCTURES (3)
Prerequisites: None
This course is about discrete structures and forms an introduction to the theoretical side of computer science. Discrete structures and discrete mathematics turn out to be the "calculus'' of computer science–these are the structures that students will use to model real-world problems, to build algorithms upon, and to program with (both for modeling problems as well as use in data-structures and algorithms). In this course students will learn about various discrete structures (numbers, sets, relations, functions, trees, graphs), how to talk about them (propositional and predicate logic), how to prove things about them (using contradiction, construction, induction, combinatorics), and how to read and write literate formal mathematics. Students will also get a quick introduction to key applications to algorithmic analysis (like asymptotic worst-case running time analysis for algorithms). This "calculus of computer science'' will serve students as a foundation for computational thinking.

CSC 502 PRINCIPLES OF OS AND DISTRIBUTED SYSTEMS (3)
Prerequisites: None
The course begins with basic principles of a monolithic OS, as exemplified by Linux, MacOS, and Windows, then advances to more sophisticated details of processes, preemptive multiprocessing, lightweight processes, and interrupts various types of interprocess communications, demons, file systems, signals, and paging, which are present on each independent node of the network. Then it advances to the specific software subsets on each node of the aggregate operating system composed of the multitude of nodes. Then it advances to the higher level of the global system management components given for each node that coordinate the nodes' activities to form a collaboration. Coordination of the cooperation of an individual node's kernel OS and management component by the management system. In a properly functioning integration the whole distributed system should exhibit transparency which means that it appears to the user as one single OS entity.

CSC 505 THE UNIX/LINUX OS (3)
Prerequisites: Knowledge of C
Linus is a Unix like operating system that has been ported to more hardware platforms than any other OS. It is the leading OS on servers, big computers including supercomputers, embedded systems, and mobile devices such as android. This course focuses on the practical usage of the basic Linux operating system features. It introduces the student to the general principles of modern operating systems: preemptive multiprocessing; and of Linux in particular: shells, environment, shell variables, processes, threads, interprocess communication, the Unix file system, and shell scripts. Upon completion of this course the student will be able to work efficiently in a Linux or Unix environment, to tailor an environment to specific needs, to understand the basics of Linux system administration, to understand security risks, to write C programs that use system calls, and to write scripts for the C shell.

CSC 509 C PROGRAMMING (3)
Prerequisites: None
The course is an introduction to the C language as per the chapters of the book by Kernighan and Ritchie. The key topics covered will be C basics including Control Flow, Functions, Pointers, Structures, Memory Allocation/DE Allocation, Input/output (command line and files). The course will be very hands-on and students will be expected to test code from C books (list will be given in class), and thus understand the concepts.

CSC 511 OO PROGRAMMING WITH C++ (3)
Prerequisites: Knowledge of C
This class teaches Objected Oriented Programming using C++. Prior exposure to C is helpful but not required as the basic concept of C programming will be reviewed. The topics covered include: Syntax of C++, classes and objects, encapsulation, inheritance, polymorphism, design for reuse, programming with objects, the standard template library, namespaces, exceptions, type casting, and file input/output.

CSC 512 DATA STRUCTURES (3)
Prerequisites: Knowledge of C++ or Java
This course discusses the definition, design, and implementation of abstract data structures, including arrays, stacks, queues, heaps, and linked structures. Other data structures include hash tables, trees, and graphs. Students will also learn algorithms for manipulating theses structures, searching, and sorting, and the simpler graph algorithms. An introduction to the analysis of some sorting and searching algorithms is also covered.

CSC 515 IPHONE APPLICATION DEVELOPMENT (3)
Prerequisites: None
This course provides a training in iPhone application development including: Introduction to Objective-C; iPhone technologies: multi-touch interface, accelerometer, GPS, maps, proximity sensor, dialer, address book and calendar. It helps students to understand the business aspects of an application development.

CSC 518 OO PROGRAMMING WITH JAVA (3)
Prerequisites: None
This course focuses on the Java language as a tool for object-oriented programming. It introduces the student to the basic features of the Java language: primitive data types, terminal window-keyboard I/O, file I/O, classes, constructors and initialization, references vs. objects, access modifiers, memory maps, control structures, arrays, inheritance, function overloading and overriding, dynamic binding, interfaces, command line arguments, and exception handling. Some instruction to the platform-independent Java GUI API with Swing will be provided.

CSC 519 ANDROID PHONE APPLICATION DEVELOPMENT (3)
Prerequisites: CSC 518
This course teaches the use of SDKs released by Google to

facilitate the development of applications for the Android Phone. Android Phones are Linux based and are programmed in Java. This alone bodes very well for any software development on that platform: The Linux OS, the most powerful and easiest to manage of all operating systems, and the Java programming language with its superior GUI development capabilities. Knowledge of SDKs is certainly an advantage when developing for the Android platform.

CSC 520 PYTHON PROGRAMMING (3)
Prerequisites: None
Programming and problem solving using Python. Emphasizes principles of software development, style, and testing. Topics include procedures and functions, iteration, recursion, arrays and vectors, strings, an operational model of procedure and function calls, algorithms, exceptions, object-oriented programming.

CSC 522 R LANGUAGE PROGRAMMING (3)
Prerequisites: None
This course is an introduction to the R programming language, which is the premier language for statistical computing, machine learning, and data mining. Basic facilities of R contained in the course include mathematical, graphical, and interactive web applications. R is an open-sourced language used extensively in industry and in academia research. The course demonstrates methods for obtaining data from various sources, along with manipulating that data into a format that can be easily used in machine learning and data mining algorithms. The course covers a multitude of interactive visualization techniques along with the ability to share visualizations through web applications. This course provides insight into functional programming. The course covers reading and writing to and from various sources, R built in data types, controlling the flow of execution, using operators, functions, and R packages. The course includes methods of sharing analytic results in professional formats used by technical journals.

CSC 525 HTML/CSS PROGRAMMING (3)
Prerequisites: None
This course will examine how to create web pages using HTML code. The use of Cascading Style Sheets (CSS) will also be covered. Basic website development tools and website design will be studied though the creation of several HTML/CSS web site projects.

CSC 527 MOBILE WEB PROGRAMMING (3)
Prerequisites: CSC 525, CSC 530
This course is for experienced front-end Web developers who'd like to learn what it takes to create great mobile experiences. In order to succeed in this class, they should be comfortable with HTML, CSS, and Javascript, and should have experience creating Web apps, either professionally or for fun. This course will teach Web developers how to build Web experiences that adapt to the different screen sizes and capabilities that mobile devices offer, and how to scalably optimize media for mobile and desktop. This course will cover programming touch interaction, as well as how to optimize form field input for mobile devices and use APIs like geolocation and the accelerometer, and ensuring their web experiences work great when network conditions are suboptimal.

They will gain the tools to investigate performance in mobile applications, with a strong understanding of mobile networking, battery usage patterns and optimizing paint techniques to build smooth animations on mobile. Upon completion, the web developers will understand what it takes to build great web experiences on mobile devices, have gained experience with the tools they need to test performance, and be able to apply their knowledge to their own projects in the future.

CSC 530 JAVASCRIPT PROGRAMMING (3)
Prerequisites: CSC 525
This course introduces JavaScript as a programming language. It will talk about variables, data types, conditionals, loops, arrays, event handlers, objects, string, forms, cookies, and functions. It will teach students how to use JavaScript to access and manipulate BOM (Browser Object Model) and DOM (Document Object Model), and how to use JavaScript to make Web pages interactive. It will teach students how to interact HTML, CSS, JavaScript, and DOM within a Web page.

CSC 532 CLIENT PROGRAMMING WITH JS/JQUERY (3)
Prerequisites: CSC 525, CSC 530
jQuery is a JavaScript library designed to simplify the client-side scripting of HTML. It is designed to make it easier to navigate a document, select DOM elements, create animations, handle events, and develop Ajax applications. The topics of the course include: Basic jQuery syntax, jQuery element selectors, jQuery event handling, Ajax using jQuery, jQuery UI library.

CSC 535 SERVER PROGRAMMING WITH PHP (3)
Prerequisites: CSC 525
PHP is one of the best server-side technologies for handling Web content easily and efficiently. PHP is a free, open-source language devoted primarily to handling dynamic web pages and used by millions of sites worldwide. It can be integrated with HTML and handle databases. The course starts with the development environment and the language syntax. It introduces the concepts of OOP in PHP at different levels. It also covers the interactions with HTML web pages and databases. PHP Ajax support is introduced as the advanced topic. Practical examples and sample codes will be given. Upon successful completion of this course, students will gain hands-on experience with PHP syntax and constructs such as variables, arrays, strings, loops, user-defined functions and how to integrate HTML and PHP code to manage and process data.

CSC 545 PROGRAMMING IN GO (3)
Prerequisites: None
Go, also commonly referred to as golang, is a programming language developed at Google in 2007 by Robert Griesemer, Rob Pike, and Ken Thompson. It is a statically-typed language with syntax loosely derived from that of C, adding garbage collection, type safety, some dynamic-typing capabilities, additional built-in types such as variable-length arrays and key-value maps, and a large standard library. Go projects are for networking, distributed functions, or services: APIs, Web servers, minimal frameworks for Web applications, and the rest. In its weekday modality the course is taught over 15 weeks with 2 hours lecture and 1 hour lab per week.

CSC 550 BIG DATA (3)
Prerequisites: Knowledge of Java
This course will introduce the basic concepts, tools, techniques, and applications. This course will cover the most up-to-date Big Data Technology including Hadoop Distributed File System (HDFS) and MapReduce engine as well as Business Intelligence tools.

CSC 560 INTRODUCTION TO DATA SCIENCE (3)
Prerequisites: None
A practitioner of data science is called a data scientist. Data science leverage all available and relevant data to effectively predict a model that can be easily understood by non-practitioners. A major goal of data science is to make it easier for others to find and coalesce data with greater ease. Data science technologies impact how we access data and conduct research across various domains, including the biological sciences, medical informatics, social sciences and the humanities.

CSC 570 WEB SECURITY FUNDAMENTALS (3)
Prerequisites: Knowledge of HTTP, TCP/IP, SQL, and operating systems
This course introduces students to the fundamentals of computer security as the first step towards learning how to protect computers from hackers. The course begins by explaining the very basic concepts of computer security and provides substantial technical details to keep students interested and involved. It includes hands-on labs and graded and non-graded assignments for each credit that provide an opportunity to practice what the students learn. It also includes a few security games to make learning more exciting and interactive. Students are expected to be familiar with standard computer operations (e.g., login, cut and paste, email attachments, etc.) before enrolling in the course. This course will give students a clear vision on how all seven layers will work in IOS model and different levels of security in each layer.

CSC 580 COMPUTER ALGORITHMS (3)
Prerequisites: none
This course will cover algorithm design, sorting, searching, graph algorithms, stacks, queues, and dictionary implementations, divide and conquer algorithms, dynamic programming, randomized algorithms, amortized analysis, lower bound analysis, NP-Completeness.

CSC 620 PROGRAMMING LANGUAGE THEORY (3)
Prerequisites: Knowledge of Discrete Mathematics for Computer Science
This course provides an overview of common programming paradigms, including imperative, object-oriented, logic, and functional programming, and discusses the fundamental concepts underlying the design, definition, and implementation of modern computer languages. Students will get practical experience with languages that exemplify a particular paradigm.

CSC 625 ADVANCED HTML5 (3)
Prerequisites: CSC 525, CSC 530
This course is for Web developers who have solid experience in the basics of HTML5. This course will take the Web developers deep into the advanced techniques and functions that HTML5 has to offer. This course will first explore some Javascript basics - writing to an HTML page, using variables and functions, interacting with HTML, looping and drag and drop functions. Then the course will continue by exploring how to utilize and create custom media controls. The course will cover the more popular CSS3 features such as transform, translation and animation, and HTML5 Form API, Canvas, Geolocation, Drag and Drop, Web Storage, Communication, Messaging, History, Offline, indexDB, File, Web Workers, and finally, HTML5 for Mobile Apps. Upon completion, the Web developers will have a deeper understanding of how to take advantage of the many new features and functions that HTML5 has to offer.

CSC 631 DATA MINING (3)
Prerequisites: None
This course provides an introduction to the theoretical concepts and practical applications of data mining. Data mining facilitates the extraction of hidden predictive information from large complex databases. It is a powerful new technology with enormous potential to help organizations and institutions extract and interpret important information. The course content includes the conceptual framework of data mining, descriptions and examples of standard methods used in data mining. Internet related data mining techniques are also covered. Data processing, statistical modeling, data warehousing and online analytical processing, data conditioning and cleaning, data transformation, text and web mining, mining massive datasets, data stream mining, data mining algorithms, association and correlation, pattern mining, classification, cluster analysis, outlier detection, knowledge discovery, knowledge representation, and validation.

CSC 633 MACHINE LEARNING (3)
Prerequisites: Knowledge of basic computer science principles and skills, probability theory, and linear algebra.
Machine learning is a fast-moving field with many recent real world commercial applications. The goal of Machine Learning is to build computer model that can produce useful information whether predictions, associations, or classifications. The ultimate goal for many machine learning researchers is to build computing systems that can automatically adapt and learn from their experience. This course will study the theory and practical algorithms in Machine Learning. It reviews what machine learning is about, how it evolved over the past 60 years, why it is important today, basic concepts and paradigms, what key techniques, challenges and tricks. It also cover examples of how machine learning is used/applied today in the real world, and expose students to some experience in building and using machine learning algorithms. This course will also discuss recent applications of machine learning, such as to robotic control, speech recognition, face recognition, data mining, autonomous navigation, bioinformatics, and text and web data processing.

CSC 650 BIG DATA ANALYTICS (CPO-SAS/SPSS) (3)
Prerequisites: CSC 550
This course emphasizes the key aspects of data analytics for students intending to pursue certain professional certification, i.e., SPSS or SAS, upon the completion of the course. The first module introduces the fundamental statistical thinking to the

computer scientist, including probability, random variables, and statistical inference. Then, predictive modeling techniques, such as linear and logistic regression, are covered to make transition to the supervised and unsupervised data mining techniques. In the last module of the course, some popular big data platforms, namely, Hadoop/Mahout and Spark/MLlib, are discussed from the data analytics point of view. Examples from the text and social media mining application are covered in the second and the third module. The commercial software (student version) is required and used through the first and second modules, such that the students can be fluent in the application to meet the certification requirement thus limited programming requirement.

CSC 670 NETWORK AND DATA SECURITY (3)
Prerequisites: Knowledge of Information Assurance Fundamentals and Data communications
The course covers theory and practice of the security aspects of the web and Internet. It surveys cryptographic tools used to provide security, such as shared key encryption (DES, 3DES, RC-4/5/6, etc.); public key encryption, key exchange, and digital signature (Diffie-Hellmann, RSA, DSS, etc.). It then reviews how these tools are utilized in the internet protocols and applications such as SSL/TLS, IPSEC, Kerberos, PGP, S/MIME, SET, and others (including wireless). System security issues, such as viruses, intrusion, and firewalls, will also be covered.

CSC 680 ADVANCED COMPUTER ALGORITHMS (3)
Prerequisites: none
This course covers advanced methods of algorithmic design, analysis, and implementation. Techniques to be covered include amortization, randomization, network flow, linear programming, approximation algorithms, computational complexity, and NP completeness analysis. Domains include FFT, number theoretical algorithms, RSA encryption - decryption, various breaking attempts (factorization), primality checking, Diffie-Hellman key exchange, ElGamal encryption, algebra-based encryptions such as AES, cryptographic hash functions, pattern matching, and bioinformatics.

CSC 682 GRAPH ALGORITHMS (3)
Prerequisites: CSC 580
This course provides an introduction to mathematical modeling of computational problems and the design and analysis of the graph algorithms that solve these problems in practice. It covers the common graph algorithms, algorithmic paradigms, and data structures used to solve these problems. The course emphasizes the connection between graph models and the engineering problems solved by graph algorithms. It also illustrates how to synthesize new graph algorithms and algorithms employing graph computations as key components and analyze them. Several of the methods discussed in the course are of great practical use within areas such as transportation, network design, scheduling, and job assignments.

CSC 688 SPECIAL TOPICS (3)
Prerequisites: None
Special topics courses cover subjects not currently contained in the curriculum, but are designed to address especially relevant trends or developments related to the discipline.

CSC 689 INDEPENDENT STUDY (1-3)
Prerequisites: None
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

CSC 690 CAPSTONE PROJECT (3)
Prerequisites: Department approval and completion of 27 credit hours of the program
A capstone is the summative component of the master's degree program submitted by a graduate student. The Capstone Project is designed to demonstrate the in-depth learning and higher-order thinking of the student. It is meant to be an analysis of knowledge, breaking the information down into its component parts, and also the synthesis of new knowledge, assembling the parts into a new coherent whole. The capstone is also meant to be practical and useful. The student should choose an area that is uniquely and personally important and research or perform a project in that area. The Capstone Project is performed by arrangement with the project advisor. The student must conduct independent research in an approved topic in software engineering, prepare a report and defend it before a faculty advisor.

CSC 695 MASTER'S THESIS (6)
Prerequisites: Department Chair approval and completion of 27 credit hours of the MSCS program.
The master's thesis must be arranged with the capstone thesis advisor. After the topic is approved independent research in computer science toward the MS degree must be conducted. The research must result in some new insights into the academic or practical concepts of the CS world. These must be analyzed, explained, and documented in the thesis. After completing the thesis the student must defend it before a committee of faculty appointed by the Department Chair.

CSC 720 FORMAL METHODS (3)
Prerequisites: None
This course will focus on fundamental mathematical models of computation. It will discuss both the inherent capabilities and limitations of these computational models as well as their relationships with formal languages. Rigorous arguments and proofs of correctness will be emphasized. Particular topics to be covered include: (1) Finite automata, regular languages, and regular grammars. (2) Deterministic and nondeterministic computations on various automata. (3) Context free grammars, languages, and pushdown-automata. (4) Turing machines, Church's thesis, and undecidable problems.

CSC 730 CRYPTOGRAPHY AND CRYPTANALYSIS (3)
Prerequisites: None
This course analyzes ways to protect information during transfer in computer systems and networks. It includes the mathematics of cryptography, Number theoretical concepts, RSA theory, Diffie-Hellman key exchange, ElGamal Discrete Logarithm and their application and use in distributed systems, secure internet services, digital signature, intrusion detection and firewalls; coding based encryption; post-quantum cryptography. Some factoring methods to be studied include Fermat, Pollard Rho, and Elliptic Functions.

CSC 750 CODING THEORY (3)
Prerequisites: AMS 750
This class gives an introduction to coding theory. This course introduces examples for codes (ISBN, UPC, etc.) including binary codes, the meaning of important code parameters, detecting errors, correcting errors, sphere packing bound, and binary linear codes. Abstract algebra: fields and vector spaces, polynomial extensions of GF(2). Encoding linear codes: Introduction to generator matrices and parity check matrices, Hamming codes. Linear Algebra over GF(2), nullspace of a matrix, relation between generator and parity matrix. Error correcting codes, cyclic codes (BCH and Reed-Solomon codes), Goppa codes; syndrome decoding, the Patterson Algorithm.

ICS (INFORMATION AND CYBERSECURITY)

ICS 501 INTRODUCTION TO CYBERSECURITY (3)
Prerequisites: None
Overview of the field of Cybersecurity: history and basics of cryptography, risk and data management, fundamental concepts, preventative measures, rules, regulations and legal issues, security testing and assessment, identity and access management, database security, computer ethics, digital signatures.

ICS 502 CYBER ATTACK COUNTERMEASURES (3)
Prerequisites: ICS 501
Countermeasures for the preventing of cyberattacks. Firewalls – design, types and comparisons, intrusion detection, network access controls, network and browser encryption, network management, and secure systems development, cloud security.

ICS 520 PERSONAL COMPUTER SECURITY (3)
Prerequisites: None
Beginner's computer security course for small office or home users. Learn to stop hackers, worms, viruses, spyware, web bugs and identity theft. Learn vulnerabilities found in web browsers, email and operating systems. Protect against online purchase dangers, install firewalls, manage cookies, restrict ports, analyze log files, evaluate wireless networks and examine encryption.

ICS 525 PRINCIPLES OF ETHICAL HACKING (3)
Prerequisites: None
Recommended: Working knowledge of C++, Java, or Python
In this course students will learn and practice hacking techniques used by malicious, black-hat hackers as a means to learn best defense from these same hackers. The course is an in-depth study using hands-on lab exercises. While these hacking skills can be used for malicious purposes, this course teaches you how to use the same hacking techniques to perform a white-hat, ethical hack, on your organization. The course trains for the CEH (Certified Ethical Hacker Certificate). Students will be trained to penetrate, test and hack their employers' own computer system in order to safeguard it from real (malicious) hackers. The Ethical Hacker is a trustworthy employee of an organization trained to attempt to penetrate networks and/or computer systems by using the same methods and techniques as a malicious hacker. Through this the individual can learn and master the malicious hackers methods find the weak pointes in an organization's network or computer systems and build safeguards against hacking attempts. The CEH is the most desired information security training program for any IT security professional.

ICS 550 SECURITY POLICIES (3)
Prerequisites: None
The policies governing administration, management and enforcement of security issues are a separate, necessary element of Cybersecurity, not based on some other more fundamental Cybersecurity topic. They relate to network security, server security, and application security. Explain the vulnerability of small firms. Examples: Policies for enforcing encryptions and strong passwords. Rewards for followers, punishment for non-followers; information in all its forms will be protected from unauthorized modification. All existing systems will be equipped with approved antivirus software. All new equipment and software will be controlled before installation. Set antivirus software for automatic update. No foreign equipment, including private USB thumb drives, are allowed to be used. Employees must know the policies.

ICS 601 ADVANCED CYBERSECURITY (3)
Prerequisites: ICS 501
Cryptographic systems, communications and network security, security operations, security in the SW life cycle, investigations, resource protection, incidence response, implications of quantum computing.

ICS 620 COMPUTER MALWARE (3)
Prerequisites: ICS 520
Definition of computer malware (viruses, worms, Trojan horses, rootkits, backdoors), Infectious malware, the functioning of malware, coding of malware, self-replication, techniques for evading detection; reasons for vulnerability to malware; anti-malware strategies, anti-virus software. Dangers of malware: identity theft, file and data corruption industrial espionage.

ICS 630 DIGITAL FORENSICS TECHNOLOGY (3)
Prerequisites: ICS 520
General tools and techniques used in forensic analysis, investigating digital media and physical memory for securing evidence in criminal investigations, investigating computer crime; digital forensic software, mobile forensic analysis.

ICS 680 THEORY OF CRYPTOGRAPHIC SYSTEMS (3)
Prerequisites: ICS 601
A deeper coverage of modern encryption system and the necessary mathematics. Classical cryptographic constructions, basic cryptographic algorithms, symmetric cryptography; public-key cryptography: RSA, AES (Rijndael) stream cypher, Diffie-Hellman, El Gamal, coding based cryptography: McEliece – Niederreiter. Basic issues and concepts of Network and Data Security such as data confidentiality, data and user authenticity, data integrity, key management and distribution; digital signatures.

ICS 688 SPECIAL TOPICS (3)
Prerequisites: None
This elective allows the offering of courses about current topics of high interest and prominence in Information and Cybersecurity, the knowledge of which can give the graduate significant advantage in the job search, since universities traditionally don't offer such topics by means of established courses within a short time span.

ICS 689 INDEPENDENT STUDY (1-3)
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

ICS 690 CAPSTONE PROJECT (3)
Prerequisites: Department Approval and completion of 27 credit hours of the MSICS program
The capstone project is a report, analysis, project, or program, submitted by a graduate student. It is designed to demonstrate the in-depth learning and higher-order-thinking of the student. It is meant to be an analysis of knowledge, breaking information down according to the analytical strength of the student's thinking as well as synthesis of knowledge and assembling the parts into a new coherent whole.

ICS 695 MASTER'S THESIS (3-6)
Prerequisites: Department Approval and completion of 27 credit hours of the MSICS program
The master's thesis must be arranged with the capstone advisor. After the topic is approved independent research in Information Security toward the MS degree must be conducted. The research must result in some new insights into the academic or practical concepts of the Information Security world. These must be analyzed, explained, and documented in the thesis. After completing the thesis, the student must defend it before a committee of faculty appointed by the department chair.

SWE (SOFTWARE ENGINEERING)
SWE 500 SOFTWARE ENGINEERING (3)
Prerequisites: None
In this class, students will learn the elements of engineering and the relationship of engineering to software practice. It also covers how those principles and practices apply to the design, development, and maintenance of software throughout the entire software lifecycle. The course introduces traditional and contemporary approaches to software engineering practice. These include: requirements development, architecture and detailed design, modeling, testing strategies, process selection, project management, how to interact with other engineers on large-scale systems, and more. This course includes a capstone team where students gain practical experience designing a software system from start to finish using software modeling techniques such as UML, as well as a variety of project management methods and tools. This is not a programming course, but a background in object-oriented programming (OOP) will be valuable in helping the student understand the demands of the capstone project.

SWE 510 INFORMATION SECURITY COUNTERMEASURES (3)
Prerequisites: None
This course covers Cyber Ethics, Basic Network Terminologies, Information Gathering and Footprinting, various attach methods like Trojans, Backdoors, Viruses and Worms, Phishing and its Prevention; System Hacking and Security, Cryptography - the most important methods without going into mathematical details, Google Hacking, Secure Coding Practices, Firewalls, IDS, Evading IDS, Wireless Hacking and Security, Bluetooth Hacking; Introduction to Cyber Crime Investigation and IT ACT 2000, Investigation Methodologies and Case Studies, Cyber Forensics.

SWE 520 PRINCIPLES OF ETHICAL HACKING (3)
Prerequisites: Knowledge of C++, Java, or Python
In this course students will learn and practice hacking techniques used by malicious, black-hat hackers as a means to learn best defense from these same hackers. The course is an in-depth study using hands-on lab exercises. While these hacking skills can be used for malicious purposes, this course teaches you how to use the same hacking techniques to perform a white-hat, ethical hack, on your organization. The course trains for the CEH (Certified Ethical Hacker Certificate). Students will be trained to penetrate, test and hack their employers' own computer system in order to safeguard it from real (malicious) hackers. The Ethical Hacker is a trustworthy employee of an organization trained to attempt to penetrate networks and/or computer systems by using the same methods and techniques as a malicious hacker. Through this the individual can learn and master the malicious hackers methods find the weak pointes in an organization's network or computer systems and build safeguards against hacking attempts. The CEH is the most desired information security training program for any IT security professional.

SWE 525 VERSION CONTROL TOOLS/GIT (3)
Prerequisites: None
This course is designed to make the participants experts in git tool. It starts with fundamental concepts like git branch and continues to advanced topics like design and git work flow. The course covers different components of git and github and how they are used in software development operations. The course also covers Installation and Configuration of github and other tools and techniques like github desktop, SourceTree and Sparkle share as well. Participants will also get to implement one project towards the end of the course. Companies use git for creating and managing open source API's and to help the open source community. It is github, a git repository hosting service founded just a few years ago to build software better, together. Most of the high paying companies are using git and github for their new, innovative and upcoming Software Languages. Open source software can now be made using github and you will be able to share your repositories with other developers so that they can also contribute. github concepts can be implemented in Big Data and Hadoop technology, Java Projects and other frameworks as well. Some of the trending repositories in github are Scala and AngularJS.

SWE 530 CLOUD COMPUTING SECURITY (3)
Prerequisites: SWE 561
This class provides students a comprehensive understanding cloud security fundamentals and advanced expertise in cloud environments. Starting with a detailed description of cloud computing, the course covers all major domains in the latest Guidance document from the Cloud Security Alliance, and the recommendations from the European Network and Information Security Agency (ENISA) with expanded material and extensive hands-on activities. Students will learn to apply their knowledge as they perform a series of exercises as they complete a scenario bringing a fictional organization securely into the cloud.

SWE 535 CLOUD AND VIRTUALIZATION SECURITY (CPO) (3)
Prerequisites: SWE 561
This course introduces the concepts and techniques of implementing and securing cloud computing through the use of virtualization and distributed data processing and storage. Topics include operating system virtualization, distributed network storage, distributed computing, cloud models (IAAS, PAAS and SAAS) and techniques for securing cloud and virtual systems. Practical experience of integrating private, public, and hybrid clouds and virtual servers securely into an existing IT infrastructure will also be covered.

SWE 540 SQA/MANUAL TESTING (3)
Prerequisites: None
This course is a comprehensive introduction to Software Testing and Quality Assurance. The following topics will be taught: Software Development Methodologies, The Role of Quality Assurance in a Software Development Life Cycle, Common Software Testing Life Cycles, Software Testing Types and Definitions, Test Planning, Test Design, Test Cases Development, Test Execution and Results Analysis, and Test Matrices.

SWE 542 SQA/MANUAL/AUTO/PERF TESTING (3)
Prerequisites: None
Testing of software can be done in both Automation and Manual testing method, but it totally depends on the project requirement, budget associated with the project, and which testing method will be benefited to the project. Automation Testing is a method which uses automation tools to run tests that repeat predefined actions, matches the developed program's probable and real results. Manual testing is a method used by software developers to run tests manually. This course will teach the following: Software testing concepts; Black Box Testing, White Box Testing, Integration Testing, System Testing, Unit Testing, and Acceptance Testing; and Test Management tools: QC/ALM, Defect tracking tool, Jira and automation tool, and QTP/Selenium.

SWE 544 SQA/SOFTWARE TESTING TOOLS (3)
Prerequisites: None
This course introduces the QA with test methodologies and procedures. During the course, the students go through the Manual Testing and Automation of Client/server and web based applications. The course will quickly build through each of these concepts and configuration so that by the final day of class, each student will have fully tested the application manually and convert manual test cases into automation scripts. In doing so, the students will focus on different aspects and become acquainted with additional functions.

SWE 560 PRINCIPLES OF DATABASE SYSTEMS (3)
Prerequisites: None
This is an advance level course on the principles of database systems. Main topics include, but are not limited to: an overview of the relational data model and relational query languages; recursive queries, datalog, and fixed-points; query processing and optimization; database design, dependencies, normal forms, and the chase procedure. Additional topics may include: information integration, complex objects, semistructured data, and XML.

SWE 561 CLOUD COMPUTING (3)
Prerequisites: Knowledge of Operating Systems
Introduction to cloud computing, cloud architecture and service models, the economics and benefits of cloud computing, horizontal/vertical scaling, thin client, multimedia content distribution, multiprocessor and virtualization, distributed storage, security and federation / presence/ identity/ privacy in cloud computing, disaster recovery, free cloud services and open source software, and example commercial cloud services.

SWE 562 ORACLE DATABASE MANAGEMENT/ADMINISTRATION (3)
Prerequisites: None
This course introduces Oracle as a practical example of a widely used database system, teaches basic database concepts, data definition and manipulation languages (SQL), general architecture of database management systems, transaction management, concurrency control, security, distribution, and query optimization.

SWE 570 INTERNET OF THINGS ARCHITECTURE AND SECURITY (3)
Prerequisites: None
The objective of the course is to introduce students to the principles, technology and applications of the Internet of Things (IoT). The course includes a coverage of the key principles and building blocks of IoT (architecture), the key enabling technologies (devices, networking and management), and the issues of security of the IoT systems. At the end of this course the student would be able to describe the key IoT technologies in detail, explain issues in developing large-scale IoT systems, explain applications of IoT and demonstrate a deep understanding of at least one IoT research topic.

SWE 600 ADVANCED SOFTWARE ENGINEERING (3)
Prerequisites: SWE 500
This class goes into greater depth in learning the practices and principles of software engineering. The course also includes a brief review of some of the material from SWE 500. In this course, we expand our understanding of software modeling to include real time, concurrency, and embedded systems software engineering. It also goes into more depth in software metrics, project estimation techniques, risk management, software reliability, new and emerging directions for software development. This is also a team-oriented capstone project course, and one of the deliverables at the end of the

trimester is a fully-formed, professional level software design from the project team.

SWE 602 SOFTWARE REQUIREMENTS ELICITATION (3)
Prerequisites: SWE 500
Requirements Elicitation is the process of identifying the real problems that the software stakeholder tries to solve, of defining a system and its technical environment, and of identifying the requirements of that system such that it solves these problems for users, customers and other stakeholders. The objective of the class is to prepare software engineers for the task of developing effective requirements under a variety of development modalities. The student, at the conclusion of this course, will understand requirements engineering for Waterfall, V-Model, Spiral Model, Agile Methods, Cleanroom Engineering, the [Rational] Unified Process, as well as other approaches. The student will also understand, and gain experience with, the Unified Modeling Language, including use cases and other facilities of UML. Finally, it will introduce the student to the concepts necessary to moving from requirements to architecture, to design, to implementation. This is not a design or programming course, but an understanding of the principles and practices of software engineering are essential for the software requirements engineer.

SWE 610 RUBY ON RAILS (3)
Prerequisites: Knowledge of HTML, JavaScript, database
This course offers a comprehensive introduction to Ruby on Rails, an open source web application framework for the Ruby Programming language.

SWE 615 ANGULAR JS (3)
Prerequisites: CSC 530 or previous programming experience in JavaScript
AngularJS provides a layer on top of JQuery and DOM, reduces boilerplate code and improves maintainability. The best use of AngularJS is the consistent manner in which a new developer can generate the code for the structure and the layout. Once the structure is ready, the developer can concentrate more on look and feel rather than routine boiler plate code and cruft. The chapters covered include Introduction, Directives and Controllers, Unit Testing, Forms, Input and Services, Server Side communication using http.

SWE 620 SCALA PROGRAMMING (3)
Prerequisites: None
This course is an introduction to software programming using Scala, a programming language evolved from Java. The main advantage of Scala is its versatility. It has combined features of scripting language, objective oriented language and functional programming language. The last feature is particularly useful in Web and multicore applications that require concurrent data processing. Scala has been adopted by some leading high-tech companies. For example, in 2009, Twitter announced that it had switched large portions of its backend from Ruby to Scala and intended to convert the rest. To make learning easier, we will first introduce scala as a scripting language. We will then describe its objected oriented features (including class, object, inheritance, polymorphism, etc.) and finally move on to its main functional programming features (including currying, pattern matching, lazy evaluation, tail recursion, immutability, etc.).

SWE 633 SOFTWARE REFACTORING (3)
Prerequisites: SWE 500
Software Refactoring is a change made to the internal structure of software to make it easier to understand and cheaper to modify without changing its observable behavior (Fowler 1999). Improving the design of existing code. Various techniques and refactoring patterns. Increasing software understandability and productivity, reducing software complexity, aging, and maintenance costs. Refactoring in the context of agile development, during debugging and code review. Refactoring tools for important languages and OSs. Various categories of refactoring, small and big refactoring. Refactoring of UML design models.

SWE 640 ARTIFICIAL INTELLIGENCE (3)
Prerequisites: Knowledge of Discrete Mathematics
This course introduces the foundation of simulating or creating intelligence from a computational point of view. It covers the techniques of reduction, reasoning, problem solving, knowledge representation, and machine learning. In addition, it covers applications of decision trees, neural networks, support vector machines and other learning paradigms.

SWE 680 SOFTWARE ARCHITECTURE (3)
Prerequisites: SWE 600
Every computer software system has an architecture, even if it is an ad hoc architecture. Modern software systems are larger, include more interoperability of their components, and often involve many programmers and engineers, working together to achieve a predictable design. When there is no coherent architecture for the design, the engineers and programmers often find themselves working at cross-purposes, constantly reworking their product to satisfy previously undefined requirements. This class is focused on the high-level concern of the architecture of a software system. Therefore, we will not be doing any computer programming. The course interests will include the requirements development, system context, and relationships between the various components and structures in a software architecture. At the end of this course students will be prepared to participate in a software (or systems) engineering project at the high level of development where they design the fundamental architecture for that system. Students will understand requirements development, project strategies and tactics, patterns of architecture, and architectural styles and idioms.

SWE 688 SPECIAL TOPICS (1-3)
Prerequisites: None
Special topics courses cover subjects not currently contained in the curriculum, but are designed to address especially relevant trends or developments related to the discipline.

SWE 689 INDEPENDENT STUDY (1-3)
Prerequisites: None
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

SWE 690 CAPSTONE PROJECT (3)
Prerequisites: Department Chair approval and completion of 27 credit hours of the MSSE program.
The capstone project is a report, analysis, software project, or program, submitted by a graduate student. It is designed to demonstrate the in-depth learning and higher-order-thinking of the student. It is meant to be an analysis of knowledge, breaking information down according to the analytical strength of the student's thinking as well as synthesis of knowledge and assembling the parts into a new coherent whole.

SWE 695 MASTER'S THESIS (3-6)
Prerequisites: Department Chair approval and completion of 27 credit hours of the MSSE program.
The number or credit hours provided by the Master's Thesis is not less than 3 and not more than 6. It is determined by the supervisor in consultation with the Department Chair in accordance with the topic and level of difficulty of the Master's Thesis.

CFL 591 INTEGRATING ACADEMIC AND INTERNSHIP LEARNING (2)
Prerequisites: None
This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591(can be taken concurrently) in order to be eligible to enroll in INT 593.

INT 593 PART-TIME/FULL-TIME INTERNSHIP (1, 3)
Prerequisites: CFL 591
This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A maximum of 10 credit hours earned in INT 593 may be applied toward the Master's Degree graduation requirements.

FACULTY

Cornel Pokorny, PhD Engineering Sciences, Technical University Vienna, Department Chair

Hann So, MS Engineering Management, Santa Clara University, Assistant Department Chair

CORE FACULTY

Xiaoshu Qian, PhD. Electrical Engineering, Univ. of Rhode Island, M.S. Computer Science, Univ. of Rhode Island

Richard Sun, PhD Computer Science, University of Illinois

Ming Hwa Wang, PhD Computer Science, Illinois Institute of Technology

ADJUNCT FACULTY

Qamar Asghar, MS Mechanical Engineering, University of Tennessee

Mar Castro, MS Software Engineering, Cal State Fullerton

Tushar Chandra, MSCS & Engineering, Arizona State University

Arijit Das, MS Computer Science, Oregon State University

Donna Dulo, JD, MS Computer Science, Naval Postgraduate School

Ahmed Ezzat, PhD Electrical and Computer Engineering, University of New Hampshire

Patricia Hoffman, PhD Applied Mathematics, UC Santa Cruz

Dongming Liang, PhD Computer Science, York University

Dick Liu, PhD EE Computer Systems Laboratory, Stanford University, MS Computer Science, Pennsylvania State University

Leandro Loss, PhD Computer Science, University of Nevada

Srinivasan Mandyam, PhD Computer Science, Indian Institute of Science

Tony Nguyen, MS Computer Science, Santa Clara University

Da-Qi Ren, PhD Computer Engineering, Concordia University Montreal

Richard Riehle, PhD Software Engineering, Naval Postgraduate School

Zhupei Shi, PhD Physics, New York University

Gurminder Singh, PhD Computer Science, University of Alberta, Canada

Jeremy Tzeng, PhD EECS, UC Berkeley

Alex Wu, PhD Mechanical Engineering, UC San Diego

Yurong Xu, PhD Computer Science, Dartmouth College

Victor Yu, MA Geographical Information System, University of Akron, BS Computer Science, Franklin University, Adjunct Faculty

Fang Yuan, PhD Applied Statistics, University of Alabama

Matt Zhang, PhD Computer Science, North Carolina State University

DEPARTMENT OF DIGITAL ARTS

MISSION

The pace of technology, innovation and creativity is constantly on the rise calling for increasing demands for new methods of learning and curriculum. The ITU Digital Arts Department strives to fulfill this need by being open and proactive in integrating the latest technologies and ideas with the most timeless fundamentals of art and science. We constantly encourage and engage in regular dialogue between our faculty, students and industry in order to ensure our program nurtures the world's most creative innovators and leaders in the field of digital arts.

INSTITUTIONAL LEARNING OUTCOMES (ILOs)

ILO #1: Problem Solving

ILO #2: Critical Thinking

ILO #3: Communication literacy

ILO #4: Collaboration and Teamwork

ILO #5: Technical literacy

ILO #6: Research skills and Information literacy

ILO #7: Individual Responsibility

MASTER OF SCIENCE IN DIGITAL ARTS

In a world of smartphones, tablets, wearable computers, and Virtual Reality (VR) and Augmented Reality (AR), the role of a digital artist is more important than ever. Not only is there an insatiable appetite for new content, but also the skills demanded from a designer, storyteller and artist to create that content has extended far beyond traditional skill-sets. An infinite number of opportunities await those with the proper abilities and imagination.

ITU's Digital Arts (DA) program is taught by experienced industry professionals who integrate design fundamentals, professional skills and entrepreneurial innovation into a unique program tailored to the modern artist who dares to innovate and create their own vision of the future. Students will learn to produce live action, interactive and augmented media. The program prepares students to become leaders in digital art production, advertising, film, gaming, AR, VR, mobile and app industries. Graduates of this program will build multimedia portfolios with thesis papers designed for peer-reviewed publications in academic and industrial journals.

The Digital Arts program requires successful completion of 36 credit hours. The program offers concentrations in different disciplines. Concentration and elective courses provide flexibility in customizing the program to meet professional and personal goals.

PROGRAM LEARNING OUTCOMES (PLOs)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

PLO #1: Apply foundational digital production skills to create stories, visualizations and designs. (Mapped to ILO #1: Problem Solving.)

PLO #2: Create professional grade digital productions by utilizing general production pipelines from conception to production, marketing and distribution. (Mapped to ILO #5: Technical Literacy.)

PLO #3: Analyze products and situations to effectively articulate and identify opportunities for innovation and experimentation in art, design and product development. (Mapped to ILO #3: Communication literacy and ILO #2: Critical Thinking.)

PLO #4: Apply collaborative skills and evaluate team dynamics to successfully complete team-oriented master digital art projects. (Mapped to ILO #4: Collaboration and Teamwork.)

PLO #5: Apply understanding of software, hardware and the production process to identify appropriate industry standards to complete digital productions. (Mapped to ILO #5: Technical Literacy and ILO #6: Research Skills and Information Literacy.)

PLO #6: Create a portfolio of projects that showcase multiple art and media skills in design, animation, filmmaking and interactive design. (Mapped to ILO #7: Individual Responsibility and ILO #5: Technical Literacy.)

CAREER OPPORTUNITIES

ITU's Digital Arts program can prepare a student for a career in Film, Design, Digital Marketing, Production, Interactive Media, Computer Graphics, UI/UX, Video Games, 3D Modeling and 3D Printing, Animation, Video, Audio, Photography, Augmented Reality, and Virtual Reality.

MASTER OF DIGITAL ARTS PROGRAM REQUIREMENTS

- Required Courses
    - » 4 Core Courses: 12 Credit Hours
    - » 1 Capstone Course: Project or Thesis: 3 Credit Hours
    - » 1 Internship: 1 Credit Hour
- Elective courses: 11-20 Credit Hours
    - » Internship: 1-9 Credit Hours
    - » Cross Disciplinary Course: Up to 3 credit hours (counts as Elective)

» Transfer Credits: Up to 9 credit hours from a graduate program of a regionally accredited school

• 36 Total Credit Hours

REQUIRED CORE COURSES

» DGA 501 New Media Production

» DGA 511 General Production Pipelines

» DGA 621 Producing Digital Media

» DGA 631 Digital Media Startup

CAPSTONE AND THESIS COURSES

» DGA 690 Master's Project

OR

» DGA 692 Master's Thesis

MASTER OF DIGITAL ARTS CONCENTRATIONS

UI/UX

Production

Digital Marketing

Interactive Media and Games

If students complete with a passing grade in the Digital Arts program concentration, they will be eligible to graduate with a Digital Arts degree in their selected concentration (e.g. Digital Arts in Production, etc.). The project or thesis topic should be on the selected concentration. If a student has declared a concentration and does not complete the required concentration courses by graduation, the student will graduate with a Digital Arts degree, with no concentration. Please note that concentrations will only appear on the transcript, and not on the diploma.

DECLARING OR CHANGING A CONCENTRATION (FOR DIGITAL ARTS PROGRAM ONLY)

Digital Arts program concentrations may be declared starting at the point of admissions. If a student does not declare a concentration during the admissions process, the student will be enrolled in the Digital Arts program. Students may add or change their Digital Arts program concentration at any point before the completion of 19 credit hours. Any approved transfer credit will be counted towards the 19 credit hours. Requests to declare or change concentrations must be made by the first day of the trimester in which the student will attempt the 20th credit hour in order to be considered.

ELECTIVE COURSES

Electives from the MSDA curriculum must be chosen so that the total number of credit hours completed is at least 36.

» DGA 503 Storyboard Design

» DGA 504 Global Storytelling

» DGA 507 Design Fundamentals

» DGA 508 CG Software Fundamentals

» DGA 509 Basic Image Manipulation

» DGA 510 Intro to Game Development

» DGA 512 Web Graphic Design

» DGA 513 Documentary Production

» DGA 515 Sound Design

» DGA 516 Production Sound Recording

» DGA 517 Post Production Sound Recording

» DGA 518 UI/UX: User Interfaces and User Experiences

» DGA 519 Still Life and Figure Drawing

» DGA 520 Motion Graphics

» DGA 521 Digital Media Distribution

» DGA 522 Editing I

» DGA 523 Social Network Marketing and Publishing

» DGA 524 Virtual Reality/Augmented Reality

» DGA 526 Screenwriting

» DGA 528 Dynamic UX

» DGA 529 Introduction to Games Programming Unity, SpriteKit using C#, and Swift

» DGA 531 Beginning Augmented Reality

» DGA 532 Beginning Virtual Reality

» DGA 606 Animation I

» DGA 607 Storyboards and Layouts

» DGA 608 CG Modeling

» DGA 609 3D Modeling and 3D Printing

» DGA 610 Rigging for 3D Animation

» DGA 611 Lighting and Compositing

» DGA 612 Concept Art and Storyboarding

» DGA 615 Zbrush

» DGA 617 Motion Capture

» DGA 622 Editing II

» DGA 626 Animation II

» DGA 641 Augmented Reality Design and Production

» DGA 642 Virtual Reality Design and Production

» DGA 661 Unity 2D/3D Game Development Platform

» DGA 688 Special Topics (1 to 3 Credit Hours)

- » DGA 689 Independent Study
  (1 to 3 Credit Hours)
- » MKT 551 Competitive Marketing Strategies
- » MKT 585 International Marketing
- » MKT 590 Marketing and Social Media
- » CSC 515 iPhone Application Development
- » CSC 518 OO Programming with Java
- » CSC 519 Android Phone
  Application Development
- » CSC 520 Python Programming
- » CSC 525 HTML/CSS Programming
- » CSC 530 JavaScript Programming

INTERNSHIP
- » CFL 591 Integrating Academic and
  Internship Learning (2 Credit Hours)
- » INT 593 Part-time/Full-time
  Internship (1-3 Credit Hours)

COURSE DESCRIPTIONS

DGA 501 NEW MEDIA PRODUCTION (3)
Prerequisites: None
An introduction to digital media production, it provides design theory and hands-on experience. The course will cover basic principles of graphic and interface design, which will be applied to the course deliverables, including print, web, mobile, and video productions. Students will also learn about the big picture of project development, including vital skills such as scheduling, budgeting, creating and working within deadlines, and operating in a team-based environment.

DGA 503 STORYBOARD DESIGN (3)
Prerequisites: None
Today, Storyboard use is not exclusive to the narrative forms of Film and Animation, but is also widely used in the design of Video Games, Interactive GUI's, Product Presentations and more. Using stories, designs and flowcharts from actual productions, this course will show students of any drawing skill level an overview of how to effectively design and construct storyboards from thumbnails to presentation layouts.

DGA 504 GLOBAL STORYTELLING (3)
Prerequisites: None
In a world where the noise of mass and personal communications can overwhelm any message and idea, the role of storytellers who can tell inspiring, persuasive stories and is more important than ever. This course will demonstrate how to apply the universal heroes' journey in a way that transcends global cultures and civilizations. Students will explore the universal communication tool known as "stories" from its traditional forms such as fairytales, folklore and mythology through today's digital, augmented transmedia as a means of entertainment, education and communication.

DGA 507 DESIGN FUNDAMENTALS (3)
Prerequisites: None
This course blends classical visual language fundamentals with project-based design learning applicable to the media and tech industries. Students will learn how to apply core principles of typography, color, and composition to digital products. The emphasis of the course on design 98 methodologies in both theory and practice are instrumental in improving design performance, problem solving skills, and making students into better designers. Course projects will enable students to build a portfolio of digital design solutions across mobile, web, games or film.

DGA 508 CG SOFTWARE FUNDAMENTALS (3)
Prerequisites: None
This course will provide an overview of the computer graphics process utilized today in print, commercials, games, television and movies. The course will offer the student a hands-on tutorial covering modeling, rendering, lighting, animation and compositing. Students will get to construct a 3D model and take it through all phases of the computer graphic process culminating in a finished scene realistically composited into a 2D background. Other subjects covered include principles of rigging, animation, motion tracking and camera moves with examples provided. Lab fees may apply.

DGA 509 BASIC IMAGE MANIPULATION (3)
Prerequisites: None
In this modern digital age, the basic principles of photography have not changed. But the tools and techniques of how we arrive at our final image continue to evolve. This class will introduce students to the principles of photography and then explore the tools and aesthetics employed by professionals and amateurs alike to alter or enhance their images. Techniques and skills acquired will then be applied to projects. This class will require a laptop or tablet that can handle the specifications of the software Adobe Photoshop.

DGA 510 INTRO TO GAME DEVELOPMENT (3)
Prerequisites: None
What are the different elements to a game? What makes a great game? Computer game development requires all facets of Computer Science, including Computer Graphics, Artificial Intelligence, Algorithms, Data Structures, Networking, and Human-Computer Interaction. It also requires knowledge of other disciplines including Economics, Mathematics, Physics, and Psychology. The value of this course goes beyond culminating Computer Science. It is largely a hands-on course where real-world skills including design, teamwork, management, documentation, and communications are critical. This course will delve into topics such as the game engine, rendering, user interfaces, sound, animation, and game hacking. This course will also cover designing MMORPGs and mobile games.

DGA 511 GENERAL PRODUCTION PIPELINES (3)
Prerequisites: None
This course covers the general procedures and methodologies to produce a production pipeline from start to finish. One will be lead through the production process breaking down each phase in a step-by-step fashion and will be introduced to eas-

ily applied principles of scheduling each task. Students will learn to apply these principles to breakdown and schedule in either real-time rendering projects — such as a video game or image rendered projects— from animated shorts to features.

DGA 512 WEB GRAPHIC DESIGN (3)
Prerequisites: None
This course provides students with instruction in graphic editing software. Projects will use tools, layers and filters to design, edit and create digital images for the Web, apps and digital and interactive media. Topics covered will include: Basic Web design tenets, Using color effectively, Understanding fonts, Designing navigation, Creating graphics that don't distract from your site, and Using multimedia (sound, animation, and other media) on your site.

DGA 513 DOCUMENTARY PRODUCTION (3)
Prerequisites: None
This course is designed to introduce students to a complete beginning-to-end production process, with the goal of creating a class documentary project. Students will learn every step required to produce and create a finished film, including preproduction planning, camera operation and shooting, lighting, interview techniques, storytelling strategies, editing, motion graphics, and more. An understanding of these tools and procedures are essential for any student who wishes to work in film, or who desires to produce compelling narrative content in a variety of media.

DGA 515 SOUND DESIGN (3)
Prerequisites: None
This course provides an introduction to sound design principles for multimedia in a broad and diverse manner. Students will develop skills in recording, digital editing and mixing with industry standard software and techniques.

DGA 516 PRODUCTION SOUND RECORDING (3)
Prerequisites: None
This course is designed to acquaint and introduce students to the basic principles of audio recording and production through classroom lecture, and hands on training, as well as guided and individual studio projects. Students will learn recording techniques, including the choice of microphones and their placement, as well as mixing multi-track audio utilizing equalization, compression, reverb, and panning, with an emphasis on acoustics and the physics of sound. Class projects will focus on recording audio for distribution within, TV, radio, computer gaming, and film. Students will attend lectures and gain experience in production as they complete the projects assigned in the course.

DGA 517 POST PRODUCTION SOUND RECORDING (3)
Prerequisites: None
This course will teach students the specific techniques and strategies used during the audio post-production process. Students will learn how to spot, edit, and assemble dialogue, sound effects, Foley, and music, in addition to mixing and prepping the audio using the industry standard, Pro Tools and other DAW technologies. The course begins with a real-world overview of audio post production, including its evolution, methods, sound crew, and media formats. It then explores

techniques and tips for recording location sound, using sound effects libraries, editing production dialogue, and directing and recording a Foley session. Students will learn strategies for working with composers and music supervisors, how to edit songs to fit a scene, and how to record and mix score music. In addition, students will learn how to assemble a predub or temp mix (to group and sub-mix tracks into stems for the final dub), create the final dub, and prepare the mix for foreign distribution and final delivery.

DGA 518 UI/UX: USER INTERFACES AND USER EXPERIENCES (3)
Prerequisites: None
This course offers students an engaging introduction and hands-on practice in the fundamental areas of human centered user experience (UX) design. This course will explore design-thinking strategies ranging from behavioral psychology basics to techniques for user research, design ideation, rapid prototyping and usability evaluations. Students will learn how to gather and translate user needs into clear and responsive user interface (UI) solutions. Students will demonstrate their creative problem solving skills by building a design portfolio across a range of UX / UI projects throughout the course.

DGA 519 STILL LIFE AND FIGURE DRAWING (3)
Prerequisites: None
Digital Art calls on a variety of disciplines beyond proficiency with particular software. There are basic skills and techniques that bring creative ideas to strong, visual presentation. Still-life and Figure drawing are foundations on which most visual expression is built. In a series of sessions using both the Human Figure and Inanimate Objects, learn drawing techniques to capture form, light and shadow, perspective and composition.

DGA 520 MOTION GRAPHICS (3)
Prerequisites: None
This course will explore the fundamental principles of motion graphics, which blend art and technology to create dynamic visuals for the screen. Students will become familiar with the processes of creating effective animated graphics, suitable for broadcast, films, titles, or commercials. One will learn to create engaging visual imagery, generate unique ideas, and to apply color palettes that support a concept. This course will teach students advanced techniques of motion-graphics creation through the use of software programs utilized by design and animation companies worldwide.

DGA 521 DIGITAL MEDIA DISTRIBUTION (3)
Prerequisites: None
The business of media is distribution. It is the art and method of maximizing profits in the delivery and consumption of your work. But the business model and methods of media distribution now change and evolve at ever increasing rates. This course will expose students to industry concepts of networks, life-cycles, ultimates and windows, as well as how those concepts apply to new media such as VOD, apps, tablets, clouds and beyond. Upon completion, students will have an understanding of media business model fundamentals and be prepared to position themselves at the vanguard of the rapidly changing world of digital media distribution.

DGA 522 EDITING I (3)
Prerequisites: None
This course offers students an in-depth understanding of editing principles is one of the core competencies of cinematic storytelling for movies, television, video games, advertising, animation and new media. Logical, intelligent editing is essential for clearly communicating story information and making video greater than the sum of its parts. The theory, practice, history, and techniques of editing will be covered in this comprehensive overview. Students will explore the art and function of editing the moving image for narrative, documentary, and non-traditional web material through an introduction to industry leading non-linear editing systems.

DGA 523 SOCIAL NETWORK MARKETING AND PUBLISHING (3)
Prerequisites: None
In the vast sea of opportunities offered by today's technology and networks, how can you most effectively use social media to achieve your career goals? Many traditional forms of media and networking are simply not enough to reach and captivate today's media savvy audience. To successfully reach your online and offline audiences you must fully utilize creative, problem-solving, design and communication skills. This class will explore established concepts of personal narrowcasting, blogs and tweets as well as modern takes on subjects such as data visualization and vanity metrics vs. validated learning. Finally, all of these concepts and skills will be applied utilizing affordable and accessible digital publishing tools to deliver the latest apps and media.

DGA 524 VIRTUAL REALITY/AUGMENTED REALITY (3)
Prerequisites: None
This course focuses on the design and evaluation of Augmented Reality (AR) and Virtual Reality (VR) systems, algorithms, and applications related to the hardware, software, interaction, psychology, technology, and research that are used. Class topics will include systems for presenting information to all five senses (visual, auditory, haptic, olfactory and gustatory), methods for users to interact with objects within virtual environments, and evaluation techniques for assessing effectiveness, as well as vision-based marker and feature tracking, model-to-view space transformations, mobile application development, and interaction techniques. Students will interact with various display and interface 100 devices throughout this course, develop prototype applications, and evaluate them. Through a combination of traditional lecture, literature review, and hands-on work, students will learn to critically evaluate different alternatives, build prototype systems, and design comparative evaluations to test the effectiveness of various (AR) and (VR) applications.

DGA 526 SCREENWRITING (3)
Prerequisites: None
Screenwriting is the foundation of cinematic storytelling, and is also a primary tool for animation and video game development. This class will teach students the fundamentals of compelling plots and great drama, the nuances of realistic character development, tips and tricks for writing visually compelling scenes, and how to make your dialog jump off the page. Through story analysis and writing exercises, students will learn to take apart any story to see what makes it work, and will author their own short screenplays all the way from idea to finished script.

DGA 528 DYNAMIC UX (3)
Prerequisites: None
This course will explore how web technologies are making it easier for websites to become more interactive and behave more like native applications. Students will learn to identify and improve static web designs through the use of dynamic web content, make web pages more interactive without sacrificing usability or accessibility, learn how to deal with touch-screen devices, and learn to give on-screen feedback effectively This course is intended for • UX, UI and Web designers – both beginners and advanced • Marketers • Developers

DGA 529 INTRODUCTION TO GAMES PROGRAMMING UNITY, SPRITEKIT USING C#, AND SWIFT (3)
Prerequisites: None
Learn to code in Swift Apple's new coding language. Learn to make apps in Xcode and learn how to make games with SpriteKit. The course is step by step and project-based, so you will learn programming Swift and C# concepts and apply them immediately to real indie games as you go. • Build an entire game yourself • Step by step in class • Learn Swift and C# • Learn Sprite kit and Unity Requirements: Students must have knowledge of programming in Java, C, C++ or equivalent, course might requires a MAC computer for the Swift and SpriteKit loaded with latest version of Xcode.

DGA 531 BEGINNING AUGMENTED REALITY (3)
Prerequisites: None
Augmented reality, virtual reality, mixed reality… these systems can provide users with astonishingly immersive content. What are the sciences involved in this new technology, and what are the content integration issues to building these virtual places? This course focuses on the design and evaluation of Augmented Reality (AR) systems, algorithms, and applications related to the hardware, software, interaction, psychology, algorithms, technology, and research that are involved. With the proliferation of powerful, always-on, Internet-connected mobile devices such as smart-phones, tablets and newer head-worn displays, sophisticated applications that combine location-specific content with the current user view are becoming more possible. Application developers for these devices require a broad set of technical and design skills to create effective interactive AR experiences. Topics will include vision-based marker and feature tracking, model-to-view space transformations, mobile application development, and AR interaction techniques. Through a combination of traditional lecture, literature review, and hands-on work, students will learn to critically evaluate different alternatives, build prototype systems, and design comparative evaluations to test the effectiveness of various AR applications. Students will be expected to implement several techniques as part of this course. This course welcomes students with a diverse set of backgrounds, including (but not restricted to): computer science, math, physics, digital art, engineering, architecture, and psychology.

DGA 532 BEGINNING VIRTUAL REALITY (3)
Prerequisites: None

During this course, students will explore the techniques and technologies that need to be brought together to allow Virtual Reality, and other realities along the Mixed Reality Continuum and organic life forms to interact within virtual worlds. Commercial displays, trackers and graphics hardware have enabled many new applications and venues, including: entertainment, training and learning activities, exercise, assessment, rehabilitation and socialization. Class topics include systems for presenting information to all five senses (visual, auditory, haptic, olfactory and gustatory), methods for users to interact with objects within virtual environments, and evaluation techniques for assessing effectiveness. Students will interact with various display and interface devices throughout this course, develop prototype applications, and evaluate them. The format of the course will be a combination of traditional lecture, literature review, and hands-on work. Because the definition and purpose of Virtual Reality is in flux and evolving rapidly, this course will be colloquium in nature, focused on synthesizing existing literature from multiple related fields and sources, in order to understand and make use of these changes to VR.

DGA 606 ANIMATION I (3)
Prerequisites: DGA 508

Students will develop an understanding of a wide variety of applications used in animation and learn the principles behind 2-D, 3-D, and motion graphics. Through an exploration of 2-D animation concepts, design and techniques, each student will become familiar with animation language and eventually garner the basics used for modeling, positioning and rendering 3-D objects using Autodesk Maya, one of the leading animation software packages for the film and gaming industries.

DGA 607 STORYBOARDS AND LAYOUTS (3)
Prerequisites: DGA 503

In this course, students will learn advanced storyboarding and the layout process as it relates to the narrative structure. Emphasis is placed on the full storyboard process from initial sketch (thumbnails) to final, sequential panels. Using supplied stories, design and flow chart examples, students will learn to apply the essentials of drawing to a production, from initial storyboard sequences to final production layouts. Through interactive lectures, discussions, demonstration and studio work, students will be able to translate narrative concepts into effective visual communications for film and video productions, animation, motion graphics, multimedia apps, video games, and theme park attractions.

DGA 608 CG MODELING (3)
Prerequisites: DGA 508

3D modeling involves digitally constructing shapes in a virtual space and is utilized in fields ranging from movies, animations, video games, architecture, medical and industrial visualizations, and a host of new applications and media such as creating virtual actors and Augmented Reality (AR). In this course, students will learn the techniques used by movie and video game industry experts to create professional 3D Models. They will use industry techniques and applications to create new worlds by designing and modeling their own objects, creatures, and environments. This class requires a laptop computer or tablet running Adobe CC Photoshop.

DGA 609 3D MODELING AND 3D PRINTING (3)
Prerequisites: DGA 508

This course instructs students in the best industry standard practices and production pipelines for creating 3D assets using Autodesk Maya, one of the leading software packages for the film and gaming industries. Students will explore the tools and techniques needed to model a wide array of characters, objects, architectures, and environments. Students will build a strong understanding of the methods and principles of 3D modeling. Aspects of the production pipeline will be covered, but the main focus will be from concept design to final sculpture. In addition to learning the basics of 3D modeling with Maya, we will be learning some basics of 3D printers, such as MakerBot Replicator 2. Students will learn the differences between printing materials, techniques to have more predictable results, limitations of current 3D printers and even will be able to print out some objects by the end of the class session!

DGA 610 RIGGING FOR 3D ANIMATION (3)
Prerequisites: DGA 508

This course introduces the basic techniques of character set-up and rigging as used in 3D animation. This course will cover such principles and skills as how to set up a skeleton for an animated character, joint hierarchies, forward kinematics, inverse kinematics, constraints, and how to create facial rigs and blendshapes for facial animation.

DGA 611 LIGHTING AND COMPOSITING (3)
Prerequisites: DGA 508

This course covers the art and science of lighting, shading, and compositing to create computer graphics images (CGI). The lighting and shading portion of the course investigates the look, shading, and atmosphere techniques that brings characters and scenes to life. The compositing portion of the course focuses on the integration of CGI elements with live action footage. The course begins with introduction to the history of photographic lighting and compositing and ends with students learning to create and integrate their own CGI elements through both individual and team based projects.

DGA 612 CONCEPT ART AND STORYBOARDING (3)
Prerequisites: DGA 503

A critical phase for cinema pre-production is in design, planning and storyboarding. Stories unfold through concept designs that include characters, props, wardrobe, locations, sets, color palettes, and environments. No matter what the size of their cinematic project, this course will get students ready for production and a unique integrated approach to quick, realistic and aesthetic designs relevant to their story and characters. Students will learn to generate pre-production material from concept illustrations and character designs to color studies, storyboards and wardrobe designs.

DGA 615 ZBRUSH (3)
Prerequisites: DGA 608
ZBrush is a very powerful 3D sculpting and texturing tool. The course covers the most popular tools and techniques for digital painting and sculpting in ZBrush, and explains how to export the models and texture maps to other programs for use in games, film, fine art, or 3D printing. The course also highlights the new features in ZBrush 4, such as ShadowBox, clip brushes, and LightBox. Exercise files are included with the course. Topics include: navigating the canvas, using perspective and floor, creating a mesh with a ZSketch, extracting from an existing mesh, managing subdivision levels, working with alphas, masking off parts of a model, using deformation, using subtools, deforming with Transpose, painting and texturing, and creating UV maps. Software used: ZBrush and/or Photoshop.

DGA 617 MOTION CAPTURE (3)
Prerequisites: DGA 610
Motion capture, often called mocap, is the process of digitizing a performance from an actor or animal. It is commonly used for reference or a method to get animation data quickly. This course will cover topics such as: skeletal rigs, animation retargeting, data cleanup, and on set preparation. Software used: Maya and or Motion Builder.

DGA 621 PRODUCING DIGITAL MEDIA (3)
Prerequisites: DGA 511
The skills necessary to produce today's media are more demanding than ever. Whether it is movies, games, motion graphics, interactive apps and other new media, this class will help students apply universal business production processes essential to take a media project from concept to completion. Topics covered in this course include concept and story development, pre-visualization, bidding, budgeting, financing, scheduling, talent and asset management, and distribution.

DGA 622 EDITING II (3)
Prerequisite: DGA 522
The techniques learned in Editing 1 are now applied to the creation of short videos. Students will write and plan short narratives, shoot these projects with basic video cameras, then assemble their work using editing software. The class will cover the technical foundations of nonlinear editing and its software, and provide an introduction to image adjustment tools such as digital mattes, color correction, time remapping (slow and fast motion), title generators, and motion graphics. Video compression and codecs will also be covered.

DGA 626 ANIMATION II (3)
Prerequisites: DGA 606
Using principles introduced in DGA 606 Animation 1, this class offers more advanced and detailed explorations into animation concepts, techniques and processes including acting, gesture, storytelling, 2-D and 3-D forms, software proficiency and project management from concept through to completion of an animated project. This will lead to final projects where students will work individually and with others to complete an animated project which be included in one's student showreel.

DGA 631 DIGITAL MEDIA STARTUP (3)
Prerequisites: DGA 511
The state of innovation sets the tone, direction and growth of jobs and entire new industries. The heart of new and innovative ideas is the modern start-up. Master the creative, technical and business skills required to conceive and create one's own disruptive idea, then launch it into a new startup. This is project-driven and can be a companion class to the Digital Arts Master Project where students conceive and produce a project from their own original ideas and designs.

DGA 641 AUGMENTED REALITY DESIGN AND PRODUCTION (3)
Prerequisites: DGA 524 and DGA 508
A Journeyman Level course that gives students an opportunity to learn about Mixed Reality and a specific subclass referred to as Augmented Reality as a technology, a human computer interaction paradigm, and an electronic medium. Today's powerful, always on, Internet-connected mobile devices, wearables and newer head-worn displays, require sophisticated applications and content that combine location specific information with the current user view. Application developers for these devices require a broad set of technical and design skills to create these effective interactive AR experiences. Students will work individually and in teams to explore the potential of AR. Students with backgrounds in visual design, industrial design, architecture, video production, and visual storytelling are welcome, as are students with significant programming, HCI or computer graphics backgrounds.. Through a combination of traditional lecture, literature review, and hands on work, students will learn to critically evaluate different alternatives, build prototype systems, and design comparative evaluations to test the effectiveness of various AR applications. Students will be expected to implement several techniques as part of this course.

DGA 642 VIRTUAL REALITY DESIGN AND PRODUCTION (3)
Prerequisites: DGA 508 and DGA 524
Virtual Reality Design and Production is a Journeyman Level course designed to instruct students the fundamentals of Virtual Reality content design and production. Course content will focus on digital story development, methodology, technical skills and the software proficiency necessary to create deeply immersive, multisensory, interactive experiences. Through a combination of lectures, class discussion, hands on experience, in depth topic presentations, and readings from current industry relevant literature, students will be exposed to a wide range of interesting and exciting research in the broadly defined field of virtual reality, 3Duser interaction and spatial user interfaces. Students will have the opportunity to conduct a trimester-long term project, working hands on with leading edge virtual reality hardware such as the Oculus Rift virtual reality headset, the Oculus /Samsung Gear VR wireless headset, Google Cardboard phone based viewers, and the HTC Vive.

DGA 661 UNITY 2D/3D GAME DEVELOPMENT PLATFORM (3)
Prerequisites: DGA 508
Many of today's games were created using a game engine, such as Crytek, Unreal Engine, Unity or even a proprietary one written in house. These game engines provide many built in functionalities that aid in the game making process. This course will teach you how to make games from your own assets (3D models, textures, and character rigs). Student will also be writing their own C# scripts. Software: Maya, Photoshop and Unity.

DGA 688 SPECIAL TOPICS (1-3)
Prerequisites: None
Special topics courses cover subjects not currently contained in the curriculum, but are designed to address especially relevant trends or developments related to the discipline.

DGA 689 INDEPENDENT STUDY (1-3)
Prerequisites: None
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

DGA 690 MASTER'S PROJECT I (3)
Prerequisites: Approval from a faculty advisor
This is a capstone project culminating in applying and demonstrating the knowledge base and skillets acquired throughout the MSDA program and meeting all departmental Program Learning Outcomes. One is eligible for Master's Projects only within the final two trimester prior to graduation. One will need to get approval and work closely with a faculty advisor to map out a study plan and create Student Learning Outcomes for a Master's Project before enrolling in this capstone program.

DGA 692 MASTER'S THESIS (3)
Prerequisites: Department Chair's approval and completion of 27 credit hours of the MSDA program.
The master's thesis must be arranged with the master's thesis advisor. After the topic is approved independent research in Digital Arts toward the MS degree must be conducted. The research must result in some new insights into the academic or practical concepts of the Digital Arts world. These must be analyzed, explained, and documented in the thesis. After completing the thesis the student must defend it before a committee of faculty appointed by the Department Chair.

CFL 591 INTEGRATING ACADEMIC AND INTERNSHIP LEARNING (2)
Prerequisites: None
This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591(can be taken concurrently) in order to be eligible to enroll in INT 593.

INT 593 PART-TIME/FULL-TIME INTERNSHIP (1, 3)
Prerequisites: CFL 591
This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A maximum of 10 credit hours earned in INT 593 may be applied toward the Master's Degree graduation requirements.

FACULTY

Jake Wachtel, MS, USC Annenberg School for Communication and Journalism, Digital Social Media, Award-winning Producer and Journalist, Department Chair

CORE FACULTY

Dave Lo, BFA, Academy of Art University, Computer Arts, BS, Georgia Institute of Technology, Computer Science, Motion Picture Computer Artist

Michael Kimball, Emmy Award-winning Sound Designer and Sound Engineer

ADJUNCT FACULTY

Stacey Houghton, MFA, Rochester Institute of Technology, Computer Graphics Design, Graphic Artist, UI/UX Designer, Web Designer

Chris Petrocchi, BS, San Jose State University, Animator, Concept Artist and Art Director in television, games and film

Tom Rubalcava, Designer, Director, Animator and Storyboard Artist in film, television, and commercials

Michael Snyder, Journalist, Editor, Broadcaster, Educator, Screenwriter, and Animation Developer

Allen White, Filmmaker, Screenwriter, and Film Journalist

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

MISSION

The Department of Electrical and Computer Engineering strives to prepare its graduates for success in professional careers, combining the rigor of science, the power of engineering and the thrill of innovation.

INSTITUTIONAL LEARNING OUTCOMES (ILOS)

ILO #1: Problem Solving

ILO #2: Critical Thinking

ILO #3: Communication literacy

ILO #4: Collaboration and Teamwork

ILO #5: Technical literacy

ILO #6: Research skills and Information literacy

ILO #7: Individual Responsibility

MASTER OF SCIENCE IN COMPUTER ENGINEERING

Degree program of Computer Engineering embodies the science and technology of design, construction, implementation, and maintenance of software and hardware of modern computing, intelligent systems and automatic equipment, leading to the degree of Master of Science in Computer Engineering (MSCE). Its purpose is to prepare students for professional careers in industry, research or education.

PROGRAM LEARNING OUTCOMES (PLOs)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

PLO #1: Fundamentals: Outline up-to-date technologies in computer engineering. (Mapped to ILO #5)

PLO #2: Engineering Ability: Demonstrate an understanding of established and emerging engineering techniques, and problem-solving skills. (Mapped to ILO #1)

PLO #3: Research Ability: Solve problems in engineering through self-learning and research activities. (Mapped to ILO #6)

PLO #4: Career Responsibility: Apply professional ethics in the definition, planning, and execution of engineering projects. (Mapped to ILO #7)

PLO #5: Critical Thinking: Demonstrate the ability to make evidence-based choices between various engineering paradigms and alternative options for problem solving. (Mapped to ILO #2)

PLO #6: Communication Skills: Present technical issues clearly in oral and written communications. (Mapped to ILO #3)

PLO #7: Team Work: Provide support for team projects in a way that promotes effective team dynamics to achieve team goals. (Mapped to ILO #4)

CAREER OPPORTUNITIES

MSCE requires knowledge combination of Computer Science and Electrical Engineering to accommodate the dual role of computer engineers who are competent on system, algorithm, software, and hardware designs.

Typical areas include: Design and development of Distributed systems, Embedded systems, Computer-control systems; Computer-Aided designs; FPGA development; ASIC design, firmware development, etc. Positions in the fields are included but not limited: system design engineer, system administrator, hardware designer, firmware designer, software engineer, verification engineer, test engineer, product engineer, quality-control engineer, custom support engineer, application engineer, and more.

PROGRAM REQUIREMENTS

- Required Courses
    - » 4 Core Courses: 12 Credit Hours
    - » Capstone Course: 3 Credit Hours

        Or

        Thesis: 3 credit hours (Approval is required)

        Or

        Thesis: 6 credit hours (Publication and approval are required)
    - » Internship: 1 Credit Hour
- Elective Courses: 11-20 Credit Hours
    - » Computer Engineering Related: 6 Credit Hours
    - » Cross Disciplinary (MBA, EM, DA) Elective: Up to 3 credit hours
    - » Transfer Credits: Up to 9 credit hours from a graduated program of a regionally accredited school
    - » Internship: 1 - 9 Credit Hours
- 36 Total Credit Hours

REQUIRED CORE COURSES

- » CEN 500 Computer Engineering
- » CEN 510 Algorithms and Data Analysis
  (Alternative: CEN 508 Scientific Computing, or CSC 580 Computer Algorithms)
- » CEN 551 Computer Architecture
- » CEN 556 Distributed Computing Systems

CAPSTONE COURSES

- » EEN 646 Embedded System Design
  Or
- » CEN 643 Advanced Digital Image Processing
  Or
- » CEN 698 Master Thesis I
  Or
- » CEN 699 Master Thesis II

ELECTIVE COURSES

- Computer Engineering Related Courses (6 Credit Hours):
  - » AMS 510 Linear Algebra
  - » AMS 512 Applied Mathematics Methods
  - » AMS 514 Fast Fourier Transformation & Applications
  - » AMS 520 Optimization Techniques
  - » AMS 530 Numerical Analysis
  - » AMS 540 Discrete Mathematics
  - » AMS 552 Statistics, Probability and Reliability for Engineers
  - » AMS 722 Advanced Applied Mathematics Methods
  - » AMS 750 Abstract Algebra
  - » AMS 760 Advanced Optimization Techniques
  - » CEN 508 Scientific Computing
  - » CEN 540 Network Security Techniques
  - » CEN 541 Deep Learning for Computer Vision
  - » CEN 542 Digital Image Processing
  - » CEN 548 Computer Network Systems
  - » CEN 565 Introduction to Medical Image Systems
  - » CEN 568 Network Storage Systems
  - » CEN 580 System Analysis and Optimization
  - » CEN 581 Principle of Internet of Things
  - » CEN 661 Parallel Computing
  - » CEN 688 Special Topics

- » CEN 691 Research Project
- » CEN 692 Research Project
- » CEN 693 Research Project
- » CSC 505 Unix/Linux Operating System
- » CSC 550 Big Data
- » CSC 560 Introduction to Data Science
- » CSC 580 Computer Algorithms
- » CSC 631 Data Mining
- » CSC 633 Machine Learning
- » DGA 524 Virtual Reality/Augmented Reality
- » EEN 505 Digital Design in HDL
- » EEN 514 Script Languages and Applications
- » EEN 520 ASIC Design I
- » EEN 521 FPGA Design and AI Applications
- » EEN 525 ASIC Design II
- » EEN 541 Digital Signal Processing and System Analysis
- » EEN 561 Fundamentals of Communication Systems
- » EEN 646 Embedded System Design
- » EEN 688 Special Topics
- » EEN 689 Independent Study
- » EEN 753 Advanced Machine Learning Engineering
- » EEN 758 Advanced Embedded System Design
- » SWE 561 Cloud Computing
- » SWE 640 Artificial Intelligence

OTHER ELECTIVE COURSES

- Any course in MSEE, MSCE, MSSE or MSCS can be accepted as an elective course.
- One course cross disciplinary (MBA, EM or DA) can be accepted as an elective course.

INTERNSHIP

- » CFL 591 Integrating Academic & Internship Learning
- » INT 593 Part-time/Full-time Internship

The Master of Science in Electrical Engineering (MSEE) degree program focuses on the following areas:

Chip Design

Integrated Circuit (IC) chips constantly bring revolutionary computing power to the world, empowering intelligent and automatic devices. AI chips implement artificial intelligence (AI) algorithms on IC chips to lead advanced technologies in engineering.

System Design

System designs including embedded systems accomplish Internet of Things (IoT) from distributed systems to data collectors. Computer algorithms, networks, communications, scientific computing, software and coding skills are important knowledge to students for victorious in the field.

PROGRAM LEARNING OUTCOMES (PLOs)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

PLO #1: Fundamentals: Explain current and emerging technologies in Chip Design or System Design in electrical engineering. (Mapped to ILO #5)

PLO #2: Engineering Ability: Demonstrate an understanding of established and emerging engineering techniques, and problem-solving skills. (Mapped to ILO #1)

PLO #3: Research Ability: Conduct independent research to solve challenges in electrical engineering. (Mapped to ILO #6)

PLO #4: Career Responsibility: Apply professional ethics in the definition, planning, and execution of engineering projects. (Mapped to ILO #7)

PLO #5: Critical Thinking: Analyze spectrum to make evidence-based choices between various engineering paradigms and alternative options. (Mapped to ILO #2)

PLO #6: Communication Skills: Present technical issues clearly in oral and written communications. (Mapped to ILO #3)

PLO #7: Team Work: Support team effort through collaboration to achieve project goals. (Mapped to ILO #4)

CAREER OPPORTUNITIES

MSEE requires knowledge not only in Electrical Engineering but also computer algorithms and programming skills to accomplish the roles of chip design or system design engineers.

Typical career fields include: IC Chip Design, Electronic Design Automation, Embedded System Design, Computer-Aided Design, Computer-Control Systems, Sensor Designs, Bioelectronics Systems, etc. Positions in the fields are included but not limited: Logic Design Engineer, Circuit Design Engineer, Physical Design Engineer, Verification Engineer, Test Engineer, Reliability Engineer, Application Engineer, and more.

PROGRAM REQUIREMENTS

- Required Courses
    - » 4 Core Courses: 12 Credit Hours
    - » Capstone Course: 3 Credit Hours

        Or

        Thesis: 3 Credit Hours (Approval is required)

        Or

        Thesis: 6 Credit hours (Publication is required)
    - » Internship: 1 Credit Hour
- Elective Courses: 11-20 Credit Hours
    - » Electrical Engineering Related: 6 Credit Hours
    - » Cross Disciplinary (MBA, EM, DA) Elective: Up to 3 credit hours
    - » Transfer Credits: Up to 9 credit hours from a graduated program of a regional accredited school
    - » Internship: 1 - 9 Credit Hours
- 36 Total Credit Hours

REQUIRED CORE COURSES

- » EEN 500 Electrical Engineering
- » EEN 511 VLSI Design
- » EEN 541 Digital Signal Processing and System Analysis
- » CEN 510 Algorithms and Data Analysis *(Alternative: CEN 508 Scientific Computing, or CSC 580 Computer Algorithms)*

CAPSTONE COURSE

- » EEN 646 Embedded System Design Or
- » EEN 627 IC Design to Silicon Or
- » CEN 643 Advanced Data and Image Processing Or
- » EEN 698 Master Thesis I Or
- » EEN 699 Master Thesis II

ELECTIVE COURSES

Required minimum of 6 credit hours from one of the focus areas:

- **CHIP DESIGN**
  - » CEN 548 Computer Network Systems
  - » CEN 581 Principle of Internet of Things
  - » EEN 505 Digital Design in HDL
  - » EEN 506 Electromagnetic Fields and Waves
  - » EEN 513 Microprocessor Design
  - » EEN 515 Analog IC Design
  - » EEN 520 ASIC Design I
  - » EEN 521 FPGA Design and AI Applications
  - » EEN 525 ASIC Design II
  - » EEN 538 Signal Integrity of High-Speed Digital Circuits
  - » EEN 616 Mixed Signal IC Design
  - » EEN 618 RF IC Design
  - » EEN 627 IC Design to Silicon
  - » EEN 629 System on Chip (SOC) Design
  - » EEN 635 Introduction to MEMS Design
  - » EEN 637 Bioelectronics and Bioengineering
  - » EEN 646 Embedded System Design
  - » EEN 688 Special Topics
  - » EEN 691 Research Project
  - » EEN 692 Research Project
  - » EEN 693 Research Project
  - » EEN 714 Advanced Microprocessor Design
  - » EEN 717 Advanced Analog IC Design
  - » EEN 719 Advanced RF IC Design
  - » EEN 732 Advanced Nanotechnology
  - » EEN 736 Advanced MEMS Design
  - » EEN 749 Advanced Digital Signal Processing
  - » SWE 640 Artificial Intelligence
- **SYSTEM DESIGN**
  - » CEN 500 Computer Engineering
  - » CEN 508 Scientific Computing
  - » CEN 540 Network Security Techniques
  - » CEN 541 Deep Learning for Computer Vision
  - » CEN 542 Digital Image Processing
  - » CEN 548 Computer Network Systems
  - » CEN 580 Signal Processing and System Analysis
  - » CEN 581 Principle of Internet of Things
  - » CEN 661 Parallel Computing
  - » CEN 643 Advanced Data Image Processing
  - » CSC 580 Computer Algorithms
  - » CSC 505 Unix/Linus Operating System
  - » DGA 524 Virtual Reality/Augmented Reality
  - » EEN 505 Digital Design in HDL
  - » EEN 506 Electromagnetic Fields and Waves
  - » EEN 513 Microprocessor Design
  - » EEN 521 FPGA Design and AI Applications
  - » EEN 538 Signal Integrity of High-Speed Digital Circuits
  - » EEN 561 Fundamentals of Communication Systems
  - » EEN 577 Green Energy
  - » EEN 629 System on Chip Design
  - » EEN 637 Bioelectronics and Bioengineering
  - » EEN 646 Embedded System Design
  - » EEN 671 Introduction to Wireless Communication Systems
  - » EEN 676 Introduction to Near Field Communication
  - » EEN 688 Special Topics
  - » EEN 691 Research Project
  - » EEN 692 Research Project
  - » EEN 693 Research Project
  - » EEN 698 Master Thesis I
  - » EEN 699 Master Thesis II
  - » EEN 714 Advanced Microprocessor Design
  - » EEN 749 Advanced Digital Signal Processing
  - » EEN 753 Advanced Machine Learning Engineering
  - » EEN 758 Advanced System Design
  - » EEN 766 Advanced Communication Systems
  - » EEN 774 Advanced Wireless Communications
  - » SWE 561 Cloud Computing
  - » SWE 640 Artificial Intelligence
- **Elective Courses**
  - » AMS 510 Linear Algebra
  - » AMS 512 Applied Mathematics Methods
  - » AMS 514 Fast Fourier Transformation & Applications
  - » AMS 520 Optimization Techniques
  - » AMS 530   Numerical Analysis
  - » AMS 540   Discrete Mathematics
  - » AMS 552 Statistics, Probability and Reliability for Engineers
  - » AMS 722 Advanced Applied Mathematics Methods
  - » AMS 750 Abstract Algebra
  - » AMS 760 Advanced Optimization Techniques

OTHER ELECTIVE COURSES

- Any course in MSEE, MSCE, MSSE or MSCS can be accepted as elective course
- One course cross disciplinary (MBA, EM or DA) can be accepted as elective course

INTERNSHIP

- » CFL 591 Integrating Academic & Internship Learning
- » INT 593 Part-time/Full-time Internship

DOCTOR OF PHILOSOPHY IN ELECTRICAL ENGINEERING

The Doctor of Philosophy Degree in field of Electrical Engineering is conferred by Department of Electrical Engineering, International Technological University, primarily in recognition of competence in the subject field and the ability to investigate engineering problems independently, resulting in a new contribution to knowledge in the field. The work for the degree consists of advanced studies in engineering, mathematics and related physical sciences, engineering research, preparation of a dissertation based on that research, dissertation defense and publication.

PROGRAM LEARNING OUTCOMES (PLOs)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

PLO #1: Fundamentals: Experiment analytical thinking and comprehensive knowledge on solving problems in specialized aspects of electrical engineering. (Mapped to ILO #1)

PLO #2: Research Ability: Create independent scholarly researches and contribute innovative ideas and concepts to science or engineering field. (Mapped to ILO #2, ILO #6)

PLO #3: Career Responsibility: Procedure accountable and continuing self-improvement with open-mind and substantial working strategy to achieve career success. (Mapped to ILO #7)

PLO #4: Communication: Generate positive communication skills to fulfill professional positions. (Mapped to ILO #3)

PLO #5: Team Work: Perform teamwork perspective and leadership. (Mapped to ILO #4)

PLO #6: Ethics: Outline professional teaching and research leadership to contribute to academic, industry or society. (Mapped to ILO #5)

CAREER OPPORTUNITIES

PhD Program in Electrical Engineering prepares its graduates to be professionals and leaders in the fields of electrical and computer engineering in industry, academic, research, or other services of society.

PROGRAM REQUIREMENTS

- 60 credit hours beyond Master's degree including:
  - » 30 hours of Course Work and Independent Study
  - » 30 hours of Doctoral Dissertation
- Passing a qualification exam consists of written and oral parts is required for admission of candidacy.
- Passing a comprehensive examination in oral is required with presenting dissertation topic proposal and sufficient preparation for advanced research for the proposed dissertation topic.
- Passing a comprehensive final defense examination in oral is required to defend the PhD dissertation.
- Publication in an internationally-recognized academic journal is required to complete the PhD dissertation.
- Maximum 15 credit hours with grade of B or above may be transferred from PhD level courses of a regionally accredited University with approval of the Department Chair.

DOCTORAL COURSES

Courses with number 700 or above in the Electrical Engineering and Math courses are designed as PhD courses. Other courses may be accepted as PhD courses with the approval of the PhD advisor and chair of the EE Department.

DOCTORAL COURSES

Thesis Adviser
It is the student's responsibility to obtain consent from a faculty member in the student's major department to serve as his/her prospective thesis advisor upon acceptance into the PhD program.

A PhD student and his/her advisor jointly develop a study plan for courses and research in a particular area, and submit to the chair of the department for approval.

Study Program and Course Work
The student is required to complete a minimum of 60 credit hours of graduate credit beyond the master's degree. Of these, 30 credit hours may be earned through course work and independent study, and up to an additional 30 credit hours through the thesis process. All thesis hours are graded on a Pass/No Pass basis. A maximum of 15 trimester hours may be transferred from other accredited institutions at the discretion of the PhD advisor and the Department Chair.

QUALIFICATION EXAMINATION

The qualification exam must be administered within two years of the date of admission for full-time students and within three years for part-time students. The qualification exam can be retaken only once.

The qualification examination will be in written form. There will be three fields within the examination. Mathematics is a required field. The student may choose the two other fields from among the four fields listed below:

- » VLSI Design
- » Analog Sensors & Bio Design
- » Digital Signal Processing and Communication
- » System Design

Each field will cover at least three courses, for example:

- » VLSI Design (EEN 714, EEN 732, EEN 758)
- » Analog Sensors & Bio Design (EEN 717, EEN 719, EEN 736)
- » DSP & Communication (EEN 749, EEN 766, EEN 774)
- » System Design (EEN 739, EEN 753, EEN 758)

ADMISSION TO CANDIDACY

A student who passes the qualification examination is considered as advanced to candidacy. Upon advancement to candidacy, the PhD student must approach his/her PhD advisor to assist with formation of a doctoral committee.

DOCTORAL COMMITTEE

The committee must consist of at least five members, including the PhD advisor, the Department Chair and at least one other member of the Electrical Engineering department. The committee must also include at least one member from outside the department, preferably from outside the University. Either the PhD advisor or Department Chair will serve as the chair of the committee.

The Doctoral Committee will review the proposed dissertation topic and recommend any necessary changes. For the candidacy to proceed, the committee must approve the topic.

COMPREHENSIVE EXAMINATION

Upon approval of the dissertation topic by the doctoral committee, the candidate shall request a comprehensive examination. The examination shall be an oral exam, the results of which demonstrate to the committee's satisfaction sufficient preparation in depth and breadth for the necessary advanced research. The comprehensive examinations must be completed within one year of passing the qualification examination. Comprehensive examinations may be repeated only once, in whole or in part, at the discretion of the PhD advisor.

DISSERTATION RESEARCH

The period following the comprehensive examination is devoted to research for the dissertation, although such research may begin before the examination is completed. After the research topic is approved by the Doctoral Committee, the PhD candidate should begin the completion of dissertation research.

PUBLICATION

One or more refereed articles, based on the dissertation research, must be accepted for publication in an internationally-recognized academic journal, such as IEEE, IEE, ACM, or other journals approved by the Doctoral Committee.

TEACHING REQUIREMENT

PhD candidate must teach at least one Master level course in order to demonstrate teaching ability. The course being taught must be completed prior to a dissertation defense.

DISSERTATION DEFENSE

The dissertation must be made available to all examiners one month prior to the examination. The oral examination shall consist of a presentation of the dissertation results and the defense. Dissertation defense is open to the public, but only members of the Doctoral Committee may vote. The dissertation defense passes only through a unanimous vote.

PROGRAM COMPLETION

At least one month prior to degree conferral, the candidate must submit to the Doctoral Program Council of the University two copies of the final version of the dissertation. The dissertation will not be considered as accepted until approved by the Doctoral Committee and publication acceptance. Each member of the Doctoral Committee must indicate his/her final approval by signature.

The University reserves the right to evaluate the undertakings and the accomplishments of the degree candidate in total, and award or withhold the degree as a result of its deliberations.

TIME LIMIT FOR COMPLETING DEGREES

All requirements for the doctoral degree must be completed within eight years following acceptance into the Ph.D. program. Extensions will be allowed only in unusual circumstances and must be approved in writing by the Doctoral Program Council.

DEPARTMENTAL RESEARCH ACTIVITIES

Five research labs are established within the department: Artificial Intelligence (AI), Bioelectronics (BE), Embedded Systems (EM), Green Energy (GE), and System-on-Chip (SoC). Research focuses on cutting-edge innovation and application, including autonomous movement, deep-learning, image processing, non-invasive glucose sensors, smart battery management system, and close-loop of energy-management systems.

COURSE DESCRIPTIONS

CEN (COMPUTER ENGINEERING)

CEN 500 Computer Engineering (3)
Prerequisites: None
This course provides general review of technical concepts and current developments in computer engineering with relevance to digital design in HDL, distributed computing architectures, computer algorithms, computer networks, computing techniques, and artificial intelligence. Experts in the fields introduce fundamental and up-to-date knowledge of science and technology in computer engineering including Neural Networks, Machine Learning and Deep Learning, Big Data Parallel Processing, Data Mining Computing, and Computing Software.

CEN 508 Scientific Computing (3)
Prerequisites: None
Recommended: AMS 510
This course covers fundamental scientific computing and optimization techniques used in various computer and electronic engineering fields. The techniques include interpolation methods (linear and non-linear interpolation, piece-wise interpolation, Splines, surface interpolation), solving linear systems of equations and partial differential equations using numerical methods. The Least Squares Fitting algorithm is addressed to solve the Engineering Regression through predictive modeling, profiling, optimizations and Monte Carlo simulations. Matrix Eigen functions are introduced to derive the QR factorization and multivariate Linear Regression to solve the Data Mining dimensionality reduction algorithms such as Principal Component Analysis, Singular Value Decomposition, and Factor Analysis. Machine learning technique such as Neural Networks, Support Vector Machines, and Artificial Intelligence are also briefly introduced. Time series frequency and spectrum analysis techniques are addressed on time domain engineering problems. Reliability engineering concept, modeling and computing techniques are demonstrated for both hardware device and software testing. Utilize several computing software such as MATLAB, R, SAS/JMP to help students conduct the scientific project.

CEN 510 Algorithms and Data Analysis (3)
Prerequisites: None
Recommended: Working knowledge of Data Structure
This course discusses computer algorithms as applied in computer and electrical engineering fields. It covers fundamental techniques of design, analysis and implementation, including recursion, dynamic programming, randomization, dynamic data structures, graph theory, NP-completeness, and optimization algorithms. Big data, data mining, and data analysis techniques will be introduced. Course project is designed to strengthen students' problem-solving capability.

CEN 540 Network Security Techniques (3)
Prerequisites: None
Recommended: CEN 548
This course is designed to develop knowledge and skills for security in the network systems and focuses on design and implementation of network security solutions. The key areas of the network security are intrusion detection, virtual private networks, firewalls, web security, packet filtering, network layer security, and electronic mail security.

CEN 541 Deep Learning for Computer Vision (3)
Prerequisites: None
Recommended: CEN 510
The course focuses on methods of deep learning for computer vision. Challenges of data collection with various sensors and cameras, high-level algorithms and real-time implementation for 2D and 3D objective recognition and reconstruction will be discussed. After gaining background knowledge, the course will review the latest algorithms using deep learning to solve problems in computer vision and machine perception. Convolutional neural networks will be presented and analyzed in detail to understand the potential of these state of the art tools in visual pattern recognition. Engineering guidelines and scalability issues will be addressed to solve tasks such as object detection, image classification or automatic textual captioning.

CEN 542 Digital Image Processing (3)
Prerequisites: None
Recommended: CEN 508 or CEN 510
The course provides image processing algorithms and systems. It covers image acquisition, image data structures, and images operations such as geometric, arithmetic, logical convolution, transforms, calibration, correction, and enhancement. Course project is required to encourage students implementing and investigating image processing algorithms using Matlab.

CEN 548 Computer Network Systems (3)
Prerequisites: None
This course covers the theory and practice of essential computer network hardware and software. Topics include network topologies, protocol hierarchy, network reference models, circuit vs. packet switching, signal transmission, modulation and multiplexing, Media Access Control (MAC), error detection, flow control, congestion control, routing, and Network Operating Systems (NOS).

CEN 551 Computer Architecture (3)
Prerequisites: None
Recommended: Working knowledge of Digital Logic and Circuit
This course focuses on principles of computer architecture, offering students an overview of computer systems, CPU and GPU designs, computer arithmetic, instruction set architecture, pipelining, microprogramming techniques, memory hierarchies and management, input/output subsystem organization, and performance measurement. Its purpose is to prepare students to understand the internal organization of computers, and how architecture affects performance.

CEN 556 Distributed Computing Systems (3)
Prerequisites: None
This course covers several main topics in distributed systems, including map-reduce, stream processing, cloud computing, remote service invocation (RPC), web services, service

registration and discovery, data synchronization, service replication, and fault tolerance.

CEN 565 Introduction to Medical Image Systems (3)
Prerequisites: None
The course introduces imaging processing systems applied in medical field, including CT, Ultrasound, Radionuclide, and Magnetic Resonance. The focus is on the physical principles, instrumentation methods, and imaging algorithms. The medical interpretation of images, and the clinical, research and ethical issues in medical imaging are included.

CEN 568 Network Storage Systems (3)
Prerequisites: None
Recommended: CEN 548
This course will introduce distributed systems designed to offer access to storage resources over a network. It will cover network file system, network storage architecture, security issues in data transferring over networks, performance measurement, file service types, and file servers. In addition, topics of data redundancy, data throughput, Samba, and load balancing will be covered.

CEN 580 Signal Analysis and Optimization (3)
Prerequisites: None
Recommended: AMS 552
This course utilizes on computer hardware-software engineering integration techniques such as Statistical Signal Processing (Analog and Digital; Noise Reduction, Image Enhancement, echo cancellation), System Design Verification and Validation, Robust Design and Tolerance Design (Monte-Carlo Simulation, Signal-Noise Ratio), Design Reliability in Computer Systems (Design Maintainability, Life Cycle Costing and Warranty Modeling), System Measurement, Statistical Process and Quality Control, Financial Signal Processing (Time Frequency/Spectrum Analysis, Time Series and Forecasting), Data Mining and Pattern Recognition, etc. Robot case study is used to demonstrate the statistical and experimental approach on system hardware-software design integration.

CEN 581 Principle of Internet of Things (3)
Prerequisites: None
This course provides the fundamentals of Internet of Things. It focuses on system collaborating various device protocols, coordinating recovery data from sensors, providing local control of assets, and best reuse of existing resources and infrastructures. Related technologies, architectures, and protocols aimed at improvement of system efficiency, resources sharing, interoperability, and intelligent use of sensors will be introduced. With seamlessly connected sensor devices and cloud database, IoT makes information management systems more efficient, intelligent, and globally applied. User interfaces of mobile devices with app implementation and system security will be discussed.

CEN 643 Advanced Digital Image Processing (3)
Prerequisites: None
Recommended: CEN 542
This course introduces techniques and algorithms for advanced digital image processing. It covers segmentation, shape and texture, morphology, recognition and classification, compression techniques, real-time image, video coding, etc. Matlab is used to implement and test various image-processing algorithms.

CEN 661 Parallel Computing (3)
Prerequisites: None
Recommend: CEN 510
The course focuses on parallel computing frameworks and techniques. It covers cutting-edge techniques including multiprocessing, multithreading, synchronization, cluster/MPI, cell computing, general purpose GPU (CUDA/STREAM), and stream computing. The course project will be issued for solving/benchmarking some computing intensive problems, such as Monte-Carlo simulations, partial differential equations, image processing, etc., using different parallel computing frameworks.

CEN 688 Special Topics (1-3)
Prerequisites: None
The course offers a relatively new subject that is not currently available in the catalog, but will be of great relevance to computer engineering. It consists of lectures, readings, homework, presentations and projects determined by the instructor.

CEN 689 Independent Study (1-3)
Prerequisites: Approval by Department Chair
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

CEN 691 Research Project (1)
Prerequisites: Approval by Department Chair
Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in computer or electrical engineering, prepare a technical report, and defend it in front of a faculty advisor.

CEN 692 Research Project (2)
Prerequisites: Approval by Department Chair
Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in computer or electrical engineering, prepare a technical report, and defend it in front of a faculty advisor.

CEN 693 Research Project (3)
Prerequisites: Approval by Department Chair
Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in computer or electrical engineering, prepare a technical report, and defend it in front of a faculty advisor.

CEN 698 Master Thesis I (3)
Prerequisites: Approval by Department Chair
Thesis research is arranged with thesis advisor upon an approval by chair of the department. Students will conduct independent research in computer engineering, prepare a thesis, and defend it in front of a committee consists of a number of faculty designated by department chair.

CEN 699 Master Thesis II (3)
Prerequisites: Approval by Department Chair
Master Thesis II is a continuance of Master Thesis I. It is upon recommendation of student's thesis advisor and approval of chair of the department. Paper submitting for publication is required.

CFL 591 Integrating Academic & Internship Learning (2)
Prerequisites: None
This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591 in order to be eligible to enroll in INT 593.

INT 593 Internship (1-3)
Prerequisites: CFL 591
This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A student may take a maximum of 10 credit hours of INT 593.

EEN (ELECTRICAL ENGINEERING)
Courses numbered 700 or above are designed for PhD-EE program. Master students are eligible to take 700 series as elective courses.

EEN 500 Fundamentals of Electrical Engineering (3)
Prerequisites: None
This course provides a general review of technical concepts and current developments in electrical engineering, with emphasis on the following: Integrated Circuit (IC) Design; Artificial Intelligence as applied in Electrical Engineering; Signal Processing and Communication in Telecom and Wireless; Internet of Things (IoT) and Intelligent Systems implemented with Embedded System Design. Experts in the fields teach the course.
EEN 505 Digital Design in HDL (3)
Prerequisites: None
The course introduces VHDL and Verilog, two IEEE standards of hardware design languages, skills of design and verification, synthesis consideration, timing/power effective designs.
EEN 506 Electromagnetic Fields and Waves (3)
Prerequisites: None
Recommended: College level Physics
This course introduces electromagnetic fields in vacuum and in matter, boundary value problems and Green's functions, retarded potentials, wave propagation, wave-guides and cavities, radiation, dispersion and absorption.

EEN 511 VLSI Design (3)
Prerequisites: None
Recommended: Working knowledge of Data Structure
This course provides an overview of IC (integrated circuit) design and methods. The course introduces the IC design procedure, basic analog and digital circuits, operational principles, schematic and layout techniques, circuit

simulation, clock distribution, power distribution, high-speed circuits and low-power design techniques. The implementation of artificial intelligence on a chip will be discussed. Course project will be assigned on practice of circuit/layout design using EDA tools.

EEN 513 Microprocessor Design (3)
Prerequisites: None
Recommended: CEN 551
The course introduces various microprocessor architectures, characteristics, and applications. It delivers to students a specific microprocessor design to understand each functional block design and design considerations.

EEN 514 Script Languages and Applications (3)
Prerequisites: None
This course is to focus on the familiarity of encoding multiple scripting languages, C Shell, Bourne Shell, Perl, Python and Tcl, which are very popular in the current semiconductor chip design and computer engineering industry. The goal will be achieved by working on at least 3 real VLSI design projects and the explanation of practical script examples. The expected outcome will have students to have strong encoding ability on the industry automation project by using multiple scripting languages fluently.

EEN 515 Analog IC Design (3)
Prerequisites: None
Recommended: Working knowledge of Electrical Circuits
This is the introductory course to analog circuit design and starts by giving a thorough grounding in solid-state physics and basic circuit concepts. Transistor device characteristics are explored in depth as well as simple transistor stages. The course also involves design and analysis of multi-stage BJT and CMOS analog amplifiers, Frequency response of cascaded amplifiers and gain-bandwidth considerations, concepts of feedback, stability, and frequency compensation. Each student will be assigned a small design project to be completed before the end of the course.
EEN 520 ASIC Design I (3)
Prerequisites: None
Recommended: Working knowledge of Digital Structure
The course focuses on ASIC design principle, consideration, and design implementation with logical design, verification, synthesis, and design analyses of function, timing, power, signal integrity and others. A design project with a front-end ASIC design flow will be assigned for practice.
EEN 521 FPGA Design and AI Applications (3) Prerequisites: None
Recommended: EEN 505
The course introduces the principle of design in Field Programmable Gate Array (FPGA). The revolutionary increased FPGA functions with high performance of multipliers, microprocessors, DSPs, GPUs provide direct incidence to FPGA implementations in artificial neural networks (ANNs) and other intelligent systems. Practicing with course projects, students will develop solid understanding and hands-on experience in this exciting digital design area.

EEN 525 ASIC Design II (3) Prerequisites: None
Recommended: Working knowledge of Digital Structure
The course emphasizes on back-end ASIC design implementation with floorplan, placement and routing, layout verification and parameter extraction, design for manufacture and post-layout analysis with consideration of timing-driving and power-aware layout. A design project with a back-end ASIC design flow will be assigned for practice.

EEN 541 Digital Signal Processing and System Analysis (3)
Prerequisites: None
Recommended: AMS 514
This course focuses on analysis of discrete-time signals in both time and frequency domains, modeling of electrical systems, and the design of finite impulse response (FIR) and infinite impulse response (IIR) filters. The sampling theorem, reconstruction process, discrete Fourier transform (DFT) and its computation with the fast Fourier transform (FFT) and applications are discussed. Design and implementation of FIR and IIR filters and multi-rate signal processing, decimation, interpolation, least mean square (LMS), normalized least mean square (NLMS), sample rate conversion, and efficient implementation are covered. Application of communications systems and system analysis are introduced. Students will learn Fourier techniques, applications in communications systems, and implementation of signal processing software and hardware.

EEN 561 Fundamentals of Communication Systems (3)
Prerequisites: None
The course focuses on the analysis, principle, and application of the communication systems, both digital and analog. Students will learn Fourier techniques and their usages in communication systems, brief review of probability theories, concept of information theory, different modulation and demodulation techniques.

EEN 577 Green Energy (3)
Prerequisites: None
The course focuses on solar energy, especially the principles and operational characteristics of modern solar cells. Main topics to be covered will be solar energy principles, principles of diode, solar cell, concentrated solar cell, thin film solar cell, multi-cell structure, power conversion (DC to AC, grid), power storage (battery, fuel cell, etc.) and other green energy source (hydro, wind, biomass, etc.) comparison.

EEN 616 Mixed Signal IC Design (3)
Prerequisites: EEN 511 or EEN 515
The course focuses on the intersection of the digital and analog design worlds. The course will introduce various SPICE simulators for circuit analysis as well as Matlab for system analysis. The students will be expected to have basic analog circuit and digital design knowledge, and to have used the principal EDA tools like SpectreRF and Verilog. The course will cover mixed signal subsystems such as A/D converters, digital PLLs, embedded CPUs with thermal sensors, DDR PHYs and others. Mixed-signal issues like substrate noise will be explored in detail. The course will also include a significant design project with a simple embedded CPU.

EEN 618 RF IC Design (3)
Prerequisites: EEN 515
This course covers fundamentals of CMOS RFIC design. The course will start with basic electromagnetics like high-Q inductor design, and then move into device modeling and layout issues. It will examine in detail the primary CMOS RF subcircuits like LNAs, power amplifiers, fractional N synthesizers, mixers and filters. A design practice will be done using SpectreRF, with the passive components designed using Sonnet or equivalent modeling tool. The circuits will be laid out using Cadence Virtuoso and the parasitic parameters will be extracted using Assura.

EEN 627 IC Design to Silicon (3)
Prerequisites: EEN 511 or EEN 515
The course will provide students with hands-on practice in chip design. Students will complete a full-custom design, from circuit to silicon. With given technology and design specifications, students will start their own designs on a transistor-level schematic, check design accuracy, complete layout and layout verification, and run LPE and whole chip post-layout verification. The designs will be taped out for EEN 629 System on Chip (SOC) (3) Prerequisites: EEN 500 The course introduces method, consideration and analysis of System on Chip design fundamentals. VLSI architectures, systolic arrays, self-timed systems, system verification, design flow and implementation will be covered. System C and/or System Verilog will be applied for pra) ctice.

EEN 635 Introduction to MEMS Design (3)
Prerequisites: None
The course introduces MEMS design fundamentals, microfabrication techniques and analysis of a variety of MEMS structures including switches, accelerometers and microcavities. The focus will be on hands-on design using COMSOL and Matlab and modeling the resulting structures' electromechanical properties. The class will have a design project.

EEN 637 Bioelectronics and Bioengineering (3)
Prerequisites: None
This course introduces key concepts in biology, bioelectronics and biosensing, while expanding your knowledge of MEMs, analog electronics and digital signal analysis. This is a fundamental course to give you the basic knowledge for understanding bioelectronics field. The course will cover topics like biological interfaces, critical human body systems.

EEN 638 Signal Integrity of High-Speed Digital Circuits (3)
Prerequisites: EEN 500
The course introduces the issues in signal integrity of high-speed digital circuits, identify signal integrity problems; circuit analysis for transient signals in lumped and distributed circuits; reflection and crosstalk; analysis of coupled-line systems; current measurement processes for high-speed signals; and also the current design techniques, rules and procedures.

EEN 646 Embedded System Design (3)
Prerequisites: None
This course teaches the design of embedded systems with an emphasis on the Internet of Things (IoT). Students will learn the principles of embedded systems design by working with the Linux operating system, ARM microprocessor cores, peripherals such as GPIO, UART, I2C, SPI, and USB, and application programming in Python and JavaScript (Node.js). Students will be introduced to system design through series of labs and work on an IoT project using Raspberry Pi boards. These labs are designed to give students hands-on experience in embedded system design and web services.

EEN 671 Introduction to Wireless Communication Systems (3)
Prerequisites: None
Recommended: EEN 561
The course provides an overview of wireless communication systems in use today as well as some of the emerging systems such as 5G cellular systems. It presents wireless challenges and wide range of wireless applications, from cellular systems to wireless local area networks (WLAN), to satellite communications, and their underlying technologies. It will examine the pros and cons of wireless communication and describe both infrared and radio technologies. It will also survey the representative 2G, 3G and 4G cellular systems as well as representative WiFi WLAN systems.

EEN 676 Introduction to Near Field Communication (3)
Prerequisites: None
Recommended: EEN 561
The course introduces the fundamentals of Near Field Communication (NFC). It starts with general applications such as those can be integrated into users' smartphones: payment, coupon redemption, ID card, bus/train/boarding pass, car key, etc. The course focuses on the technology aspects of NFC: its standardization, architecture, operation modes, physical layer and security element.

EEN 688 Special Topics (1-3)
Prerequisites: None
The course offers a relatively new subject that is not currently available in the catalog, but will be of great relevance to electrical engineering. It consists of lectures, readings, homework, presentations and projects determined by the instructor.

EEN 689 Independent Study (1-3)
Prerequisites: Approval by Department Chair
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

EEN 691 Research Project (1)
Prerequisites: Approval by Department Chair
Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in electrical or computer engineering, prepare a technical report, and defend it in front of a faculty advisor.

EEN 692 Research Project (2)
Prerequisites: Approval by Department Chair
Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in electrical or computer engineering, prepare a technical report, and defend it in front of a faculty advisor.

EEN 693 Research Project (3)
Prerequisites: Approval by Department Chair
Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in electrical or computer engineering, prepare a technical report, and defend it in front of a faculty advisor.

EEN 698 Master Thesis I (3)
Prerequisites: Approval by Department Chair
Thesis research is arranged with thesis advisor upon an approval by chair of the department. Students will conduct independent research in computer engineering, prepare a thesis, and defend it in front of a committee consists of a number of faculty designated by department chair.

EEN 699 Master Thesis II (3)
Prerequisites: Approval by Department Chair
Master Thesis II is a continuance of Master Thesis I. It is upon recommendation of student's thesis advisor and approval of chair of the department. Paper submitting for publication is required.

EEN 714 Advanced Microprocessor Design (3)
Prerequisites: EEN 513
The course provides a comprehensive guide for system designers and computer engineers. It covers broad and in-depth topics from computer architecture and operating system designs to system implementations. It is a fast paced course intended for graduate students in Electrical and Computer Engineering, as well as Embedded System professional. Design flow will be covered and EDA tools will be used in practice. Microprocessor architectures from MIPS, Intel, and ARM will be discussed and evaluated, as well as Operating Systems such as uClinux. Low-power and high performance microprocessors, parallel processing architectures, AI chips, and computer interface will also be discussed in detail.

EEN 717 Advanced Analog IC Design (3)
Prerequisites: EEN 515
The course provides an understanding of analog circuit and systems design and complex CMOS IC issues. Topics include high-frequency amplifiers, high-Q oscillators, low-noise circuits, selecting passive components for minimum mismatch, non-linear systems, active filters, A/D and D/A converters, grounding and shielding, layout and system design. Students will design a medium-complexity analog circuit starting from performance and parametric specifications. The course will require heavy use of HSPICE and some electromagnetic modeling.

EEN 719 Advanced RF IC Design (3)
Prerequisites: EEN 515 or EEN 618
This advanced course introduces designs of local oscillators and baluns, supporting mixed signal circuits like A/D

converters and baseband filter-amplifier blocks. The course will include a significant design project that is typically a subsystem like a power amplifier or low-noise amplifier. The design will be done using SpectreRF, the circuits will be laid out using Cadence Virtuoso, and the parasitic parameters will be extracted using Assura.

EEN 732 Advanced Nanotechnology (3)
Prerequisites: None
The course is further study on quantum behaviors which mechanic, electronic, magnetic, optical and chemical properties open the door to a new domain of engineered nanostructures and nanodevices, with enormous applications in many aspect of life. Students learn small-scale quantum phenomena, device fabrication, analysis and synthesis processes, instrumentation for characterization and integration of Nano devices and systems.

EEN 736 Advanced Sensor/Bio Design (3)
Prerequisites: EEN 635
The course applies parametric design and optimal design to micro-electro-mechanical systems with an emphasis on design and micro-mechanical simulation. The primary thrust of the course will be experimental, with an actual design and fabrication project to be built in a local MEMs fabrication facility. The design will be analyzed for electromechanical properties and compared to the simulations.

EEN 739 Advanced Bioelectronics and Bioengineering (3)
Prerequisites: EEN 637
This advanced course will emphasize on microfabrication, instrumentation, biomedical imaging and lab on chip technologies. The course draws upon the knowledge of experts in the field who will take part in delivering the course and supervising the laboratory experiments.

EEN 749 Advanced Digital Signal Processing (3)
Prerequisites: EEN 541
The course focuses on advanced techniques in signal processing. Stochastic signal processing, parametric statistical signal models, and adaptive filtering will be discussed. Application to spectral estimation, speech and audio coding, adaptive equalization, noise cancellation, echo cancellation, and linear prediction will be covered.

EEN 753 Advanced Machine Learning Engineering (3)
Prerequisites: CEN 510 or CSC 580
The course introduces artificial intelligent theories, algorithms, and applications. The course covers detection and analysis, self-learning system; Bayesian network, sensor data analysis, pattern recognition, observation-based self-localization, map learning, environment reconstruction, motion planning and motion control. Project of robot system design will be applied as practice.

EEN 758 Advanced Embedded System Design (3)
Prerequisites: EEN 646
The course intends to expose students to the state-of-the-art design and analysis techniques for embedded systems. Fueled by advances in semiconductor technology and consumer demands, many embedded systems have become so complex that the design capability simply prevents such systems to be realized. In the last decades, new research areas targeting at advanced embedded system design have emerged. In this course, major results in this field will be discussed. The main topics include system modeling, performance and power/energy analysis and estimation, system-level partitioning, synthesis and interfacing, co-simulation and emulation, and reconfigurable computing platforms. Research papers with significant impacts on the above topics are studied in detail. Class discussions and research project participation are integral parts of the course.

EEN 766 Advanced Communication Systems (3)
Prerequisites: EEN 561
The course focuses on up-to-date digital communication systems and technologies. It covers introductory information and coding theory, baseband transmission systems, optimum receiver structures, intersymbol interference, equalization, various modulation and corresponding demodulation schemes and application of digital systems.

EEN 774 Advanced Wireless Communications (3)
Prerequisites: EEN 671
This course is an advanced course of EEN 671. The topics include: capacity of wireless channels, multi-user capacity and multi-user diversity, MIMO channel capacity and spatial channel modeling, MIMO receiver design. The concepts are illustrated using examples from the WiMax and LTE systems.

EEN 891 Independent Study (1-6)
Prerequisites: Approval by PhD Advisor
Independent Study is designed for PhD students. The study topic could be special interest in electrical engineering under the direction of an instructor who is knowledgeable in the field. It may consist of readings, homework, tests, presentations and project reports assigned by the instructor.

EEN 907 Doctoral Dissertation Thesis (3)
Prerequisites: Approval by PhD Advisor
Doctoral Dissertation Thesis consists of a series of research studies and arranged with thesis advisor for PhD candidates upon his/her thesis topic approved. Students will conduct independent research in electrical or computer engineering, prepare for publication, prepare a thesis and defend it in front of a committee consists of a number of faculty designated by Department Chair.

CFL 591 Integrating Academic & Internship Learning (2)
Prerequisites: None
This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591 in order to be eligible to enroll in INT 593.

INT 593 Internship (1-3)
Prerequisites: CFL 591
This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom

learning. A student may take a maximum of 10 credit hours of INT 593.

COURSE DESCRIPTIONS OF MATHEMATICS

AMS 510 Linear Algebra (3)
Prerequisites: None
This course covers algebraic basic concepts of matrices and matrix operations, determinants, systems of linear equations, Gauss elimination, LU decomposition, vector spaces with inner product, change of bases, transformations, and Gram-Schmidt orthonormalization. Meaning and purpose of eigenvalues and eigenvectors and algorithms for computing them are also introduced.

AMS 512 Applied Mathematics Methods (3)
Prerequisites: None
Recommended: AMS 510
The course emphasize on applying mathematical methods to analyze and solve engineering problems. The course starts with a review of Linear Algebra and its applications, and goes to introduction of some numerical methods including eigenvalue problems, ordinary differential equations (ODE's), and partial differential equations (PDE's), etc. Optimization and minimization methods are important consideration in applied math. Examples of equations and methods of Minimum Degree and Nested Dissection, Convection-Diffusion Equation, Conservation Laws, Multigrid Method, Investigations into Direct Methods for Solving Large Sparse Systems of Linear Equations, Thermal Analysis of the Heating of a Fiber Optic via Concentrated Solar Energy, Numerical Methods for Initial-value Problems, Comparison of Multigrid Methods for the One-Dimensional Convection-Diffusion Equation, Finite Difference Acoustics Modeling for Waveguide Loudspeaker Design, Poisson-Boltzmann Equation, Efficiently Solving the Two-way Wave Equation, etc. will be introduced. Students are encouraged to use applied math on engineering applications through group projects.

AMS 514 Fast Fourier Transformation & Applications (3)
Prerequisites: None
The course provides electrical/computer engineering and applied mathematics graduate students with the background knowledge of Fourier Transformations (FT), Discrete Fourier Transformations (DFT) and Fast Fourier Transformations (FFT). The applications of FFT in Filter Design, Signal Processing and Image Processing are also included in this course.

AMS 520 Optimization Techniques   (3)
Prerequisites: None
The course covers basic concepts of unconstrained optimization, linear programming, simplex method, degeneracy, multidimensional optimization problems involving equality or inequality constraints by gradient and non-gradient methods.

AMS 530   Numerical Analysis (3)
Prerequisites: None
The course covers numerical solution of linear system of equations by direct method and iterative method, numerical least square problem, eigenvalue problem, numerical solution of non-linear systems of equations and optimization problem.

AMS 540   Discrete Mathematics (3)
Prerequisites: None
The course covers topics that are important in the development of computer algorithms and data structures, such as mathematical induction, asymptotic notations, recurrences, infinite series summations, graphs, digraphs, trees and counting combinatory and discrete probabilities analysis and statistical quality control.

AMS 552 Statistics, Probability and Reliability for Engineers (3)
Prerequisites: None
This course provides an introduction to the field of statistics and how engineers use statistical methodology as part of the engineering problem-solving process. It covers the basic concepts of probability, discrete, probability distributions, random sampling and data description techniques. The course also addresses the hypothesis tests, ANOVA, linear regression, and factorial design of experiment to build a solid foundation of statistical analytics skills. Furthermore, the course will, through statistical analysis, cover the engineering applications including measurement system analysis, process capability analysis, robust design verification, statistical process control, and statistical data mining. Reliability concept, block diagram, and reliability modeling are also introduced to predict and ensure the reliability performance.

AMS 722 Advanced Applied Mathematics Methods (3)
Prerequisites: AMS 512
The course will emphasize on the connection between mathematics and applied and natural science and technologies. Applied mathematics and computational methods encompass some of the most diverse and interdisciplinary research in the physical, engineering, and biological sciences, and are broadly used for the design and optimization of products and processes.

AMS 750 Abstract Algebra (3)
Prerequisites: AMS 510
This course provides the abstract algebraic knowledge necessary for coding theory and cryptography. The general notion of algebraic structures, groups, rings, fields. Ring of polynomials over fields. Remainder classes of polynomials. Field extensions and Galois Fields. General field extensions, fields of rational, real and complex numbers. Some complex arithmetic. Vector spaces over various fields including GF(2). Euclidean algorithm in finite fields. Linear algebra in $GF(2^n)$. The algebra used in AES. Square roots of elements in $GF(2^n)$.

AMS 760 Advanced Optimization Techniques (3)
Prerequisites: AMS 520
Combinatorial optimization, Hopfield neural network model, Simulated Annealing and Stochastic machines, mean field annealing, genetic algorithms, Applications to: Tabu search, traveling salesman problems, telecommunications problems, quadratic 0-1 & quadratic assignment problems, graph partition and graph bipartition problems, point pattern matching problems, multiprocessor scheduling problems.

FACULTY

Dr. May Huang, PhD, International Technological University. Principal Engineer and Project Manager at Virtual Silicon, Hitachi, VLSI Tech Inc. Department Chair.

Dr. Karl Wang, PhD, Massachusetts Institute of Technology. Director at ARM and Hitachi, VP at UMC and Silicon Motion Inc., Advisor at Embedded Research Lab, VP of Research and Technology.

CORE FACULTY

Dr. Eric Chen, PhD, Waterloo University. Tech Lead at Uber, Google and GE Healthcare, Advisor at AI Research Lab.

Dr. Dominik Schmidt, PhD, Stanford University. Technology Analyst at QVT Financial LP, former Senior Director of Technology Development at Intel, Advisor at Bioelectronics Research Lab.

Dr. John Kim, PhD, New Mexico State University. Senior Engineer at Broadcom, District Manager at Panasonic, consultant at Electronics, Telecommunications Research Institute (ETRI), Sybersay Communications, and Bell Labs in Lucent Tech.

Dr. Qingning Li, PhD, University of Utah. System Consultant at Engineering Information and former designer at IBM, Advisor at Green Energy Research Lab.

Dr. Ted Sun, PhD, Santa Clara University. Engineer at Cadence and Integrated Device Technology.

ADJUNCT FACULTY

Dr. Raminder Bajwa, PhD, Pennsylvania State University. Director of ASIC design at Google.

Dr. Fred Cheng, PhD, ITU. COO of Tend Insight Inc., former CTO of TChips Technology, and VP of Marketing at Winbond.

Dr. John Ladasky, PhD, Stanford University. Founder of Blind Watchmaker LLC. Research Scientist, Bioelectronics Research Lab.

Dr. Bhaskar L. Mantha, PhD, University of Cincinnati. Engineer at Intel, VLSI Technology, Hynix, and Zilog.

Dr. Neeli R. Prasad, PhD, University of Rome, Italy. CEO of SPA Solutions LLC, IEEE Communication Society Globecom/ICC Management and Strategy (GIMS), committee member and chair of the Marketing, Strategy and Staff Liaison Group.

Dr. Xiaoshu Qian, PhD, University of Rhode Island. Designer at Intel.

Dr. Jagadeesh Vasudevamurthy, PhD, McGill University, Canada. Senior Engineer at Xilinx, Mentor Graphics and Synplicity.

Weihan Wang, PhD, Candidate, University of Toronto. Cofounder and CTO of AeroFS. Research Scientist, Embedded Research Lab.

Dr. John Ye, PhD, University of Southern California. Engineering Director at Camel Microelectronics, Inc. Advisor, SoC Research Lab.

Dr. Henry Zhang, PhD, University of Texas at Austin. Director of ASIC design at Sundisk.

Dr. Qing Zhu, PhD, UC Santa Cruz. Engineering Manager at eveRAM Technology Inc, Intel and SanDisk.

DEPARTMENT OF ENGINEERING MANAGEMENT

MISSION

The mission of the Master of Science in Engineering Management Department at ITU is to train students to become managers of projects in technology-oriented businesses.

INSTITUTIONAL LEARNING OUTCOMES (ILOS)

ILO #1: Problem Solving

ILO #2: Critical Thinking

ILO #3: Communication literacy

ILO #4: Collaboration and Teamwork

ILO #5: Technical literacy

ILO #6: Research Skills and Information Literacy

ILO #7: Individual Responsibility

MASTER OF SCIENCE IN ENGINEERING MANAGEMENT

The Master of Science in Engineering Management degree program at ITU provides practical training in all the essential elements of running a technology-focused business including project management, business strategy development, teamwork, collaboration, and communication, product management and marketing, accounting, finance, legal aspects of technology businesses, operations and supply chain management.

For some, engineering management is described as a "technical MBA." However, it is distinguishable from this discipline in its focus on the creation of new technology, as well as the management of technology specifically for competitive business advantage.

Moreover, companies are showing a preference for technical graduate students who have both a deep understanding of technology and who also show cross-training in business management knowledge and skills. It is with this focus that the Engineering Management Department places its emphasis on training.

Last, given the effects of globalization on the environment in which innovation occurs in technology-based businesses, the ITU masters in engineering management degree emphasizes the need for degree candidates to develop a strong appreciation and awareness of emerging technologies and to be able to adapt to the constant impact of change in the business environment.

The standards to which the Engineering Management aligns itself include the models provided by the programs of universities who are members of the Masters in Engineering Management Program Curriculum (MEMPC). This is a prestigious group of nine top universities in America including Cornell University, Dartmouth, Duke, Johns Hopkins, MIT, Northwestern University, Purdue, Tufts, and the University of Southern California.

Additionally, the ITU program studies the guidance put out by the American Society of Engineering Management (ASEM) and participates in the Technology and Engineering Management special interest group of the IEEE.

PROGRAM LEARNING OUTCOMES (PLOs)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

PLO #1: Be prepared to lead engineering and technical project teams delivering new products and services whether in the United States or internationally. (Mapped to: ILO#4, Collaboration and Teamwork) and ILO#7, Individual Responsibility)

PLO #2: Be able to take a systems-approach to analyzing problems and managing projects. (Mapped to: ILO#1, Problem Solving and ILO#5, Technical Literacy)

PLO #3: Understand the process of aligning project goals and objectives with corporate strategy. (Mapped to ILO#1, Problem Solving and ILO#5, Technical Literacy)

PLO #4: Have a strong grasp of principles of project management and be able to apply them in the work setting. (Mapped to ILO#1, Problem Solving and ILO#5, Technical Literacy)

PLO #5: Be able to demonstrate good communication skills, both written and oral, as an engineering manager. (Mapped to ILO#3, Communication Literacy)

PLO #6: Demonstrate competence and knowledge in at least one area of technical emphasis, such as software engineering, electrical engineering, etc. (Mapped to ILO#5, Technical Literacy and ILO#6, Research Skills and Information Literacy)

PLO #7: Show evidence of an entrepreneurial mindset that allows the engineering manager to identify new business opportunities and an ability to develop an action plan to capitalize on new venture ideas. (Mapped to ILO#1, Problem Solving)

CAREER OPPORTUNITIES

Upon completion of the Engineering Management master's program at ITU, students, depending on their elective course choices, can prepare themselves for positions in engineering

management, as lead project engineers, technology analysts, R&D managers, business analysts, data analysts, product managers, systems analysts, program managers, patent engineers or analysts, IT consultants, market research analysts, operations managers, management consultants, and more.

MASTER OF SCIENCE ENGINEERING MANAGEMENT PROGRAM REQUIREMENTS

- Required Courses
    - » 4 Core Courses: 12 Credit Hours
    - » 1 Capstone course: Project or Thesis: 3 Credit Hours
    - » 1 Internship: 1 Credit Hour / INT 591
- Elective Courses: 11 - 20 Credit Hours
    - » Internship: 1-9 Credit Hours / INT 591 and INT 593
    - » Cross Disciplinary course: Up to 3 credit hours
    - » Transfer Credits: Up to 9 credit hours from a graduated program of a regionally accredited school
- 36 Total Credit Hours

REQUIRED CORE COURSES

- » EMG 500 Principles of Engineering Management
- » EMG 501 Engineering Practicum
- » EMG 502 Organizational Behavior
- » EMG 503 Product Management

REQUIRED CAPSTONE COURSE

- » EMG 690 Capstone Project

    OR

- » EMG 697 Master's Thesis

ELECTIVE COURSES

Electives from the MSEM curriculum must be chosen so that the total number of credit hours completed is at least 36.
- » EMG 511 Technology Management and Entrepreneurship
- » EMG 540 Writing and Presentation Skill-Building for Engineering Managers
- » EMG 541 Project Management for Engineers and Engineering Managers
- » EMG 542 Engineering Manager's Toolkit
- » EMG 522 Fundamentals of Business Analysis for Software Development
- » EMG 545 Introduction to Medical Devices and Digital Health Products

- » EMG 549 Introduction to Software Development & Business Architecture for Engineering Managers
- » EMG 550 Software QA & Testing for Business Analysts
- » EMG 551 Agile Methodologies
- » EMG 554 Management Consulting
- » EMG 557 Internet of Things (IoT) Management Issues
- » EMG 559 Introduction to Sensor Technology for Engineering Managers
- » EMG 560 Cybersecurity Management
- » EMG 563 Introduction to Intellectual Property Management
- » EMG 564 Quantitative Analysis for Engineering Managers
- » EMG 565 Healthcare Product Economics and Outcomes
- » EMG 568 Technology Management
- » EMG 570 Cloud Computing Management Issues
- » EMG 579 Business Process Management
- » EMG 688 Special Topics

Course Descriptions

EMG 500 PRINCIPLES OF ENGINEERING (3)
Prerequisites: None
This course will provide an overview of the essential skills relevant to managing engineering and science-based teams in a variety of industries. Such teams are typically responsible for new product development, getting innovations to market, developing new technologies, implementing product improvements, establishing or improving technical processes, and setting up organizational infrastructure. Students will focus on the fundamental skills and applications of engineering and science management and will be introduced to business and engineering topics needed to be successful in the field. Major topics include the areas of leadership and ethics, general management principles, teamwork, collaboration, project management, risk management, systems engineering, organizational structure and behavior, customer service, business communication, marketing, trends in science and technology, innovation management, entrepreneurship, and more.

EMG 501 ENGINEERING PRACTICUM (3)
Prerequisites: None
This course is an exercise in applying the principles of project management to an engineering or other technical objective. Project management training features will include team formation, leadership skills development, collaboration, market research and assessment, project planning, generating a project charter with business case justification, work breakdown structure, risk assessment, task assignments, scheduling, on-going project-reporting, conflict resolution, a final project report and presentation.

EMG 502 ORGANIZATIONAL BEHAVIOR (3)
Prerequisites: None
The purpose of this course is to provide students with a technical background to become effective managers and leaders. It covers a wide range of management and leadership issues that industries face today – from individual, to team, to entire organization. It includes: individual differences, personnel diversity, motivation in the workplace, managing individual stress, interpersonal communication, managing interpersonal conflicts and negotiation, team building, leadership models and styles, decision making in organizations, organizational culture and managing change.

EMG 503 PRODUCT MANAGEMENT (3)
Prerequisites: None
The product manager is responsible for the strategy roadmap, and feature definition of a product or product line. In this course, students will learn about the general role of the product manager in technology-oriented businesses.

EMG 511 TECHNOLOGY MANAGEMENT AND ENTREPRENEURSHIP (3)
Prerequisites: None
This course focuses on the connection between entrepreneurship and the creation of new technologies which drive economic development and the creation of wealth. A second area of study focuses on the existence or establishment of an "innovation ecosystem" to create and sustain economic development.

EMG 522 FUNDAMENTALS OF BUSINESS ANALYSIS FOR SOFTWARE DEVELOPMENT (3)
Prerequisites: None
In this course, students will learn about the basic duties of business analysts in the field of software development. Overall, business analysts help companies solve problems by developing a process or technical solution. A business analyst's work is done at many levels within a company, but at its core necessitates an understanding of the Software Development Life Cycle (SDLC) which involves: a) planning a software project, b) identifying the project scope, c) eliciting, analyzing, and communicating requirements, d) designing a solution, e) building or buying the solution, f) testing the solution, g) implementing the solution, and h) conducting a post-project review.

EMG 540 WRITING AND PRESENTATION SKILL-BUILDING FOR ENGINEERING MANAGERS (3)
Prerequisites: None
The key emphasis of this course is on writing. The students will begin by receiving training on producing technical engineering reports, summarizing engineering management academic literature and journal articles, writing engineering research reports, writing a thesis in the engineering management discipline, and more.

EMG 541 PROJECT MANAGEMENT FOR ENGINEERS AND ENGINEERING MANAGERS (3)
Prerequisites: None
Project management knowledge and techniques are critical to getting complex technical projects completed on time and on budget. A project engineer's responsibilities include schedule preparation, pre-planning and resource forecasting for engineering and other technical activities related to the project. They may also be in charge of performance management of vendors. The role of an engineering manager is usually permanent and different from that of a project manager who works on specific projects. In this course, engineering management students will delve deeply into learning about the role and responsibilities of engineering project managers in Silicon Valley and other high-tech environments.

EMG 542 ENGINEERING MANAGER'S TOOLKIT (3)
Prerequisites: College Algebra, minimum background necessary. Training up to Calculus preferred.
This course provides an overview of essential quality management topics important for engineering managers to know. More specifically, the course content includes discussion and the study of Failure Mode and Effects Analysis (FMEA), statistical process control (SPC), the design of experiments (DOE), supplier management assessment, process capability analysis, and systematic problem solving (including topics such as TRIZ and root cause analysis).

EMG 545 INTRODUCTION TO MEDICAL DEVICES AND DIGITAL HEALTH PRODUCTS (3)
Prerequisites: None
This course provides an introduction to the special regulatory requirements associated with developing medical devices (i.e., medical treatment and diagnostic products), as well as other new technologies in the emerging digital health industry.

EMG 549 INTRODUCTION TO SOFTWARE DEVELOPMENT AND BUSINESS ARCHITECTURE FOR ENGINEERING MANAGERS (3)
Prerequisites: None
This course provides a comprehensive introduction to computer programming and software development. The instruction will benefit individuals pursuing management careers in programming and software development, as well as anyone in the information technology field who works with programmers and systems analysts. General topics covered will include: 1) Problem-solving approaches to software development 2) Specifications and requirements 3) User-interface design 4) Structured program design.

As to programming concepts, the course will provide basic instruction in Python, C, C#, Java, Visual Basic and shell scripting. The course includes working with different operating systems, such as Linux. As exercises, students will develop small web applications and mobile apps. The full software development life cycle (SDLC) will be taught, including unit test and integration, alpha / beta testing, and software defect tracking and classification.

EMG 550 SOFTWARE QA & TESTING FOR BUSINESS ANALYSTS (3)
Prerequisites: None
This course will cover the typical software testing methods found in industry and will prepare business analysts and

others with a need to know about the fundamentals of software testing procedures and practices found in Silicon Valley.

EMG 551 AGILE METHODOLOGIES (3)
Prerequisites: None
Agile software development is an umbrella term for a set of methods and practices based on the values expressed in the 2001 Agile Manifesto which documented the views of leading software developers in the field at that time. This course instructs students on these industry best practices.

EMG 554 MANAGEMENT CONSULTING (3)
Prerequisites: None
This course is aimed at those specifically interested in consulting careers and/or whose future jobs involve working with consultants. Students will learn the basics of the consulting profession with subsequent emphasis on business technology (BT) – the ever increasing reliance on information technology by business of all types to digitize and optimize their business models. In the first part of the course you will learn the basic principles that apply to any consulting-based approach and explore a range of topics that define consulting knowledge. These topics cover the consulting process from preparation for and delivery of client engagements to management of engagement-related obstacles and the development of advising skills.

In the second part of the course, students will explore a range of topics that consultants and their consulting clients need to know when engaging on BT change initiatives. These topics cover the essential building blocks of any digital transformation blueprint: lean thinking and innovation, process automation, organization and change management, technology insights, and data and analytics.

EMG 557 INTERNET OF THINGS MANAGEMENT ISSUES (3)
Prerequisites: None
The Internet of Things is a proposed development of the Internet in which everyday objects will have networked connectivity, allowing them to send and receive data. This course is focused on studying the management problems that will arise in connection with this rapidly emerging technology.

EMG 559 INTRODUCTION TO SENSOR TECHNOLOGY FOR ENGINEERING MANAGERS (3)
Prerequisites: None
Sensor technology is an important aspect of the Internet of Things which is forecasted to have huge impacts on business and society in the near future. This course is designed to give students a hands-on introduction to the kind of devices changing our world with the Internet of Things and will provide them with a basic understanding of the core technology allowing them to engage in product development and prototyping.

EMG 560 CYBERSECURITY MANAGEMENT (3)
Prerequisites: None
This course is an introduction to cybersecurity principles, processes and technologies. It presents students with a detailed overview of best practices in the management,

governance, and policy development of cybersecurity measures for businesses and organizations.

EMG 563 INTRODUCTION TO INTELLECTUAL PROPERTY MANAGEMENT (3)
Prerequisites: None
In this course students will learn about the connection between knowledge, innovation and intellectual property asset creation. Moreover, they will also learn about the value and importance of the proper management of IP assets including: 1) Identifying existing intellectual property assets and the need for developing new ones. 2) Documenting existing and new intellectual property. 3) Deciding on the proper form of intellectual property protection needed in any particular instance. 4) Deciding how the intellectual property asset will be used. 5) Periodically reassessing the value and use of the intellectual property portfolio.

EMG 564 QUANTITATIVE ANALYSIS FOR ENGINEERING MANAGERS (3)
Prerequisites: College Algebra, minimum requirement. Pre-Calculus or Introduction to Calculus is the preferred background.
The content of the course will be on applied mathematics in such areas as technology forecasting, linear programming, transportation network flows, practical applications of determinants and matrices, calculus-based optimization, inventory control models, queuing theory, as well as other math topics in operations research and supply chain management.

EMG 565 HEALTHCARE PRODUCT ECONOMICS AND OUTCOMES (3)
Prerequisites: None
This course explores the various synergistic dynamics of healthcare product economics and outcomes. Topics will include reimbursement overview, insurance coverage, product design, comparative effectiveness review, and the Affordable Care Act. Emphasis will be placed on how creative innovations and synergism can impact the healthcare industry and economics.

EMG 568 TECHNOLOGY MANAGEMENT (3)
Prerequisites: None
In this course, students will develop a broad understanding of technology management and its importance in establishing competitive advantage in a globalized world. Content will include studies of leadership, technology trends, market analysis, innovation management, product development, business model analysis, effective organizational structure, team building and collaboration, project management, and effective business communications.

EMG 570 CLOUD COMPUTING MANAGEMENT ISSUES (3)
Prerequisites: None
Cloud computing is the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer. In this class students will study the issues associated with managing cloud services and the business considerations needed before switching to the cloud.

EMG 579 BUSINESS PROCESS MANAGEMENT (3)
Prerequisites: None
Business process management is a discipline that uses various methods to discover, analyze, measure, improve and optimize business processes in an organization. In this course, students will learn about the basic methods used to analyze business processes and will develop skill in conducting business process analysis.

EMG 688 SPECIAL TOPICS (1-3)
Prerequisites: None
Special topics courses cover subjects not currently contained in the curriculum, but are designed to address especially relevant trends or developments related to the discipline.

EMG 689 INDEPENDENT STUDY (1-3)
Prerequisites: None
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

EMG 690 CAPSTONE (3)
Prerequisites: Department Chair approval and completion of 18 credit hours of the MSEM program.
During the last two trimesters of their training, students in the ITU Engineering Management Department must complete a capstone project or write a master's thesis. If the capstone project option is chosen, engineering management students are required to demonstrate their competence in the skills and knowledge associated with their degree program. It is designed to show the in-depth learning and higher-order thinking of the students. With this option, students must choose a project in the field of engineering management. Then they will plan, organize, implement, and work towards the completion of the project in a controlled manner, so as to meet the goals and objectives of their project. The capstone project is usually carried out by an individual student. Before beginning work, each capstone project must first be approved by an Engineering Management Faculty Advisor assigned by the Engineering Management Department Chair. At the end of the project, the student will prepare a Final Project Report and defend this work product before the Faculty Advisor and a panel of other assigned faculty members.

EMG 697 THESIS (3)
Prerequisites: Department Chair approval and completion of 18 credit hours of the MSEM program.
During the last two trimesters of their training, students in the ITU Engineering Management Department must complete a capstone project or write a master's thesis. For the master thesis, the research must result in some new insights into the academic or practical concepts of the Engineering Management discipline. These must be fully analyzed, explained and documented in the thesis. If the Thesis Option is chosen, students must seek the assignment of an Engineering Management Faculty Advisor to guide their research on a topic in the field of engineering management. Additionally, the selection of a faculty advisor and the intended plan of study must be approved by the Engineering Management Department Chair. At the conclusion of the student's writing, the student will be required to orally defend the thesis before a committee assigned by the Engineering Management Department.

CFL 591 INTEGRATING ACADEMIC & INTERNSHIP LEARNING (2)
Prerequisites: None
This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591(can be taken concurrently) in order to be eligible to enroll in INT 593.

INT 593 PART-TIME/FULL-TIME INTERNSHIP (1, 3)
Prerequisites: CFL 591
This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A maximum of 10 credit hours earned in INT 593 may be applied toward the Master's Degree graduation requirements.

FACULTY

Tom Tafolla, J.D. Law, University of San Francisco, Interim Department Chair

Avid Farhoodfar, Ph.D. Engineering Physics, Queen's University, Ontario, Canada; M.Sc. Condensed Matter Physics, Brock University, Ontario, Canada; M.S. Plasma Physics, Islamic Azad University, Iran; Core Faculty

Girish Harshe, Ph.D. Solid State Electronics, Penn State University; MBA University of Chicago Booth School of Business; Core Faculty

Bhairav Mehta, M.S. Industrial and Systems Engineering, Rochester Institute of Technology; M.S. Applied Statistics/Operations Research and MBA, Cornell University; MBA, Queen's University, Ontario, Canada; Core Faculty

Mamoun Samaha, M.S. Electronics and Computer Engineering, Eindhoven University of Technology; Core Faculty

Michelle Liang, Ph.D. Computer Science, Fudan University, Shanghai, People's Republic of China; M.S. Computer Engineering, University of Minnesota, Minneapolis, Minnesota; Core Faculty

Alex Peters, Post-Doctorate Fellowship, Princeton University; Ph.D. Engineering, RWTH Aachen University, Aachen, Germany; Adjunct Faculty

Jeremy Tzeng, M.S./Ph.D. Electrical Engineering, University of California Berkeley, Adjunct Faculty

Robert Payne, L.LM. International Law, University College, University of London; J.D. University of

California Davis, B.A. Stanford University; Adjunct Faculty

Tomas M. Flores, J.D. Intellectual Property, Whittier Law School, Whittier, California; B.S. Computer Science, University of California Irvine; Adjunct Faculty

Azadeh Adibi, Ph.D. Industrial Engineering, Arizona State University, Tempe, Arizona; M.S. Industrial Engineering, Wichita State University, Wichita, Kansas York University; Adjunct Faculty

Yousef Al-Shehabi, Ph.D. Theology; M.S. Computer Science and Electrical Engineering, Santa Clara University; M.A. International Relations, San Francisco State University; Adjunct Faculty

Ruthu Sreebashyam, M.S. Management Studies, Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts; Adjunct Faculty

Claudia Sloan, MBA W.P. Carey School of Business, Arizona State University; B.S. Computer Science, University of Texas Dallas; Adjunct Faculty

Kim-Yo Hsieh, Doctor of Chiropractic (D.C.), Palmer College of Chiropractic, San Jose, California; B.A. Biological Sciences, University of California Davis; Adjunct Faculty.

INTERDISCIPLINARY SCIENCES

DOCTOR OF PHILOSOPHY IN INTERDISCIPLINARY SCIENCES

GENERAL REQUIREMENTS

- Students must complete 60 credit hours to earn their degree
- 30 Credit Hours of Course Requirements
- 30 Credit Hours of Dissertation

PROGRAM REQUIREMENTS

Application:
Students who complete their master's degree in the subject field with GPA or above are eligible to apply for the Ph.D. program. Exceptions may apply to select individuals upon AQC approval.

Thesis Advisor:
It is the student's responsibility to obtain consent from a full-time faculty member in the student's major department to serve as her/his prospective thesis advisor. Students are required to find a thesis advisor as soon as possible after being accepted as a Ph.D. student. The student and the thesis advisor jointly develop a complete program of study for research in a particular area. The complete program of study (and any subsequent changes) must be submitted to the AQC and approved by the student's advisor.

Course Work and Study Program:
The students are expected to complete a minimum of 60 credit hours of graduate credit beyond the master's degree. Of these, 30 credit hours may be earned through coursework and independent study and 30 through the thesis. All thesis credit hours are graded on a Pass/No Pass basis. A maximum of 15 credit hours may be transferred from other accredited institutions at the discretion of the student's advisor.

Comprehensive Examinations:
After completion of the formal course work approved by the Doctoral Committee, the student shall request for comprehensive examination. The examination shall be a written exam representing sufficient preparation in depth and breadth for advanced research in the major. The comprehensive examinations normally must be completed within four years from the time of admission. Comprehensive examinations may be repeated only once, in whole or in proposed thesis topic, and determine any further changes to approving the research objective.

Thesis Research:
The period following the comprehensive examinations is devoted to research for the thesis, although such research may begin before the examinations are complete. After a research topic is approved by the Doctoral Committee, the students should conduct the thesis research toward the defined objective.

Publication:
One or more refereed articles based on the thesis research must be accepted for publication in a professional or scientific journal approved by the Doctoral Committee.

Thesis Defense:
The thesis must be made available to all examiners one month prior to the examination. The oral examination shall consist of a presentation of the results of the thesis and the defense. Thesis defense is open to all faculty members of the University, but only members of the Doctoral Committee have a vote.

Program Completion:
At least one month before the degree is to be conferred, the candidate must submit to the Academic Quality Committee two copies of the final version of the thesis describing the research in its entirety. The candidate will submit the final draft of their thesis to ProQuest Dissertation Publishing. The Research Librarian is available to answer publication questions and assist students in this process. The thesis will not be considered as accepted until approved by the Doctoral Committee and publication acceptance. The University reserves the right to evaluate the undertakings and the accomplishments of the degree candidate in total, and award or withhold the degree as a result of its deliberations.

Time Limit for Completing Degrees:
All requirements for the doctoral degree must be completed within ten years following acceptance for the Ph.D. program. Extensions will be allowed only in unusual circumstances and must be approved in writing by the Committee on Graduate Programs.

Prerequisite Requirements
All courses listing a prerequisite requirement can be petitioned by the student for waiver and evaluated by the Academic Committee on a case-by-case basis.

Ph.D. in Interdisciplinary Sciences Requirements
The completion of at least 30 credit hours of graduate courses in the major field of study, and 30 credit hours of thesis includes:

- 30 Credit Hours of Required Courses:
  - » IDS 711 General Consilience
  - » IDS 712 Physics
  - » IDS 713 Cosmology
  - » IDS 714 Chemistry
  - » IDS 715 Genetics
  - » IDS 716 Evolution
  - » IDS 717 Biology/Ecology

- » IDS 718 Evolutionary Neuroscience
- » IDS 719 Psychology
- » IDS 720 Philosophy
- 30 Credit Hours of Thesis/Dissertation:
  - » IDS 901 Doctoral Dissertation

INTERNSHIPS

INTERNSHIPS

In order to be competitive in today's economy, students must graduate with relevant work experience. Employers are looking for more seasoned employees who can add value from the start, so skill development is a key component of ITU's educational pedagogy. ITU places a strong emphasis on hands-on learning through internships, which link classroom learning to relevant industry experience. If you are an International Student, you must in lawful F-1 status to be eligible to apply for internship.

COURSES

- » CFL 591: Integrating Academic and Internship Learning
- » INT 593: Part-Time/Full-Time Internship

COURSE DESCRIPTIONS

CFL 591 INTEGRATING ACADEMIC AND INTERNSHIP LEARNING (2)
Prerequisites: None
This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591(can be taken concurrently) in order to be eligible to enroll in INT 593.

INT 593 PART-TIME/FULL-TIME INTERNSHIP (1, 3)
Prerequisites: CFL 591
This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A maximum of 10 credit hours earned in INT 593 may be applied toward the Master's Degree graduation requirements.

SUPPLEMENTARY PROGRAMS AND REQUIRMENTS

CERTIFICATE PROGRAMS

Upon completing three of the approved enterprise resource planning courses with a grade of B or above, the student is awarded a joint student recognition award from ITU and SAP University alliance. To collect the certificate, the student should make the request after completing the three courses or while submitting their petition to graduate.

ITU PRESENTS

ITU Presents aims to connect University students with the artists, inventors, engineers, and business owners shaping modern day Silicon Valley. ITU Presents has hosted guest lectures from Oscar nominees, start-up founders, and industry experts. Join us for our next ITU Presents to learn about the latest trends and network with the larger community.

STUDENT SUCCESS PROGRAM

The Student Success Program includes programming designed for both native and non-native English speakers that enable them to effectively communicate in both academically and professional contexts.

The program includes skill development in the following areas: library research, academic writing, giving presentations, interviewing, resume and cover letter writing, and reading comprehension. All students are welcome to join this program if their schedule permits. The program is offered during the day. Much of the program is conducted virtually so students don't have to worry about commute time and costs.

The Student Success Program has a required lab and materials fee which covers testing, textbooks and some other course expenses. This fee must be paid each trimester the student is enrolled. Students must complete a placement test prior to starting the program in order to properly assess their language development needs. The course runs the full length of the trimester.

CROSSWALK

New	Old	Course Title	Credit Hours
ACT 500	ACTN 900	Financial Accounting	3
ACT 501	ACTN 922	Forensic Accounting	3
ACT 502	ACTN 926	International Accounting	3
ACT 504	ACTN 927	Tax Accounting Principles	3
ACT 600	ACTN 910	Managerial Accounting	3
ACT 601	ACTN 920	Cost Accounting	3
ACT 602	ACTN 921	Intermediate Accounting	3
ACT 603	ACTN 925	Accounting Information Systems/ERP	3
AMS 510	AMN 910	Linear Algebra	3
AMS 512	AMN 912	Applied Mathematic Methods	3
AMS 514	AMN 914	Fast Fourier Transformation & Applications	3
AMS 520	AMN 920	Optimization Techniques	3
AMS 530	AMN 930	Numerical Analysis	3
AMS 540	AMN 940	Discrete Mathematics	3
AMS 552	AMN 952	Probability, Statistics, and Reliability for Engineers	3
AMS 722	AMN 922	Advanced Applied Mathematics Methods	3
AMS 750		Abstract Algebra	3
AMS 760	AMN 960	Advanced Optimization Techniques	3
BIO 500	BIOM 900	Clinical Research Management	3
BIO 501	BIOM 901	Modern Medicine and Biology	3
BIO 506	BIOM 909	Biotech Industry Fundamentals	3
BIO 510		Ethics in Medical Research	3
BUA 500		Principles of Business Analytics	3
BUA 501		Quantitative Analysis	3
BUA 503		Game Theory, Business Strategy, and Thinking Strategically	3

New	Old	Course Title	Credit Hours
BUA 504		Data Warehousing and Visualization	3
BUA 505		Predictive Analytics for Business Strategy	3
BUA 506		Developing Value Through Business Analysis Applications	3
BUA 507		Ethical Business Decision-Making	3
BUA 508		Risk Analytics	3
BUA 509		Web Analytics	3
BUA 510		Data Science Applications with R or Python	3
BUA 690		Simulation and Optimization for Business Analytics	3
BUS 500	PMGT 900	Project Management Frameworks	3
BUS 501	PMGT 901	Strategic Planning & Portfolio Management	3
BUS 502	PMGT 904	Project Management & Leadership	3
BUS 503	PMGT 905	Project Management - Agile Approach	3
BUS 504	PMGT 911	Contract Management & Financial Planning	3
BUS 509	EBUS 917	Leading and Managing Change	3
BUS 510	EBUS 918	Regulation, Governance, Ethical and Social Responsibility	3
BUS 516	INMG 910	Principles of Quality Management	3
BUS 517		Organization Culture and Diversity	3
BUS 518		Applied Statistics	3
BUS 519		Organizational and Leadership Change	3
BUS 520		Emerging Technologies for Product Development	3
BUS 521		Management of Technology and Innovation	3
BUS 600	MBAN 997	Research Methods	3
BUS 688		Special Topics	1-3
BUS 689		Independent Study	1-3
BUS 700	DBA 810	Management Practice and Organizational Behavior	3
BUS 703	DBA 813	Leadership Behavior and Motivation	3
BUS 710	DBA 822	Current Issues in Accounting Research	3
BUS 713	DBA 825	Multinational Business Finance	3
BUS 720	DBA 836	International Information Technology Management	3

New	Old	Course Title	Credit Hours
BUS 726	DBA 845	Seminar in Organizational Behavior Research	3
BUS 728	DBA 847	Seminar in Strategy and Innovation	3
BUS 729	DBA 848	Leadership Behavior and Conflict Resolution	3
BUS 730	DBA 850	Technology, Innovation, and Entrepreneurship	3
BUS 800	DBA 900	Writing and Research Methods	3
BUS 801	DBA 901	Quantitative Research Methods	3
BUS 802	DBA 902	Qualitative Research Methods	3
BUS 804	DBA 911	Management and Organizational Theory	3
BUS 807	DBA 914	Emerging Issues in Strategic Decision Making	3
BUS 813	DBA 925	Seminar in Organizational Behavior Research with Emphasis on Leadership	3
BUS 891		Independent Study	1-6
BUS 901	DBA 990	Doctoral Dissertation	1-9
CEN 500	CEN 900	Computer Engineering	3
CEN 508	CEN 908	Scientific Computing	3
CEN 510	CEN 910	Algorithms and Data Analysis	3
CEN 540	CEN 940	Network Security Techniques	3
CEN 541	CEN 941	Deep Learning for Computer Vision	3
CEN 542	CEN 942	Digital Image Processing	3
CEN 548	CEN 948	Computer Network Systems	3
CEN 551	CEN 951	Computer Architecture	3
CEN 556	CEN 956	Distributed Computing Systems	3
CEN 565	CEN 965	Introduction to Medical Image Systems	3
CEN 568	CEN 968	Network Storage Systems	3
CEN 580	CEN 980	Signal Analysis and Optimization	3
CEN 581	CEN 981	Principle of Internet of Things	3
CEN 643	CEN 943	Advanced Digital Image Processing	3
CEN 661	CEN 961	Parallel Computing	3
CEN 688	CEN 680, CEN 992	Special Topics	1-3
CEN 689		Independent Study	1-3
CEN 691	CEN 998	Research Project	1
CEN 692	CEN 998	Research Project	2
CEN 693	CEN 998	Research Project	3
CEN 698	CEN 999	Master Thesis I	3
CEN 699	CEN 999	Master Thesis Research II	3
CFL 591		Integrating Academic & Internship Learning	2
CSC 501		Discrete Structures	3
CSC 502		Principles of OS & Distributed Systems	3
CSC 505	SEN 933	The UNIX/Linux OS	3
CSC 509	CS 880	C Programming	3
CSC 511	SEN 909	OO Programming With C++	3
CSC 512	SEN 890	Data Structures	3
CSC 515	SEN 965	iPhone Application Development	3
CSC 518	SEN 964	OO Programming with Java	3
CSC 519	SEN 958	Android Phone Application Development	3
CSC 520	SEN 963	Python Programming	3
CSC 522	CS 860	R Language Programming	3
CSC 525	SEN 910	HTML/CSS Programming	3
CSC 527		Mobile Web Programming	3
CSC 530	SEN 949	JavaScript Programming	3
CSC 532	SEN 951	Client Programming with JS/jQuery	3
CSC 535	SEN 954	Server Programming with PHP	3
CSC 545		Programming in Go	3
CSC 550	CS 850	Big Data	3
CSC 560	CS 960	Introduction to Data Science	3
CSC 570	CS 940	Web Security Fundamentals	3
CSC 580	SEN 920	Computer Algorithms	3

New	Old	Course Title	Credit Hours
CSC 610	SEN 953	Compiler Design	3
CSC 620	CS 923	Programming Language Theory	3
CSC 625		Advanced HTML5	3
CSC 631	CS 831	Data Mining	3
CSC 633	CS 933	Machine Learning	3
CSC 650		Big Data Analytics (CPO-SAS/SPSS)	3
CSC 670	CS 901	Network & Data Security	3
CSC 680	CS 950	Advanced Computer Algorithms	3
CSC 682	SEN 921	Graph Algorithms	3
CSC 688		Special Topics	3
CSC 689		Independent Study	3
CSC 690	SEN 998	Capstone Project	3
CSC 695	SEN 999	Master's Thesis	3-6
CSC 720		Formal Methods	3
CSC 730	CS 979	Cryptography & Cryptanalysis	3
CSC 750	CS 910	Coding Theory	3
DGA 501	MMM 905	New Media Production	3
DGA 503	MMM 910	Storyboard Design	3
DGA 504	MMM 820	Global Storytelling	3
DGA 507	MMM 830	Design Fundamentals	3
DGA 508	MMM 831	CG Software Fundamentals	3
DGA 509	MMM 870	Basic Image Manipulation	3
DGA 510	MMM 909	Intro to Game Development	3
DGA 511	MMM 810	General Production Pipelines	3
DGA 512	MMM 911	Web Graphic Design	3
DGA 513	MMM 800	Documentary Production	3
DGA 515	MMM 904	Sound Design	3
DGA 516		Production Sound Recording	3
DGA 517		Post Production Sound Recording	3
DGA 518	MMM 920	UI/UX: User Interfaces & User Experiences	3
DGA 519		Still Life & Figure Drawing	3
DGA 520		Motion Graphics	3
DGA 521	MMM 710	Digital Media Distribution	3
DGA 522	MMM 823	Editing I	3
DGA 523	MMM 890	Social Network Marketing & Publishing	3
DGA 524		Virtual Reality/Augmented Reality	3
DGA 526		Screenwriting	3
DGA 528		Dynamic UX	3
DGA 529		Introduction to Games Programming Unity, SpriteKit using C#, and Swift	3
DGA 531		Beginning Augmented Reality	3
DGA 532		Beginning Virtual Reality	3
DGA 606	MMM 903	Animation I	3
DGA 607	MMM 921	Storyboards and Layouts	3
DGA 608	MMM 860	CG Modeling	3
DGA 609	MMM 923	3D Modeling and 3D Printing	3
DGA 610	MMM 931	Rigging for 3D Animation	3
DGA 611	MMM 950	Lighting and Compositing	3
DGA 612	MMM 988	Concept Art and Storyboarding	3
DGA 615		ZBrush	3
DGA 617		Motion Capture	3
DGA 621	MMM 720	Producing Digital Media	3
DGA 622	MMM 824	Editing II	3
DGA 626	MMM 916	Animation II	3
DGA 631	MMM 900	Digital Media Startup	3
DGA 641		Augmented Reality Design and Production	3
DGA 642		Virtual Reality Design and Production	3
DGA 661		Unity 2D/3D Game Development Platform	3

New	Old	Course Title	Credit Hours
DGA 688		Special Topics	1-3
DGA 689		Independent Study	1-3
DGA 690	MMM 999	Master's Project	3
DGA 692		Master's Thesis	3
EEN 500	EEN 900	Electrical Engineering	3
EEN 505	EEN 905	Digital Design in HDL	3
EEN 506	EEN 906	Electromagnetic Fields and Waves	3
EEN 511	EEN 911	VLSI Design	3
EEN 513	EEN 913	Microprocessor Design	3
EEN 514		Script Languages and Applications	3
EEN 515	EEN 915	Analog IC Design	3
EEN 520	EEN 920	ASIC Design I	3
EEN 521	EEN 921	FPGA Design and AI Applications	3
EEN 525	EEN 925	ASIC Design II	3
EEN 541	EEN 941	Digital Signal Processing and System Analysis	3
EEN 561	EEN 961	Fundamentals of Communication Systems	3
EEN 577	EEN 977	Green Energy	3
EEN 616	EEN 916	Mixed Signal IC Design	3
EEN 618	EEN 918	RF IC Design	3
EEN 627	EEN 927	IC Design to Silicon	3
EEN 629	EEN 929	System on Chip (SOC) Design	3
EEN 635	EEN 935	Introduction to MEMS Design	3
EEN 637		Bioelectronics and Bioengineering	3
EEN 638	EEN 938	Signal Integrity of High-Speed Digital Circuits	3
EEN 646	EEN 946	Embedded System Design	3
EEN 671	EEN 971	Introduction to Wireless Communication Systems	3
EEN 676	EEN 976	Introduction to Near Field Communication	3
EEN 688	EEN 680, EEN 992	Special Topics	3

New	Old	Course Title	Credit Hours
EEN 689		Independent Study	1-6
EEN 691	EEN 998	Research Project	1
EEN 692	EEN 998	Research Project	2
EEN 693	EEN 998	Research Project	3
EEN 698	EEN 999	Master Thesis I	3
EEN 699	EEN 999	Master Thesis II	3
EEN 714	EEN 914	Advanced Microprocessor Design	3
EEN 717	EEN 917	Advanced Analog IC Design	3
EEN 719	EEN 919	Advanced RF IC Design	3
EEN 732	EEN 932	Advanced Nanotechnology	3
EEN 736	EEN 936	Advanced Sensor/Bio Design	3
EEN 739		Advanced Bioelectronics and Bioengineering	3
EEN 749	EEN 949	Advanced Digital Signal Processing	3
EEN 753	EEN 953	Advanced Machine Learning Engineering	3
EEN 758	EEN 958	Advanced Embedded System Design	3
EEN 766	EEN 966	Advanced Communication Systems	3
EEN 774	EEN 974	Advanced Wireless Communications	3
EEN 891	EEN 996	Independent Study	1-6
EEN 907	EEN 999	Doctoral Dissertation Research	3
EMG 500	EM 900	Principles of Engineering Management	3
EMG 501	EM 901	Engineering Practicum	3
EMG 502		Organizational Behavior	3
EMG 503		Product Management	3
EMG 511		Technology Management and Entrepreneurship	3
EMG 522		Fundamentals of Business Analysis for Software Development	3
EMG 540		Writing and Presentation Skill-Building for Engineering Managers	3
EMG 541		Project Management for Engineers and Engineering Managers	3
EMG 542		Engineering Manager's Toolkit	3
EMG 545		Introduction to Medical Devices and Digital Health Products	3

New	Old	Course Title	Credit Hours
EMG 549		Introduction to Software Development & Business Architecture for Engineering Managers	3
EMG 550		Software QA and Testing for Business Analysts	3
EMG 551		Agile Methodologies	3
EMG 554		Management Consulting	3
EMG 557		Internet of Things (IoT) Management Issues	3
EMG 559		Introduction to Sensor Technology for Engineering Managers	3
EMG 560		Cybersecurity Management	3
EMG 563		Introduction to Intellectual Property Management	3
EMG 564		Quantitative Analysis for Engineering Managers	3
EMG 565		Healthcare Product Economics and Outcomes	3
EMG 568		Technology Management	3
EMG 570		Cloud Computing Management	3
EMG 579		Business Process Management	3
EMG 688	EMG 580	Special Topics	1-3
EMG 689		Independent Study	1-3
EMG 690		Capstone Project	3
EMG 697		Thesis	3
ERP 509	ERP 901	Introduction to ERP Systems Using SAP	3
ERP 510	ERP 902	ABAP - Advanced Business Application Programming	3
ERP 511	ERP 905	Enterprise Portal Technology Using NetWeaver	3
ERP 512	ERP 907	Enterprise Procurement Processes (MM)	3
ERP 513	ERP 912	Sales Order Management With ERP	3
FIN 515	FINN 933	Managerial Finance	3
FIN 516	FINN 996	Entrepreneurial Finance	3
FIN 517	FINN 918	Financial Institutions	3
FIN 518	FINN 921	Financial and Socially Responsible Investing	3
FIN 519	FINN 922	Corporate Valuation	3

New	Old	Course Title	Credit Hours
FIN 520	FINN 930	Investment Management	3
FIN 521	FINN 931	International Financial Management	3
FIN 522	FINN 936	Behavioral Finance	3
FIN 523	ECON 920	Macroeconomic Theory	3
FIN 525	ECON 922	Econometrics	3
FIN 526	ECON 923	International Economics	3
FIN 534	FINN 934	Financial and Economic Analysis	3
FIN 604		Securities Analysis	3
FIN 605	FINN 920	Financial Derivatives and Risk Management	3
FIN 606	FINN 932	Corporate Finance	3
FIN 607	FINN 935	Mergers and Acquisitions	3
HCM 509		Scientific Writing and Research for Healthcare	3
HCM 510	BPS 821	A Regulatory Overview & Compliance	3
HCM 511	HCM 901	Concepts to Healthcare Management	3
HCM 513	HCM 904	Innovating Biomedical Technology	3
HCM 515	HCM 906	Health Information Technology	3
HCM 519	HCM 911	Healthcare Ethics	3
HCM 520	HCM 912	Healthcare Leadership, Patient Safety and Quality Improvement	3
HCM 525	HCM 921	Principles of Managed Care	3
HCM 529	HCM 930	Mental Health and Wellbeing	3
HCM 531	HCM 933	Complementary and Alternative Medicine	3
HCM 534		Financial Management for Healthcare Organization	3
HCM 535		Data Analytics Applications in Healthcare	3
HCM 690		Healthcare Innovation Management Project	3
HRM 528	HRMG 940	Human Resource Management	3
HRM 529	HRMG 941	Organizational Development	3
HRM 530	HRMG 942	Employment Law For Business	3
HRM 533	HRMG 945	Strategic Compensation: Issues and Opportunities	3
HRM 535	HRMG 946	Human Resources and Information Technology	3

New	Old	Course Title	Credit Hours
ICS 501		Introduction to Cybersecurity	3
ICS 502		Cyber Attack Countermeasures	3
ICS 520		Personal Computer Security	3
ICS 525		Principles of Ethical Hacking	
ICS 550		Security Policies	3
ICS 601		Advanced Cybersecurity	3
ICS 620		Computer Malware	3
ICS 630		Digital Forensics Technology	3
ICS 680		Theory of Cryptographic Systems	3
ICS 688		Special Topics	3
ICS 690		Capstone Project	3
ICS 695		Master's Thesis	3-6
IDS 711	CONS 901	General Consilience	3
IDS 712	CONS 902	Physics	3
IDS 713	CONS 903	Cosmology	3
IDS 714	CONS 904	Chemistry	3
IDS 715	CONS 905	Genetics	3
IDS 716	CONS 906	Evolution	3
IDS 717	CONS 907	Biology/Ecology	3
IDS 718	CONS 908	Evolutionary Neuroscience	3
IDS 719	CONS 909	Psychology	3
IDS 720	CONS 910	Philosophy	3
IDS 891		Independent Study	1-6
IDS 901		Doctoral Dissertation	1-9
INB 553	INBS 910	Fundamentals of International Business	3
INB 554	INBS 911	International Financial Markets	3
INB 556	INBS 913	Global Strategic Management	3
INB 558	INBS 916	Global Marketing and Strategy	3

INB 559	INBS 921	International Business Management	3
INT 593F	GRN 900F	Internship	3
INT 593P	GRN 900P	Internship	1
MBN 697	MBAN 999	MBA Thesis	3
MGT 503	MGTN 903	Organizational Leadership Theories	3
MGT 560	MGTN 901	Principles of Management	3
MGT 564	MGTN 916	Principles of Public Relations	3
MGT 566	MGTN 920	Production and Operations Management	3
MGT 567	MGTN 922	Quality Control Management	3
MGT 569	MGTN 930	Strategic Operations Management	3
MGT 571	MGTN 942	Critical Thinking Strategies in Decision Making	3
MGT 572	MGTN 943	High-Technology Entrepreneurship	3
MGT 573	MGTN 944	International Management	3
MGT 575	MGTN 948	Project Management	3
MGT 577	MGTN 950	Project Risk Management	3
MGT 578	MGTN 951	Business Communications	3
MGT 579	MGTN 952	Business Ethics	3
MGT 580	MGTN 953	Business Law	3
MGT 581	MGTN 966	Managing Emotions, Managing Self and Others	3
MGT 582		Team and Group Dynamics	3
MGT 583		Global Entrepreneurship and Innovation	3
MGT 584	MKTN 952	Supply Chain Management	3
MGT 593		Intrapreneurship - Innovation From Within	3
MGT 608	MGTN 902	Business Statistics	3
MGT 611	MGTN 923	Lean Six Sigma	3
MGT 612	MGTN 954	Advanced Project Management	3
MGT 690	MGTN 945	Pitching a Business Plan to Venture Capitalists	3
MIS 527	MISY 927	Technology and Operations Management: Creating Value	3
MIS 537	MISY 915	Management Information Systems	3

New	Old	Course Title	Credit Hours
MIS 538	MISY 910	Business Database Applications	3
MIS 539	MISY 911	Business Telecommunications	3
MIS 540	MISY 912	Information Resource Management	3
MIS 541	MISY 913	Managing Global Information Systems Projects	3
MIS 542	MISY 914	Information Systems Innovation	3
MIS 543	MISY 916	Human-Computer Interaction	3
MIS 544	MISY 917	Business Decision Support Systems	3
MIS 545	MISY 918	Data Mining and Business Intelligence	3
MIS 546	MISY 919	Data Science for Business	3
MIS 547	MISY 920	Software Development Process Management	3
MIS 548	MISY 921	Knowledge Management	3
MKT 551	MKTN 951	Competitive Marketing Strategies	3
MKT 582	MKTN 958	Marketing Management	3
MKT 583	MKTN 950	Entrepreneurial Marketing	3
MKT 585	MKTN 953	International Marketing	3
MKT 586	MKTN 954	Marketing Research	3
MKT 588	MKTN 957	Consumer Behavior	3
MKT 589	MKTN 961	E-Commerce	3
MKT 590	MKTN 962	Marketing With Social Media	3
MKT 591	MKTN 963	Advertising Strategy	3
MKT 592	MKTN 965	Supplier/Seller Management	3
MKT 613	MKTN 959	Advanced Marketing	3
SWE 500	SEN 941	Software Engineering	3
SWE 510	CS 810	Information Security Countermeasures	3
SWE 520	CS 820	Principles of Ethical Hacking	3
SWE 525		Version Control Tools/git	3
SWE 530	CS 830	Cloud Computing Security	3
SWE 535	CS 840	Cloud and Virtualization Security (CPO)	3

New	Old	Course Title	Credit Hours
SWE 540	SEN 760	SQA/Manual Testing	3
SWE 542	SEN 860	SQA/Manual/Auto/Perf Testing	3
SWE 544	SEN 930	SQA/Software Testing Tools	3
SWE 560	SEN 934	Principle of Database Systems	3
SWE 561	SEN 961	Cloud Computing	3
SWE 562	SEN 982	Oracle Database Management/Administration	3
SWE 600	SEN 942	Advanced Software Engineering	3
SWE 602	SEN 946	Software Requirements Elicitation	3
SWE 610	SEN 905	Ruby on Rails	3
SWE 615		Angular JS	3
SWE 620	CS 925	Scala Programming	3
SWE 633	SEN 944	Software Refactoring	3
SWE 640	SEN 992	Artificial Intelligence	3
SWE 680	SEN 950	Software Architecture	3
SWE 688		Special Topics	3
SWE 689		Independent Study	3
SWE 690	SEN 998	Capstone Project	3
SWE 695	SEN 999	Capstone Thesis	3-6

2017-2018 STUDENT HANDBOOK AND CATALOG ADDENDUM

FINANCIAL INFORMATION

TUITION AND FEES FOR MASTER'S DEGREE

The following sample tuition and fees schedule applies for all students:

	FALL TRIMESTER	SPRING TRIMESTER	SUMMER TRIMESTER	ACADEMIC YEAR
TUITION [1]	$5,400	$5,400	$5,400	$16,200
REGISTRATION FEE [2,3]	$50	$50	$50	$150
TECHNOLOGY FEE [3]	$200	$200	$200	$600
STUDENT GOVERNMENT ASSOCIATION FEE	$15	$15	$15	$45
HEALTH INSURANCE [4]	$498.56	$498.56	$498.56	$1,495.68
VTA FEE [3,5]	$27 for first trimester only. $24 for all other trimesters.	$36	$36	$99
TOTAL	$6,190.56	$6,199.56	$6,199.56	$18,589.68

TUITION AND FEES FOR DOCTORAL DEGREE

The following sample tuition and fees schedule applies for all students:

	FALL TRIMESTER	SPRING TRIMESTER	SUMMER TRIMESTER	ACADEMIC YEAR
TUITION [8]	$9,000	$9,000	$9,000	$27,000
REGISTRATION FEE [2,3]	$50	$50	$50	$150
TECHNOLOGY FEE [3]	$200	$200	$200	$600
STUDENT GOVERNMENT ASSOCIATION FEE	$15	$15	$15	$45
HEALTH INSURANCE [4]	$498.56	$498.56	$498.56	$1,495.68
VTA FEE [3,5]	$27 for first trimester only. $24 for all other trimesters	$36	$36	$99
TOTAL	$9,790.56	$9,799.56	$9,799.56	$29,389.68

TOTAL COSTS FOR A PROGRAM AT ITU

The following estimated tuition and fees table is for the entire educational program:

	FEES PER TRIMESTER	TOTAL NUMBER OF CREDIT HOURS/ TOTAL NUMBER OF TRIMESTERS TO COMPLETE THE EDUCATIONAL PROGRAM EDUCATIONAL PROGRAM	TOTAL CHARGES DUE FOR THE ENTIRE EDUCATIONAL PROGRAM
TUITION	$600 per Credit Hour	36 Credit Hours / 4 Trimesters	$21,600
REGISTRATION FEE [5]	$50	4 Trimesters	$200
STUDENT GOVERNMENT ASSOCIATION FEE	$15	4 Trimesters	$60
TECHNOLOGY FEE [5]	$200	4 Trimesters	$800
HEALTH INSURANCE [4]	$498.56	4 Trimesters	$1,994.24
VTA PASS [3,5]	$39 for first trimester only. $36 for all other trimesters.	4 Trimesters	$147
APPLICATION FEE [6] (ONE TIME FEE)			$100
ORIENTATION FEE [6,7] (ONE TIME FEE)	$250		$250
PETITION TO GRADUATE [6] (ONE TIME FEE)			$200
TOTAL			$25,351.24

TOTAL COSTS FOR A DOCTORAL DEGREE PROGRAM AT ITU

The following estimated tuition and fees table is for the entire Electrical Engineering or Interdisciplinary Sciences Doctoral program:

	FEES PER TRIMESTER	TOTAL NUMBER OF CREDIT HOURS/ TOTAL NUMBER OF TRIMESTERS TO COMPLETE THE EDUCATIONAL PROGRAM	TOTAL CHARGES DUE FOR THE ENTIRE EDUCATIONAL PROGRAM
TUITION [8]	$1,000 per Credit Hour	60 Credit Hours	$60,000
REGISTRATION FEE [2,3]	$50	14 Trimesters	$700
STUDENT GOVERNMENT ASSOCIATION FEE	$15	14 Trimesters	$210
TECHNOLOGY FEE [3]	$200	14 Trimesters	$2,800
HEALTH INSURANCE[4]	$498.56	14 Trimesters	$6,979.84
VTA FEE [3,5]	$39 for first trimester only. $36 for all other trimesters	14 Trimesters	$507
APPLICATION FEE [6] (ONE TIME FEE)			$100
ORIENTATION FEE [6,7] (ONE TIME FEE)			$250
PETITION TO GRADUATE [6] (ONE TIME FEE)			$200
TOTAL			$71,746.84

ALL OTHER NON-PROGRAM SPECIFIC FEES

The following table lists other fees:

OTHER FEES (NON REFUNDABLE)	AMOUNT
BOUNCED CHECK PENALTY FEE (PER CHECK)	$50
ISO PROCESSING FEE	$100
DIPLOMA REPLACEMENT FEE	$100
GROUND SHIPPING FEE	$25
OVERNIGHT POSTAGE FEE	$50
INTERNATIONAL POSTAGE FEE	Additional Charges Will Apply
GRADUATION FEE	$200
ORIENTATION FEE (ONE-TIME FEE FOR NEW STUDENTS PER PROGRAM)	$250
INSTALLMENT PLAN ADMINISTRATION FEE (PER TRIMESTER)	$100
EMPLOYER TUITION REIMBURSEMENT DEFERRED PAYMENT PLAN (ETR) FEE	$50 per trimester
LAB SUPPLIES/KIT (DEPENDS ON CLASS)	$50 - $200
LATE PAYMENT FEE [9]	$100
PAYMENT SWITCH FEE	$50
STUDENT ID REPLACEMENT FEE	$25 – 1st replacement $50 – 2nd replacement $100 – 3rd replacement
STUDENT VTA REPLACEMENT FEE	$3
TRANSCRIPT FEE (PER COPY, PER ORDER)	$15 for first copy $10 each for copies 2 - 5 $5 each for copies 6 - 10

The following estimated tuition and fees table is for the entire Doctor of Business Administration program:

	FEES PER TRIMESTER	TOTAL NUMBER OF CREDIT HOURS/ TRIMESTERS TO COMPLETE THE EDUCATIONAL PROGRAM	TOTAL CHARGES DUE FOR THE ENTIRE EDUCATIONAL PROGRAM
TUITION [8]	$1,000 per Credit Hour	60 Credit Hours	$60,000
REGISTRATION FEE [2,3]	$50	11 Trimesters	$550
STUDENT GOVERNMENT ASSOCIATION FEE	$15	11 Trimesters	$165
TECHNOLOGY FEE [3]	$200	11 Trimesters	$2,200
HEALTH INSURANCE [4]	$498.56	11 Trimesters	$5,484.16
VTA FEE [3,5]	$39 for first trimester only. $36 for all other trimesters	11 Trimesters	$399
APPLICATION FEE [6] (ONE TIME FEE)			$100
ORIENTATION FEE [6,7] (ONE TIME FEE)			$250
PETITION TO GRADUATE [6] (ONE TIME FEE)			$200
TOTAL			$69,348.16

The above tables were based on fourteen trimesters for Electrical Engineering or Interdisciplinary Sciences Doctoral program, or eleven trimesters for Doctor of Business Administration program to graduate, not including the additional expense to be incurred by students for books, housing, food, and miscellaneous personal expense.

[1] *Based on full-time registration of nine (9) credit hours. Note: Tuition per credit hour is $600.*

[2] *Registration Fee is $50 per trimester. Late Registration Fee is $100 (applies to students who register for classes during the Late Registration Period).*

[3] *Fees are non-refundable once students register for classes.*

[4] *Fees may be refundable if all of the requirements are met. Please refer to the ITU website for specific requirements regarding Health Insurance refund. Rate subject to change per insurance carrier notice.*

[5] *ITU is required by the City of San Jose to issue VTA passes to all enrolled students. Rates are subject to change by VTA. Beginning Spring 2018, VTA fees will increase from $27 to $39 for new students and from $24 to $36 for continuing students.*

[6] *Fees are non-refundable.*

[7] *The Orientation Fee covers the New Student Orientation event, as well as pre-arrival assistance and services.*

[8] *Based on full-time registration of nine (9) credit hours for coursework. Full time for dissertation portion of the program is at three (3) credit hours per trimester (not shown in sample tuition and fees table). Tuition is $1,000 per credit hour.*

[9] *Late Payment Fee will be applied one (1) month after the first day of the trimester if there is an outstanding balance on the account and the student has not signed up for an installment plan.*

Students are responsible for payments of all tuition and fees. ITU reserves the right to adjust the above schedule of fees at any time. Please refer to our website for the latest fees table.

COURSE MATERIALS AND SERVICES FEES

Students may be charged fees in some courses for the use, rental, or consumption of materials, tools, or equipment, or for the costs of materials or services necessary to provide a special supplemental educational experience. For example, course materials fees may cover the purchase of chemicals and glassware for a science laboratory or art supplies for an art studio class. They might also cover film rentals, field trips, or the purchase or rental of specific equipment. Courses that may be subject to the course materials fee are listed in the Class Schedule at http://itu.edu.

PAYMENT DUE DATE

Tuition and fees for each trimester are due in full upon registration of courses, unless the student has enrolled in one of ITU's approved payment plans. ITU reserves the right to deny enrollment or cancel enrollment for students whose tuition and fees are not paid in full.

ACCEPTED FORMS OF PAYMENT

1) Pay Online at MyITU:
   a. Credit/Debit Card
   b. eCheck

2) Pay in person at Accounting Services with:
   a. Cash
   b. Credit/Debit Card
   c. Cashier's Check, Money Order, Traveler's Check
   d. Personal Check

3) Pay by international wire transfer:
   a. Visit the Flywire website to pay via wire transfer.

4) Pay by Tuition Payment Plan:
   a. Installment Plan
- First payment. The checks should be

   o Plan allows tuition to be paid in two or three payments over the first two months of the term.
   b. Employer Tuition Reimbursement – Student Payment Deferral
   o For a student who participates in a tuition reimbursement program through his/her employer, this plan allows a qualified participant to defer university tuition payment until such time as they qualify for their employer reimbursement.

INSTALLMENT PLAN POLICY

- Each installment plan is subject to a per trimester Installment Plan Administrative Fee of $100.

- Installment Plans are only offered to students with good financial standing with ITU. Students who have a bounced check record on their account due to non-sufficient funds are not eligible for any installment plans for the remainder of their tenure at ITU.

- Students are responsible to make sure they have enough money in their bank account for the post dated checks. If a student drop a class after the third week of the trimester, the student will still owe all outstanding balances and any default on payment will be subject to collection.

- Any student who wishes to pay using an installment plan must download, print, and complete a Promissory Note, and bring the completed form to the Department of Accounting Services.

- Each installment plan consists of a minimum of two (2) to a maximum of three (3) installments.

- Students must submit all their installment plan checks along with their

   post-dated and will only be deposited on

the day the installment is due. If the due date falls on a weekend or holiday, the check will be deposited the following business day.
- The installment plan process is not completed until the Installment Plan Promissory Note and all postdated checks have been submitted to the Department of Accounting Services.
- Students who wish to cancel an installment check or switch payment, must contact the Department of
- Accounting Services and complete the process prior to the installment due date.

INSTALLMENT PLAN PAYMENT SCHEDULE:

- The first installment is due on the day of registration, and the amount must be equal to or greater than three (3) credit hours of tuition in addition to all of the mandatory fees, including student health insurance.
- The second installment is due one (1) month after the first day of trimester, and the amount must also be equal to or greater than three (3) credit hours of tuition.
- The Third installment is due two (2) months after the first day of trimester. Any remaining balance must be paid with this final installment.

INSTALLMENT PLAN EXAMPLE:

The example below assumes a student is registering for 9 credit hours in a given trimester. The estimated costs and projected pay will be the following:

INSTALLMENT PLAN

Installment Payment #	Payment	What's is Each Installment	Due Date
1	$2,699.56	$1,800 - 3 credit hours $200 - Technology Fee $50 - Registration Fee $15 - SGA Fee $36 - VTA Fee ($39 for new students on their first trimester) $498.56 - Health Insurance $100 - Installment Plan Application Fee	Same day that student registers for classes
2	$1,800	$1,800 - 3 credit hours	1 month after 1st day of the trimester
3	$1,800	$1,800 - 3 credit hours	2 months after 1st day of the trimester
TOTAL	$6,299.56		

INSTALLMENT PLAN PAYMENT SCHEDULE FOR DOCTORAL PROGRAM

Installment Payment #	Payment	What's in Each Installment	Due Date
1	$3,899.56	$3,000 - 3 credit hours $200 - Technology Fee $50 - Registration Fee $15 - SGA Fee $36 - VTA Fee ($39 for new students on their first trimester) $498.56 – Health Insurance $100 - Installment Plan Application Fee	Same day that student registers for classes
2	$3,000	$3,000 - 3 credit hours	1 month after 1st day of the trimester
3	$3,000	$3,000 - 3 credit hours	2 months after 1st day of the trimester
TOTAL	$9,899.56		

Note: There is a $50 fee for switching payments if you decide to substitute an installment check with another form of payment on or before the due date of the installment, unless your installment plan has 3 installments AND you are settling your entire Installment Plan balance before the second installment due date.

EMPLOYER TUITION REIMBURSEMENT DEFERRED PAYMENT PLAN (ETR)

1. Plan Overview International Technological University (ITU) has established a deferred payment plan for students who qualify for tuition reimbursement from their employer. Employer Tuition Reimbursement Deferred Payment Plan (ETR) is designed for eligible students whose employers offer reimbursement for tuition charges.

   Students accepted into the plan may defer payment of the portion of their tuition reimbursement under their employer's program up to six weeks after the last date of trimester. Any portion of tuition and fees not covered under an employer tuition reimbursement plan will be due upon registration.

   Students may apply for the ITU Installment Payment Plan to cover any tuition and fees not included in the ETR. Please refer to our website for all installment plan information. Failure to pay or have an installment plan arrangement in place may result in a financial hold that will prohibit release of official transcript and enrollment.

   Applications for the ETR have to be submitted and approved by the Department of Accounting Services each trimester. ITU has three trimesters, namely: (a) Spring Trimester from January through May, (b) Summer Trimester from May through September, and (c) Fall Trimester from September through January.

   It is important to remember that the student is personally responsible for any and all financial obligations made to ITU, regardless of employment status or the length of time it will take the employer to process reimbursement. ITU does not bill a student's employer; the student is responsible for providing employer with the reimbursement information.

   In order for the employer to receive confirmation of student grades, an official transcript request must be requested. Transcript requests are submitted by completing the Official Transcript Order Form which is available on the ITU website under Forms. The transcript will be sent to the address provided on the form after the associated transcript fee is paid.

   The student is responsible for the amount deferred six weeks after the end of term, whether or not the amount is to be paid by the employer.

   If the employer, for any reason, refuses to reimburse the student's tuition, the student remains responsible for the full payment of all tuition and fees to ITU.

   ITU reserves the right to cancel the plan, if the information provided on the application is false.

2. Eligibility
   The ETR is available for students working in a company with an Employee Education Assistance/Reimbursement Plan, who have a portion, or 100% of their tuition reimbursed directly to them by their employer upon successful completion of coursework.

   The ETR is only applicable to ITU students who are already authorized to work legally in the U.S. Students

attending ITU on an F-1 student visa are not eligible to use this plan, as their visa status requires that they show proof of ability to pay for their studies independent of any on-campus employment, Curricular Practical Training (CPT), or other work authorization. On the date of application, the student must not have an outstanding account with ITU exclusive of an installment payment plan.

Students must complete and submit all required documents during the regular registration period. Applications submitted during the late registration period will be subject to an additional late processing fee.

Maximum deferral amount allowed for the calendar year should not be greater than the annual maximum limit reimbursable by the employer.

There is no prepayment penalty.

3. Process

   i.   Visit http://itu.edu/regulations/ETR.

  ii.   Submit completed Employer Tuition Reimbursement Deferred Payment Plan Application Form and Statement of Financial Liability within ITU's regular registration period.

 iii.   Along with the completed forms in #2, student must also provide a letter from the employer's Human Resources department confirming current employment, a copy of the student's employer education assistance/reimbursement plan, and check or cash to pay the non-refundable $50 ETR processing fee.

 iv.   ETR applications submitted during the late registration period (See the University Calendar) will be assessed an additional late processing fee of $50.

  v.   A new ETR application and ETR Statement of Financial Liability must be submitted each trimester.

 vi.   Submit the completed application form along with the $50 non-refundable ETR processing fee and proof of employment to ITU, Department of Accounting Services, Accounts Receivable, at 2711 N. First St., San Jose, CA 95134.

For the most updated information, please visit http://itu.edu/regulations/ETR

NON-PAYMENT POLICY

Upon registration of courses, a student must either (a) pay tuition in full, or (b) apply for an ITU Payment Plan. Failure to do so will result in a financial hold being placed on the student's account, restricting the student's ability to add and drop courses on MyITU or to request official transcripts. The financial hold is automatically removed from the student's account once full payment is made.

A Late Payment Fee will be applied one (1) month after the first day of the trimester if there is an outstanding balance on the student account and the student has not signed up for an installment plan.

ITU reserves the right to drop courses and terminate students due to nonpayment of tuition and fees.

REFUND POLICY

1. Students will be given a 100% refund if a class is cancelled by the University.

2. Refunds are calculated using one of the following methods:

   i. The time and date the class was dropped by the student on MyITU, or

   ii. The time and date the student requested a class to be dropped by the Office of the University Registrar's Office on their behalf, if the student was unable to drop the class by themselves on MyITU.

3. Depending on the original form of payment, the following refund methods will be used:

a. Online credit card payments will be refunded back to the same credit card account. In the event we are unable to refund back to the credit card, a refund check will be issued.

b. Cash, Check, Cashier's check, E-check, traveler's

c. check, and Money orders will be refunded via check.

d. Flywire payments will be refunded to the original bank account via Flywire.

e. Refunds for international wire transfers (when applicable) will only be issued by wire transfer back to the originating account. No exceptions. Students are responsible for any fees incurred for a wire transfer refund. Refunds by wire transfer may take up to 3 months due to the receiving banks' policies and practices.

f. For non-wire transfer refunds, please allow 3 to 5 weeks of processing time.

ITU'S REFUND SCHEDULE IS AS FOLLOWS:

CLASS DROP DATE	REFUND PERCENTAGE
Prior to the start of the trimester:	100%
During the add/drop period (ending the second Sunday from the beginning of the trimester at 11:59PM):	100%
During the third week of the trimester (ending the third Sunday from the beginning of the trimester at 11:59PM):	80%
After the third week of the trimester:	0%

FINANCIAL ASSISTANCE

International Technological University does not currently participate in any federal or state financial aid programs. In order to ease the burden of a single lump sum tuition payment, the University offer payment plan options. Please refer to the Payment Plan section for more information.

Please visit https://itu.edu/admissions/financial-resources for more information on third-party (non-ITU) scholarships available to both domestic and international students.

SCHOLARSHIPS

International Technological University offers

Merit Based Scholarships to a select number of students every trimester. Beyond ITU, there are many opportunities for scholarships from numerous organizations and foundations worldwide. ITU's Financial Information Webpage has links to resources that can help you identify and apply for scholarships.

LIBRARY

A professional library team, study rooms and laptops are available six days per week to help students with scholarly information and research. The University Librarian is a member of the ITU Academic Leadership Council (ALC) and liaises with faculty so that information literacy is a high priority in ITU.

An email address, library website and reference desk provide help with locating resources, searching subscription databases and with tools such as APA citation to help students comply with copyright and avoid plagiarism.

All students should request a research consultation early in the semester.

Biweekly workshops cover scholarly resources, plagiarism, citation styles and research writing. The workshops, library website, Library Pocket Guide and information literacy tools teach students how to use APA, IEEE and the ITU thesis guidelines to produce ethical scholarly research papers, projects and theses. Academic honesty is a very high priority at ITU.

The library catalog enables students to search, hold and renew books, textbooks, proceedings, theses and Capstone projects. Students should email library@itu.edu for account set-up.

Course Reserve textbooks. ITU purchases one copy and the SGA generously funds a second copy for student convenience. The Course Reserve circulation policy clarifies the loan conditions for each.

Subscription databases (below) are accessible using the EMS. The Support>Technology Support issues all logins. If you have not received your login information by Day #1,

please send a ticket to the Support Center. For assistance with searching these resources, contact library@itu.edu.

1. ACM Digital Library
2. Ebsco Business Source Elite
3. Wall Street Journal Online
4. NYTimes Academic Pass Online
5. ITU Library Catalog (EOS.web)
6. Database Trials: IEE Xxplore, IEEE CSDL, Ebsco Business (ebooks) Collection, ACI Scholarly Blog, Credo Information

The ITU Library Pocket Guide
summarizes ITU's library services, including many FREE librarian-curated repositories such as:

1. Proquest PQDT Open dissertations
2. InTechOpen, Free Computer Books Online, FreeTechBooks
3. Google Books
4. PubMed Central
5. Media Commons Free Media Library
6. Moving Image Archive
7. DOAJ Directory of Open Access Journals
8. Cite Seer X [scholarly computer and information science

Library policies clarify the selection, use and storage of books, textbooks, course reserves, loans and student projects.

The ITU Thesis Reference and Capstone Policy requires PDF copies to be held in the library. See also The ITU Master's Thesis Guidelines and Proquest PQDT for access to dissertations that are openly published. Google Scholar has recently added 50% of Proquest Dissertations.

Beyond ITU, the library team develops linkages with large neighboring University and Public Libraries such as: San Jose State University (SJSU) Martin Luther King, Jr. Library and San Jose Public Library (SJPL), to secure extended access to rich electronic and other collections in business, computer science, electrical engineering and digital humanities.

For more information about how to access library and research services, please drop by or email library@itu.edu. Or visit the library website. Remember to request a research consultation early in the semester to ensure that your research is scholarly, honest, ethical and free from plagiarism.

DEPARTMENT OF BUSINESS ADMINISTRATION

MISSION

In order to become a center of distinction, the Department of Business Administration strives to prepare its students and graduates with the knowledge and practical skills to serve as business and industrial leaders. We believe this aspiration is achieved through collaboration with our high quality faculty and ongoing engagement with our communities.

INSTITUTIONAL LEARNING OUTCOMES (ILOS)

ILO #1: Problem Solving

ILO #2: Critical Thinking

ILO #3: Communication literacy

ILO #4: Collaboration and Teamwork

ILO #5: Technical Literacy

ILO #6: Research Skills and Information Literacy

ILO #7: Individual Responsibility

MASTER OF BUSINESS ADMINISTRATION PROGRAM

The Business Administration program is designed as a balanced preparation for managerial careers in business. The program provides the students a solid foundation in the following concentrations MBA, Business Analytics, and Healthcare Management that will

be as valuable ten years from now as it is today. The University's location in the heart of Silicon Valley provides its MBA students with exposure to the unique entrepreneurial success in this region. The MBA faculty has many years of experience in starting companies, managing corporations, directing advanced product development, and consulting for major companies. The Business program requires successful completion of 36 credit hours.

Inbound and Outbound Exams: Beginning Spring 2016, all new students are required to take the Inbound exam with Peregrine Academic Services. The Inbound exam is required to be taken in the first trimester attending ITU. The exam is considered a mandatory assignment in the core overview course MGT 503 Organizational Leadership Theories. For this reason, all new students are required to take MGT 503 in their first trimester. Students admitted prior to Spring 2016 are encouraged to take the exam when they enroll in MGT 503.

In addition, all new students are required to take the Outbound exam with Peregrine Academic Services. The Outbound exam will be taken in the capstone course, either MGT 690, Pitching a Business Plan to Venture Capitalists, MBN 697, Master Thesis, BUA 690 Simulation and Optimization for Business Analytics, or HCM 690 Healthcare Innovation Management Project. The Outbound exam is also a mandatory assignment in the capstone course. Students admitted prior to Spring 2016 are encouraged to take the exam when they enroll in the capstone course. The benefit of taking the Inbound exam is to test students' knowledge of business topics when they enter the Business program, while the benefit of taking the Outbound exam is to test their knowledge upon graduation. Students may include the progress made from the Inbound to the Outbound on their resume or portfolio.

Exams will be taken once and the exam score will not affect the GPA or Graduation qualification. The exam score does not affect credit earned for the course. Any student who does not take the Inbound exam will be assigned a grade of Incomplete and subject to the ITU Incomplete grade policy. Any student who does not take the Outbound exam, will not be eligible for graduation. The Inbound and Outbound exams are REQUIRED and are not OPTIONAL. Information on how to take the exams will be provided in the course related to the Inbound or Outbound exam. Both Inbound and Outbound exams will have a fee which is currently $34 per exam. Information on how to take the exam will be included in the course syllabus. Students admitted prior to Spring 2016 are encouraged to take the exam.

PROGRAM LEARNING OUTCOMES (PLOS)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will:

PLO #1: Justify the usage of core business theories to solve problems in the business environment. (mapped to ILO 1: Problem Solving.)

PLO #2: Appraise critical thinking models to make effective business decisions. (mapped to ILO 2: Critical Thinking.)

PLO #3 (I): Construct business documents clearly, concisely, and analytically.

 (II) Illustrate effective speaking skills in groups and in public. (Both (I) and (II) are mapped to ILO 3 Communication literacy.)

PLO # 4: Assemble teams for business projects using effective group dynamics.

(mapped to ILO 4 Collaboration and Teamwork.)

PLO #5: Illustrate in depth knowledge of key technical functions for business to work

efficiently. (mapped to ILO 5 Technical Literacy.)

PLO #6: Identify and apply research methods to understand current business practices. (mapped to ILO 6 Research Skills and Information Literacy.)

PLO # 7: Model sound ethical social responsibility. (mapped to ILO 7 Individual Responsibility.)

CAREER OPPORTUNITIES

ITU's Business Administration program can prepare a student for a career in Accounting, ERP, Finance, Healthcare Management, Human Resources, Information Systems, International Business, Management, Marketing, and Project Management. Students may work as an Accounting Manager, Business Analyst, Consultant – Strategy, Financial Analyst, CFO, Global Analyst, Healthcare Analyst, Treasurer, SAP Technical Senior Manager, SAP Business Analyst, Market Strategist, Marketing Specialist, HR Manager, Data Analyst, Marketing Manager, Product Manager, and Program Manager.

PROGRAM REQUIREMENTS
Required Courses:

4 Core Courses: 12 credit hours

1 Capstone course:
Project or Thesis: 3 credit hours

1 Internship: 1 credit hour

Elective courses: 11-20 credit hours

Internship: 1-9 credit hours

Cross Disciplinary course: Up to 3 credit hours (counts as Elective)

Transfer Credits: Up to 9 credit hours from a graduated program of a regionally accredited school (counts as Elective)

36 Total credit hours

GRADE POINT AVERAGE (GPA)
A minimum 3.0 cumulative GPA is required for granting of the Master's degree.

MASTER OF BUSINESS ADMINISTRATION CONCENTRATIONS

- · Business Analytics
- · Healthcare Management

MASTER OF BUSINESS ADMINISTRATION (MBA)

The MBA provides the students a solid foundation in various business subjects. With the MBA, you can see your future as a leader and innovator at your workplace. An MBA can offer your profession the enhancement that it needs. It gives students the flexibility to modify their study according to their educational and professional interests.

EMPHASIS LEARNING OUTCOMES WITH NEW COMPETENCIES MODEL

1. Define key *Learning Competencies* of students that graduate from the Business Degrees at ITU
    a. Competency is: a defining capability or advantage that distinguishes a business student from other degree students (internal and external) (*Oxford Dictionaries*)
    b. As defined by WSCUC, the five (5) core competencies that a student needs to develop in order to be successful at school, at work and in their lives are: Writing, Oral Communication, Quantitative Reasoning, Critical Thinking, and Information Literacy (*WSCUC, 2016. Retrieved from https://www.wscuc.org/content/big-five-addressing-core-competencies*)
    c. According to Remake Learning, the goal of competency-based learning is to ensure that students are able to demonstrate knowledge, skills, and dispositions that are important to success in school, higher education, careers, and life (*Remake Learning. Retrieved from http://remakelearning.org/competencies/*)

2. Learning Competencies defined by the Business Department at ITU are:
    a. LC 1: Communication (spoken, and written)
    b. LC 2: Leadership (includes individual strengths, collaboration and teamwork)
    c. LC 3: Critical Thinking
    d. LC 4: Focused Knowledge

EMPHASIS LEARNING OUTCOMES (ELOS)

The ELOs are intended to improve student learning in the following areas: analytical skills, communication, critical thinking, ethical reasoning, global position, information technology, and the legal systems. Upon completion of the MBA, graduates will:

MBA ELOS CHARTING TO BUSINESS PROGRAM LEARNING COMPETENCIES

Learning Competencies (LCs)	MBA ELOs
LC 1: Communication (spoken, and written)	ELO #1: Compose and express ideas effectively in a business environment. [**Mapped to** PLOs 3,4,5,6,7]
LC 2: Leadership (includes individual strengths, collaboration and teamwork)	ELO # 2: Evaluate how leadership traits and behaviors (self and others) affect key stakeholders and business performance. [**Mapped to** PLOs 1,2,3,4,5,6,7]
LC 3: Critical Thinking	ELO # 3: Identify, analyze, synthesize and evaluate appropriate data and information for problem solving and decision-making. [**Mapped to** PLOs 1,2,3,4,5,6,7]
LC 4: Focused Knowledge	ELO #4: Interpret trends using qualitative and quantitative analysis methods to control changing business environments and enhance professional performance. [**Mapped to** PLOs 2,3,5,6,7] ELO #5: Illustrate the required skills from numerous disciplines to apply ideas to local and global business environments. [**Mapped to** PLOs 2,3,4,5]

TRANSFER COURSES

If students pass four parts of the CPA exam,

they are eligible to apply for a transfer of 3 courses, equivalent to 9 credit hours. If students pass three parts of the CPA exam, they are eligible to apply for a transfer of 2 courses, equivalent to 6 credit hours. If students pass two parts of the CPA exam, they are eligible to apply for a transfer of 1 course, equivalent to 3 credit hours. If students pass one part of the CPA exam, they will not be eligible to apply for transfer of any course

SAP JOINT RECOGNITION AWARD

Upon completing 3 of the following Enterprise Resource Planning courses with a grade of B or above, the student is awarded a joint recognition award from ITU and SAP University Alliances.

· ACT 603 Accounting Information Systems/ERP - *ITU/SAP University Alliance*
· ERP 509 Introduction to ERP Systems Using SAP - *ITU/SAP University Alliance*
· ERP 510 ABAP - Advanced Business Application Programming - *ITU/SAP University Alliance*
· ERP 511 Enterprise Portal Technology Using NetWeaver - *ITU/SAP University Alliance*
· ERP 512 Enterprise Procurement Processes (MM) - *ITU/SAP University Alliance*
· ERP 513 Sales Order Management with ERP - *ITU/SAP University Alliance*

MASTER OF BUSINESS ADMINISTRATION PROGRAM REQUIREMENTS

4 Core courses for a total of 12 credit hours

REQUIRED CORE COURSES

MGT 503 Organizational Leadership theories

FIN 534 Financial and Economic Analysis

MKT 551 Competitive Marketing Strategies

MIS 527 Technology and Operations Management: Creating value

CAPSTONE COURSE

1 Capstone course: Business Project or Thesis for a total of 3 credit hours

MBN 697 MBA Thesis

OR

MGT 690 Pitching a Business Plan to Venture Capitalists

Students who will not pursue a concentration in Business Analytics or Healthcare Management will graduate with an MBA concentration and they can focus on any Business subject by completing at least 4 courses in the following areas:

Accounting, ERP/SAP, Finance, Information Systems Management, Management, Marketing, Human Resource Management, or Project Management, The thesis topic should be on the selected focus**.**

Any of the following courses that is offered in the current catalog can be considered as an elective in the previous catalog:

BUS 520 Emerging technologies for product development

BUS 521 Management of Technology and Innovation

Choose 7 Business Elective courses of the following courses for a total of 21 credit hours

2 recommended MBA courses for a total of 6 credit hours

BUS 520 Emerging technologies for product development

BUS 521 Management of Technology and Innovation

ELECTIVE COURSES

ACT 500 Financial Accounting

ACT 501 Forensic Accounting

ACT 502 International Accounting

ACT 504 Tax Accounting Principles
ACT 600 Managerial Accounting
ACT 601 Cost Accounting

ACT 602 Intermediate Accounting

ACT 603 Accounting Information Systems/ERP - *ITU/SAP*

ACT 604 Auditing

University Alliance

ERP 509 Introduction to ERP Systems using SAP - *ITU/SAP University Alliance*

ERP 510 ABAP - Advanced Business Application Programming - *ITU/SAP University Alliance*

ERP 511 Enterprise Portal technology using NetWeaver - *ITU/SAP University Alliance*

ERP 512 Enterprise procurement processes (MM) - *ITU/SAP University Alliance*

ERP 513 Sales order management with ERP - *ITU/SAP University Alliance*

FIN 515 Managerial Finance

FIN 516 Entrepreneurial Finance

FIN 517 Financial Institutions

FIN 518 Financial and Socially Responsible Investing

FIN 519 Corporate Valuation

FIN 520 Investment Management

FIN 521 International Financial Management

FIN 522 Behavioral Finance

FIN 523 Macroeconomic Theory

FIN 526 International Economics

FIN 604 Securities Analysis

FIN 605 Financial Derivatives and Risk Management

FIN 606 Corporate Finance

FIN 607 Mergers and Acquisitions

HRM 528 Human Resource Management

HRM 529 Organizational Development

HRM 530 Employment law for business

HRM 533 Strategic compensation: issues and opportunities

HRM 535 Human Resources and Information Technology

INB 553 Fundamentals of International Business

INB 554 International Financial Markets

INB 556 Global Strategic Management

INB 558 Global Marketing and Strategy

INB 559 International Business Management

MGT 560 Principles of Management

MGT 564 Principles of Public Relations

MGT 566 Production and Operations Management

MGT 567 Quality Control Management

MGT 569 Strategic Operations Management

MGT 570 Contracts and Purchasing Management

MGT 571 Critical Thinking Strategies in Decision Making

MGT 572 High-Technology Entrepreneurship

MGT 573 International Management

MGT 575 Project Management

MGT 576 Organizational Theory

MGT 577 Project risk management

MGT 578 Business Communications

MGT 579 Business Ethics

MGT 580 Business Law

MGT 581 Managing Emotions, Managing Self and Others

MGT 582 Team and Group Dynamics

MGT 583 Global Entrepreneurship and Innovation

MGT 584 Supply Chain Management (Previously MKT 584)

MGT 593 Intrapreneurship – Innovation from Within

MGT 608 Business Statistics

MGT 609 The Business of Coaching

MGT 611 Lean Six Sigma

MGT 612 Advanced Project Management

BUS 500 Project Management Frameworks

BUS 501 Strategic Planning and   Portfolio Management

BUS 502 Project Management and Leadership

BUS 503 Project Management - Agile Approach

BUS 504 Contract Management and Financial Planning

BUS 509 Leading and Changing Change

BUS 510 Regulation, Governance Ethical and Social Responsibility

BUS 516 Principles of quality management

BUS 517 Organization Culture and Diversity

BUS 519 Organizational Leadership and change

BUS 520 Emerging technologies for product development

BUS 521 Management of Technology and Innovation

BUS 600 Research Methods

BUS 688 Special Topics (1-3 credit hours)

BUS 689 Independent Study (1-3 credit hours)

MIS 537 Management Information Systems

MIS 538 Business Database Applications

MIS 539 Business Telecommunications

MIS 540 Information Resource Management

MIS 541 Managing Global Information Systems Projects

MIS 542 Information Systems Innovation

MIS 543 Human-Computer Interaction

MIS 544 Business Decision Support Systems

MIS 545 Data Mining and Business Intelligence

MIS 546 Data Science for Business

MIS 547 Software Development Process Management

MIS 548 Knowledge Management

MKT 582 Marketing Management

MKT 583 Entrepreneurial Marketing

MKT 585 International Marketing

MKT 586 Marketing Research

MKT 588 Consumer Behavior

MKT 589 E-commerce

MKT 590 Marketing with Social Media

MKT 591 Advertising Strategy

MKT 592 Supplier/Seller Management

MKT 613 Advanced Marketing

INTERNSHIP

CFL 591 Integrating Academic and Internship Learning (2 Credit hours)

INT 593 Part-time/Full-time Internship (1-3 credit hours)

BUSINESS ANALYTICS CONCENTRATION

Over the last few years, the field of Business Analytics has known a remarkable growth. Business Analytics Professionals help organizations decrease overall costs, and better support the customer and the solutions necessary to stay competitive in international economy.

International Technological University offers an MBA in Business Analytics Concentration, which prepares the students to be responsible for recognizing business needs, and to operate as a liaison between business people and technology people who know how to create solutions for business problem

BUSINESS ANALYTICS OFFERS FIVE AREAS OF SKILL:

Technical: The technical courses offer the Business Analytics Professionals the education, proficiencies and capabilities to know what technology can do.

Organizational / Process: The Business Analytics Professionals will be given a chance to build up understanding and proficiencies in the fields of organizational change management, business process analysis, business process improvement, and enterprise strategy and planning.

Practical Reasoning: Courses in this area will develop the Business Analytics Professionals capability to efficiently conceptualize, apply, study, create, and assess the collected information.

Administration / Management / Leadership: The courses in these areas will discuss the understanding, proficiencies, and capabilities necessary to manage work and to encourage and support individuals and teams to complete project tasks and objectives.

Communication: Communication is important for the Business Analytics Professionals. The courses will consist of written and verbal practical communication, active listening and understanding, customer service, and teamwork.

The Business Analytics will prepare the students to take the following certificates: Certification of Competency in Business Analysis (CCBA), and Certified Business Analysis Professional (CBAP).

EMPHASIS LEARNING OUTCOMES (ELOS):

The Business Analytics aims to help students to graduate with the ability to:

Business Analytics ELOs charting to Business Program Learning Competencies

Learning Competencies (LCs)	Business Analytics ELOs
LC 1: Communication (spoken, and written)	ELO #1: Illustrate effective communication skills that help the presentation of analysis outcomes. [Mapped to PLOs 2,3,5,6,7]
LC 2: Leadership (includes individual strengths, collaboration and teamwork)	ELO # 2: Evaluate how leadership traits and behaviors (self and others) affect key stakeholders and business performance. [**Mapped to** PLOs 1,2,3,4,5,6,7] ELO #3: Design systems to mechanize data collection and data mining that can deeply influence the success of a business. [Mapped to PLOs 1,2,3,4,5,6]
LC 3: Critical Thinking	ELO #4: Determine appropriate data analytics methodologies to support critical thinking for decision making. [Mapped to PLOs 2,3,6,7]
LC 4: Focused Knowledge	ELO #5: Identify situations to apply Decision Sciences practices for optimal business outcomes. [**Mapped to** PLOs 2,5,7]

BUSINESS ANALYTICS REQUIREMENTS

4 Core course for a total of 12 credit hours

REQUIRED CORE COURSES

MGT 503 Organizational Leadership theories

FIN 534 Financial and Economic Analysis

MKT 551 Competitive Marketing Strategies

MIS 527 Technology and Operations Management: Creating value

CAPSTONE COURSE

1 course for a total of 3 credit hours

BUA 690 Simulation and Optimization for Business Analytics

BUSINESS ANALYTICS COURSES

Business Analytics Professionals are required to use data, competencies, and capabilities that meet all areas of proficiency when performing their primary job duties. Business Analytics courses are presented as inter-related courses that meet all areas of proficiency.

The following courses were listed as required courses for the academic year 2016-2017. These courses are no longer considered required courses. They are recommended courses, they are considered elective courses, and this apply to the academic year 2016-2017:

BUA 500 Principles of Business Analytics

BUA 501 Quantitative Analysis

Choose 7 Business Analytics courses from the following elective courses (including up to 9 credit hours internship) for a total of 21 credit hours

2 recommended Business Analytics courses for a total of 6 credit hours

BUA 500 Principles of Business Analytics

BUA 501 Quantitative Analysis

BUSINESS ANALYTICS ELECTIVE COURSES

BUA 500 Principles of Business Analytics

BUA 501 Quantitative Analysis

BUA 503 Game Theory, Business Strategy, and Thinking Strategically

BUA 504 Data Warehousing and Visualization

BUA 505 Predictive Analytics for Business Strategy

BUA 506 Developing Value Through Business Analysis Applications

BUA 507 Ethical Business Decision-Making

BUA 508 Risk Analytics

BUA 509 Web Analytics

BUA 510 Data Science Applications with R or Python

BUA 511 Data Visualization and interpretation using Tableau

BUS 518 Applied Statistics

BUS 520 Emerging technologies for product development

BUS 521 Management of Technology and Innovation

BUS 688 Special Topics (1-3 credit hours)

BUS 689 Independent Study (1-3 credit hours)

ERP 509 Introduction to ERP Systems using SAP - *ITU/SAP University Alliance*

FIN 525 Econometrics

MGT 567 Quality Control Management

MIS 537 Management Information Systems

MIS 538 Business Database Applications

MIS 540 Information Resource Management

MIS 542 Information Systems Innovation

MIS 543 Human-Computer Interaction

MIS 544 Business Decision Support Systems

MIS 545 Data Mining and Business Intelligence

MIS 546 Data Science for Business

MIS 547 Software Development Process Management

MIS 548 Knowledge Management

MGT 572 High-Technology Entrepreneurship

MKT 586 Marketing Research

INTERNSHIP

CFL 591 Integrating Academic and Internship Learning (2 credit hours)

INT 593 Part-time/Full-time Internship (1-3 credit hours)

HEALTHCARE MANAGEMENT CONCENTRATION

The Healthcare Management helps students learn the competencies to meet the challenges of today's health care system, while looking for innovative answers for tomorrow.

Healthcare management is one of the fastest growing careers. ITU's MBA in Healthcare Management prepares students to play a serious role in the industry, by practicing effective leadership skills that support the business insights.

The Healthcare Management curriculum builds on the established strength of management practices, as the manager's role in diverse healthcare settings continues to grow. The Healthcare major draw on a rich variety of elective courses, including courses in behavioral theories, clinical research, biomedical sciences, and information technology.

The Healthcare Management will give students great opportunities for development. Earning that Master's degree with ITU will equip graduates with the necessary skills and knowledge to work in a variety of health-care-related environments.

EMPHASIS LEARNING OUTCOMES (ELOS):

The Healthcare Management aims to help students to graduate with the ability to:

Health Care Management ELOs charting to Business Program Learning Competencies

Learning Competencies (LCs)	Health Care Management ELOs
LC 1: Communication (spoken, and written)	ELO #1: Compose and express ideas effectively in the health care business environment. [**Mapped to** PLOs 3,4,5,6,7]
LC 2: Leadership (includes individual strengths, collaboration and teamwork)	ELO # 2: Select relevant business skills to assess and act on opportunities to innovate and improve productivity in the healthcare environment. [Mapped to PLOs 2,3,4,5,6,7] ELO #3: Judge and forecast the issues that will face the health care industry now and in the future. [Mapped to PLOs 1,2,5,6,7]
LC 3: Critical Thinking	ELO #4: Perform data driven analysis for measuring the quality of the healthcare ecosystem. [Mapped to PLOs 2,5,6,7]
LC 4: Focused Knowledge	ELO #5: Appraise and deepen knowledge of key players within the health care ecosystem with special emphasis on the strategic, political, regulatory, cultural and ethical dimensions of the industry. [Mapped to PLOs 2,3,4,6,7]

HEALTHCARE MANAGEMENT REQUIREMENTS

4 Core course for a total of 12 credit hours

REQUIRED CORE COURSES

MGT 503 Organizational Leadership theories

FIN 534 Financial and Economic Analysis

MKT 551 Competitive Marketing Strategies

MIS 527 Technology and Operations Management: Creating value

CAPSTONE COURSE

1 course for a total of 3 credit hours

HCM 690 Healthcare Innovation Management Project

The following course was listed as a required course for the academic year 2016-2017. This course is no longer considered required course. It is a recommended course, it is considered an elective course, and this apply to the academic year 2016-2017:

HCM 509 Scientific Writing and Research for Healthcare

The following course that is offered in the current catalog can be considered as an elective in the previous catalog:

HCM 511 Concepts of Healthcare Management

RECOMMENDED COURSES FOR HEALTH CARE

HCM 509 Scientific Writing and Research for Healthcare

HCM 510 A Regulatory Overview & Compliance

HCM 511 Concepts of Healthcare Management

HCM 513 Innovating Biomedical Technology

HCM 525 Principles of Managed Care

HEALTH CARE DEPTH

BIO 500 Clinical Research Management

BIO 501 Modern Medicine and Biology

BIO 506 Biotech industry fundamentals

HCM 519 Healthcare Ethics

HCM 529 Mental Health and Wellbeing

HCM 536 High Reliability Health Care Organizations

HCM 537 Commercializing Medical Devices, Diagnostics and Biomedical Innovations

HEALTH CARE ANALYTICS

HCM 535 Data Analytics Applications in Healthcare

HCM 538 Predictive Analytics and Decision Models in Health Care

ELECTIVES COURSES

BUA 511 Data Visualization and interpretation using Tableau

BUS 520 Emerging technologies for product development

BUS 688 Special Topics (1-3 credit hours)

BUS 689 Independent Study (1-3 credit hours)

MGT 575 Project Management

INTERNSHIP

CFL 591 Integrating Academic and Internship Learning (2 Credit hours)

INT 593 Internship (1-3 credit hours)

DOCTOR OF BUSINESS ADMINISTRATION PROGRAM

In the face of increasing competition, it is no longer sufficient to work harder and faster. Companies call upon people with advanced degrees. It is in this context that the International Technological University (ITU) Business School offers a Doctor of Business Administration (DBA).

The degree of Doctor of Business Administration (DBA) is a research doctorate that focuses upon business practice, and the application of theory rather than on the development of new theory. The DBA requires significant coursework beyond that required at the master level. It is a professional doctoral program intended for Executives, Senior managers, Consultants, Advanced students, and Instructors of business who want to expand their knowledge and skills.

The program develops the skills to analyze, practice, and research to equip graduates with an understanding of management thoughts and practices, and of real-world business principles and practices. As an international business school, ITU bridges the gap between learning and its application.

ITU's Doctor of Business Administration delivers a powerful program designed to enhance the student's critical thinking, analytical skills, and leadership abilities, and enable them to develop an expertise in conducting and understanding research,

methodology, and evaluation.

PROGRAM LEARNING OUTCOMES:

Upon completion of this program, graduates will:

PLO #1: Appraise the theoretical knowledge and relate it to use in business practice. [Mapped to ILOs 3,6]

PLO #2: Relate existing academic contributions to the practice of management in industry. [Mapped to ILOs 6,7]

PLO #3: Generate a greater level of effectiveness as a professional in managing technology, innovation and related organizational change. [Mapped to ILOs 2,5,7]

PLO #4: Select the appropriate research methodology, which supports the desired dissertation outcomes. [Mapped to ILOs 3,6]

PLO #5: Formulate original research, which includes research design, tools and structure. [Mapped to ILOs 5,6,7]

ADVISORY COMMITTEE

To guide students through the first phase of the degree program, an advisory committee of at least three faculty members with appropriate terminal degrees will be assigned. The advisory committee also may serve as the Dissertation Committee.

PROGRAM REQUIREMENTS

To be awarded the DBA degree, you must successfully complete 60 credit hours, consisting of 42 credit hours of course work, and 18 credit hours of doctoral dissertation. All DBA students should have earned a Master's Degree before admission to the DBA program.

Pursuit of the DBA involves two main components:

Coursework: includes 9 credit hours of

foundation courses, 15 credit hours of business core courses, and 18 credit hours of electives, totaling 42 credit hours.

Dissertation: concludes the program with a significant scholarly research project, requiring a minimum of 18 credit hours. Submission of the dissertation is 65,000 to 80,000 words. Although research papers, reports, and examinations may be required in doctoral seminars, the major assessment points in the DBA program are the qualifying examination, taken after the foundation core and Business core courses are completed.

You must successfully complete all required courses before you are allowed to present a dissertation proposal and officially advance to candidacy. To fulfill the degree requirements, your dissertation must be completed and defended successfully within eight years of entry into the program. The students are assigned a Dissertation Committee. Students work closely with their dissertation committee members through the remainder of their doctoral program.

Students will submit the final draft of their thesis to ProQuest Dissertation Publishing. The Research Librarian is available to answer publication questions and assist students in this process.

GRADE POINT AVERAGE (GPA)
A minimum 3.0 cumulative GPA is required for granting of the doctoral degree.

ADMISSION TO CANDIDACY
A student who passes the qualification examination is considered as a DBA candidate.

A DBA candidate should promptly ask his/her Advisor to form a doctoral committee.

DOCTORAL COMMITTEE
On the student's request, the Advisor will form a Doctoral Committee. The committee will consist of at least five members, including the Advisor, the Department Chair and at least another member from the Business department. The committee must also include at least one member from outside the department, preferably from outside the university. Either the Advisor or Department Chair will serve as the chair of the committee.

The Doctoral Committee will review the proposed dissertation topic, determine any further changes, and approve the research objective.

CORE COURSES
FOUNDATION CORE COURSES: 9 CREDIT HOURS

BUS 800 Writing and Research Methods

BUS 801 Quantitative Research Analysis

BUS 802 Qualitative Research Analysis

BUSINESS CORE COURSES: 15 CREDIT HOURS

BUS 804 Management and Organizational Theory

BUS 806 Emerging Issues in Marketing Management and Research

BUS 807 Emerging Issues in Strategic Decision Making

BUS 812 Emerging Issues in Financial Decision Making

BUS 813 Seminar in Organizational Behavior Research with Emphasis on Leadership

QUALIFYING EXAMINATION
The qualification exam is required to take within two years from the time of admission for full-time students and three years for part-time students. The qualification exam can be retaken once only. The qualification examination will be provided in written.

Qualifying exams will be administered upon completion of all required foundation and business core course work. This integrative examination will test your mastery of the literature in your area by satisfactory performance on this examination.

Taken after the foundation and Business core curriculum. Written Exam in four areas:

- Foundations area,
- Two research areas,
- Business Core area.

ELECTIVES AND SEMINARS

You must choose six of ITU's MBA elective courses (different than the ones taken in the MBA program; exceptions to this requirement can be made by the Academic Quality Committee) OR six of the following DBA courses closely related to your dissertation research topic. (18 credit hours)

BUS 700 Management Practice and Organizational Behavior

BUS 703 Leadership Behavior and Motivation

BUS 710 Current Issues in Accounting Research

BUS 713 Multinational Business Finance

BUS 720 International Information Technology Management

BUS 726 Seminar in Organizational Behavior Research

BUS 728 Seminar in Strategy and Innovation

BUS 729 Leadership Behavior and Conflict Resolution

BUS 730 Technology, Innovation, and Entrepreneurship

DISSERTATION RESEARCH PROJECTS

Doctoral Dissertation: 18 credit hours

BUS 901 Doctoral Dissertation

You may register for BUS 901 Doctoral Dissertation only after having first completed all required foundation courses and having passed the qualifying examination. Students begin the final phase of their studies immediately after the successful oral defense of the proposal. Working closely with their committee, students conduct their research project and develop their dissertation, achieving the highest levels of scholarship.

The dissertation must include original research that is focused either on expanding the methodological scope of the content area, developing new theories, or confirming theoretic models. Research methods that may be employed include field experiments, surveys, and case studies. Successful completion of the dissertation is the final step in the program.

DISSERTATION RESEARCH

The period following the comprehensive examination is devoted to research for the dissertation, although such research may begin before the examination is completed. After research topic proved by the Doctoral Committee, the doctoral candidate should conduct the dissertation research toward the objective defined.

DISSERTATION DEFENSE

The dissertation document must be made available to all members of the doctoral program council one-month prior to the defense. The oral defense shall consist of a presentation of the dissertation results and the defense. The dissertation defense is open to the public, but only members of the Dissertation Committee have a vote. The dissertation defense passes through unanimous vote.

DISSERTATION PROPOSAL

The critical work is a formal written proposal for dissertation research. This proposal must include a clear statement of the problem to be researched and a survey of the relevant literature. The proposal must specify the research methods, data collection, and data analysis techniques in detail. The methods to be employed must be appropriate, reliable, and appropriate for the measures taken.

PROPOSAL DEFENSE

The defense is an oral examination, limited to no more than three (3) hours. The student may

be directed to rework portions of the proposal and repeat this examination only once.

PUBLICATION

One or more refereed articles based on the dissertation research must be accepted for publication in international academic journals, or other journals approved by the Doctoral Committee.

PROGRAM COMPLETION

At least one month before the degree is to be conferred, the candidate must submit to Doctoral Program Council of the School two copies of the final version of the dissertation describing the research in its entirety. The dissertation will not be considered as accepted until approved by the Doctoral Committee and publication acceptance. Each member of the Doctoral Committee must sign-off the doctoral dissertation to indicate approval.

The University reserves the right to evaluate the undertakings and the accomplishments of the degree candidate in total, and award or withhold the degree as a result of its deliberations.

TEACHING REQUIREMENT

The Doctoral Candidate is recommended to teach at least one regular course in order to show teaching capability. The teaching assignment must be completed before the dissertation defense.

TIME LIMIT FOR COMPLETING DEGREES

All requirements for the doctoral degree must be completed within eight years following acceptance for the DBA program. Extensions will be allowed only in unusual circumstances and must be approved in writing by Doctoral Program Council of ITU.

EDUCATIONAL METHOD

Each course involves intensive reading, independent study, assignment and/or

examination. There will also be a series of research workshops. These workshops provide the face-to-face consultation and discussion between supervisors and candidates,

TERMINAL MASTER DEGREE:

Students who are not able to complete the dissertation after completing the 42 credit hours course work will receive a Terminal Master's degree. The Terminal degree is usually found in professional fields or academic areas where research is not the priority.

COURSE DESCRIPTIONS

ACT (ACCOUNTING)

ACT 500 FINANCIAL ACCOUNTING (3)

Prerequisites: None

This course provides an introduction to basic theory and methods of financial accounting. It is designed to offer managerial users the foundations of accounting concepts. The course helps the students understand financial statement information. Focus will be on accounting for assets (e.g., Accounts Receivable, Inventories, Property, Plant and Equipment, Intangible Assets), liabilities (e.g., Bonds, Deferred Taxes) and owners' equity. Focus will be also on the presentation of the income statement through Net Income, revenues and expenses. Class sessions develop the understanding of the different steps of the accounting cycle, and of the financial statements that give the managers the ability to use them for decision-making.

ACT 501 FORENSIC ACCOUNTING (3)

Prerequisites: None

This course explores the forensic accountant's role in today's economy. The course is designed to enhance a student's understanding of the emerging field of forensic accounting. The course is structured

to enhance the ability of students to think critically and to develop the knowledge, skills and attitudes necessary to compete effectively in the rapidly changing world of accounting using the traditional method of detecting fraud and using the current technology. By the end of the course, students should be able to understand the causes of fraud and white-collar crime, examine the types of fraud and fraud schemes, explore methods of deterring and detecting fraud, and examine the financial impact to businesses and the economy.

ACT 502 INTERNATIONAL ACCOUNTING (3)

Prerequisites: None

The knowledge of accounting requirements and the influence of environmental factors on accounting systems both nationally and internationally becomes important to the accounting professional. Topics of financial accounting for international operations, multinational managerial accounting and control, comparative international accounting, international reporting issues, and international taxation are examined. The focus of the course is to solve the problems related to accounting for multinational corporations doing business in a global environment. This course covers the topics of currency translation and foreign currency gains and losses and accounting for international accounting organizations.

ACT 504 TAX ACCOUNTING PRINCIPLES (3)

Prerequisites: None

This course introduces federal tax law, including the preparation of individual income tax form 1040 and related schedules. Tax accounting principles, such as the measurement of income, asset exchanges, capital transactions, and business expenses are examined. Topics include corporate income tax, subchapter S, dividends, and liquidating distributions. The course also provides tax knowledge through identification

of significant differences between tax and financial accounting.

ACT 600 MANAGERIAL ACCOUNTING (3)

Prerequisites: ACT 500, or equivalent

This course introduces the students to the principles of managerial accounting, which is the internal use of accounting information to manage modern firms, including planning, analysis, and decision-making. This course focuses on information generated by internal accounting information systems to evaluate organizational performance, methods to evaluate financial alternatives, and create financial plans. Topics will include interpretation of financial statements, cost behavior, cost allocation, budgets and cost control. Other topics such as decentralization, product costing, job and process costing, break-even analysis, and absorption costing will also be discussed.

ACT 601 COST ACCOUNTING (3)

Prerequisites: ACT 500, or equivalent

This course applies cost accounting concepts and accounting tools to make management decisions. Students learn to use cost accounting to evaluate and make strategic business formulation, research and development, budgeting, production planning, pricing, and provide information for management accounting and financial accounting. Other topics include financial statements, concept of depreciation and inventory methods, cash flows, business valuation, working capital, cost behavior, cost allocation, budgets, and control systems.

ACT 602 INTERMEDIATE ACCOUNTING (3)

Prerequisites: ACT 500, or equivalent

This course will provide a comprehensive review of the accounting process that

discussed in Financial Accounting (ACT 500). Students will learn and deepen their understanding of the preparation of classified financial statements. Students will also learn other information and apply analytical tools in making both business and financial decisions. This course will also include topics related to cash flows, accounting for a company's financing and investing activities and related tax accounting; primary current assets, current and long term liabilities; amortization of bond premiums and discounts, journal entries associated with issuance of preferred, common stocks, and treasury stocks, and declaration of dividends; owners' equity and earnings per share; and time value of money. Students will study how to record various financial transactions and understand the impact on the usefulness of the information provided for decision-making. During coverage of these topics, discussion will include a development of the understanding of full and fair disclosures based on GAAP, ethical and moral implications, and the related concept of transparency.

ACT 603 ACCOUNTING INFORMATION SYSTEMS/ERP (3)

ITU/SAP University Alliance

Prerequisites: ACT 500, or equivalent

This course addresses the development and use of accounting information systems for managerial control and external reporting, focusing on reporting objectives, management needs, documentation, security, and internal controls. The course will cover concepts and principles of financial accounting fundamentals and how to identify measure and report on the financial effects of economic events on enterprises. Topics include accrual accounting concepts; preparation, understanding and analysis of financial statements; accounting for sales and cost of sales and procurement of materials.

The course will focus on designing computer systems to perform accounting functions, and extensive use of applications of different microcomputer accounting software packages.

This course will prepare the student to understand the basic structure and procedures of financial and management accounting in the SAP System and to maintain master data and perform essential function in General Ledger, Account Payable, Account Receivable, Cost Center Accounting and Internal Orders and to describe how Financial and Management Accounting interact with other in SAP process. The course will be covered in 6 weekend classes as per the schedule. The course is presented in lecture format and hands-on problem solving exercises.

ACT 604 AUDITING (3)

Prerequisites: ACT 500 or equivalent

This course covers Generally Accepted Auditing Standards (GAAS) as they apply to the study of audit preparation and procedures, creating working papers, and audit write-up. In addition, the financial statement audit for entities that are not regulated under Sarbanes-Oxley Act 2002 will be addressed. The course also covers internal and external audit procedures and a comprehensive study of professional auditing ethics, legal, and professional responsibilities, auditing planning, risk assessment, internal control, audit evidence, completion and reporting.

BIO (BIO-MANAGEMENT)

BIO 500 CLINICAL RESEARCH MANAGEMENT (3)

Prerequisites: Any Biology background: Academic or Professional

This course is designed to create an in-depth understanding of the clinical research methodologies including the regulatory aspects of clinical research. This course will help you to understand and apply scientific

principles to the implementation of clinical research whether it is investigator-initiated, or industry-sponsored study. The student will learn to design and present a concept sheet for a Phase I/II and Phase II/III clinical trial. Also addressed in this course are different types of study design, their relative strengths and limitations, and proper choice of study design. The student will also learn to systematically implement the research protocol and evaluate the integrity of the clinical research outcome. In this course, students learn to apply knowledge of data management, information management and scientific communication. Students will explore opportunities to demonstrate professionalism and accountability in the implementation of research studies through applying management.

BIO 501 MODERN MEDICINE AND BIOLOGY (3)

Prerequisites: None

In this course, students will explore the cross-pollination of ideas and advances in biology and how they transform medicine, both at the bedside and in drug development. Many of the advances in biology have radically transformed the understanding of disease states and how medicine is practiced. For example, genomic sequencing is now being widely adopted as a method for diagnostics as well as for drug development. Bioinformatics is another area where huge data management and mining is paving way to understand the complex biological pathways and signaling mechanisms in cells and organs. Other advance in the field of computer science and algorithm development have been adopted to unravel these complex connections and arrive at a better understanding of cellular and molecular physiology. Physical and mechanical innovations drive devices that have better resolution in the areas of imaging for diagnostics.

BIO 506 BIOTECH INDUSTRY FUNDAMENTALS (3)

Prerequisites: None

This course will introduce students to biotechnology, its principle, and application. A solid knowledge of basic molecular biology is required to gain a complete understanding of the concept and its application. Biotechnology has a broad reach – from agriculture, to biofuels, waste management, medical, forensics, and food. Students will learn to apply modern biological principles and understand the trends in modern medicine, food, and green technologies. By the end of the course, students should be able to critically assess current and future applications of biotechnology in agriculture, drug development and environmental management. This course is a prerequisite course for students in Healthcare Management, and Bio Management streams. Students will benefit immensely if they enroll in this course first before taking any of the other advanced courses. A background in junior-level chemistry and biology is recommended.

BUA (BUSINESS ANALYTICS)
BUA 500 PRINCIPLES OF BUSINESS ANALYTICS (3)

Prerequisites: None

Principles of Business Analytics course introduces students to the broad business analytics field with a strong emphasis on practical outcomes which can be directly applied to a business environment. It provides a brief outline of existing theories, technologies and applications which support the modern decision-making process which is to a large extent, data-driven. In this course, students will have an opportunity to work with tools they are already familiar with such as MS-Excel to design and develop the best

analytics solutions for existing business problems. Upon completion of this course, students will be able to identify and formulate any business problem that has a potential to be transformed using analytic solutions, perform the necessary tasks to implement it, describe the tools that have been used in the process and identify the business value of the outcomes of the analytics and appreciate its role in Business Process Management.

BUA 501 QUANTITATIVE ANALYSIS (3)

Prerequisites: None

Quantitative analysis course introduces students to the main modeling and simulation strategies in quantitative analysis field with a strong emphasis on practical outcomes which can be directly applied to a business environment. It provides a brief outline of existing theories, technologies and applications which support the modern decision-making process which is to a large extent, data-driven. In this course, students will have an opportunity to work on tools like Excel and advanced add-ons, that helps with performing advanced analysis techniques such as regression and forecasting. Upon completion of this course, students will be able to identify any business problems that can be potentially modeled and simulated and judge whether an optimal solution exists, understand the important issues in their implementation, describe the tools that have been used in the process from their frameworks to the techniques used, determine the business value of outcomes of the quantitative analysis and also appreciate its role in Business Process Management.

BUA 503 GAME THEORY, BUSINESS STRATEGY AND THINKING STRATEGICALLY (3)

Prerequisites: None

The focus of this course is the use of game theory to define the most likely outcome of business situations, especially where there is a communication between two or more decision makers to build business strategy. In addition, students will be introduced to methods in strategic thinking and its connections with current game theory to resolve strategic business problems. Students will need skill at numerical reasoning for this course.

BUA 504 DATA WAREHOUSING AND VISUALIZATION (3)

Prerequisites: None

This course discusses the principles of data warehousing, design and implementation along with related software tools.

Topics consists of data warehouse architecture, dimensional model design, physical database design, data integration and visualization, and data warehouse administration. The course also builds core skills for visual study of data among students. Trends and tools in data visualization will be explained with a special focus on recognizing patterns and trends from large datasets. Knowledge in database management recommended.

BUA 505 PREDICTIVE ANALYTICS FOR BUSINESS STRATEGY (3)

Prerequisites: None

This course explains information technology, modeling methods and data sciences to familiarize students with the field of predictive analytics. Prior course work in data warehousing and visualization will add to this course, which builds on assessing data within the business context, understanding data trends and risk assessment. Through this course, students will learn how to build reliable predictive models for developing business strategy geared at organizational competitive advantage.

BUA 506 DEVELOPING VALUE THROUGH BUSINESS ANALYSIS APPLICATIONS (3)

Prerequisites: None

This course discusses the role that the business analysis plays in exploring and visualizing outcomes to create better outcomes, thereby creating organizational value. Students will be equipped with different tools and application knowledge to drive winning stakeholder outcomes through ongoing business analysis.

BUA 507 ETHICAL BUSINESS DECISION MAKING (3)

Prerequisites: None

This course introduces the ethical issues involved in the "big data" world and its effects on strategic business decisions. In studying real life case studies, existing practices and issues with developing trends, students understand the ethical dilemmas related to data identity, privacy, ownership and organizational reputation. This in turn will prepare the students to make more informed and ethical decisions related to organizational data.

BUA 508 – RISK ANALYTICS (3)

Prerequisites: None

This course builds statistics and data modeling with a focus on risk theory and management. Students gain exposure to present trends in enterprise risk logical methods. This enables students to understand and implement risk management structures in the organizational environment. Major risk categories such as financial risk, strategic risk and operational risk will be covered along with analytical methods to these risk groups.

BUA 509 – WEB ANALYTICS (3)

Prerequisites: None

The Internet is one of most powerful tools of business today. This course develops practices to analyze qualitative and quantitative data from website. Related topics, such as text mining and web mining will also be covered. In addition, this course provides students with the tools to drive constant enhancement of online experiences to customers; both current and future. Topics include Google Analytics and A/B Testing. Incoming traffic characteristics such as client browser, language, computer attributes and geolocation will also be covered.

BUA 510 DATA SCIENCE APPLICATIONS WITH R OR PYTHON (3)

Prerequisites: None

This course focuses on implementation of business analytics problems using a structured programming language such as R or python. Examples of descriptive and predictive business analytics problems such as linear regression, decision analysis, forecasting will be used and implemented using R and Python programming languages. Basic ideas of implementation of an algorithm in R, are discussed. Concepts such program I/O, reading data and visualization of the data, exceptions, conditional statements and statistical packages will be discussed. The course emphasizes hands-on experience and implementation of business analysis ideas in R and Python using pre-existing libraries. It is recommended that students be familiar with basic ideas in statistical modeling and business analytics to maximize the learning outcome of this course.

BUA 511 Data Visualization and interpretation using Tableau

Prerequisites: None

One of the key skills required for business analytics is the ability to communicate the results of data-driven analysis to non-technical decision makers. To effectively communicate a

complex analysis that results in actionable advice one needs to be familiar with the factors that impact decision makers. In this course you will learn how to become a master at communicating business-relevant implications of data analyses. After finishing this course you will be able to effectively import data, clean and transform it and convey the results of the analysis to the stakeholders. You will also know how to streamline your analyses and highlight their implications efficiently using visualizations in Tableau, the most popular visualization program in the business world. Using other Tableau features, you will be able to make effective visualizations that take advantage of innate perceptual and cognitive tendencies of a human brain to convey conclusions directly and clearly.

BUA 690 SIMULATION AND OPTIMIZATION FOR BUSINESS ANALYTICS (3) - Capstone course

Prerequisites: MGT 503; Completion of 27 credit hours in the program

Decision making is a critical part in any business. Business Analytics provides solutions to businesses worldwide with the advanced analysis techniques and tools. Optimization and simulation are two such methods that are being used in many business environments that involve decision making. In this course students will be able to examine and identify the classical and modern optimization techniques used in today's business environment. Few areas where these techniques can be used are selection of portfolio in finance, transportation industry, resource allocation of any industry, and minimizing the advertising cost in marketing. Focused on linear and the nonlinear programming techniques and their application in business environment and modern simulation and optimization techniques, this course helps students understand the need and use of decision making using these techniques.

BUS (BUSINESS)

BUS 500 PROJECT MANAGEMENT FRAMEWORKS (3)

Prerequisites: None

This course is designed to be the main structure related to the Project Management fundamentals for students who look to understand, practice, and improve the project execution process. This is based on the best practices and methods of project management implemented, such as PRINCE, PMI, PMBOK, and Microsoft Framework. This is to run projects in an agile organization toward effective implementation and efficient achievements.

BUS 501 STRATEGIC PLANNING & PORTFOLIO MANAGEMENT (3)

Prerequisites: None

This course is designed to interpret the strategic values and vision of the enterprise's portfolio management. The process is to recognize the company plan and strengthens its service offered in strategic business plan. The course's objective is to explain how a Project Management Oriented Business is able to divide the strategic planning into operational goals, which are attained by each division. Service analysis measures performance in the light of the company strategy and the business environment, with the goal of choosing and performing services that generate greatest value while incurring least risk for the business.

BUS 502 PROJECT MANAGEMENT & LEADERSHIP (3)

Prerequisites: None

This course is an overview of project management with an emphasis on leadership and team building. The first part focuses on the traits of successful leaders and the dos and don'ts for building effective teams. The second

part introduces the project management framework and the different steps of the project management process. The third part describes how leadership practices can affect key management aspects of the project, such as scope, time, cost, human resources, stakeholders and communications. This course will also provide the basic knowledge necessary to prepare for the ASQ CQIA, ASQ CMQ, PMI CAPM or PMI PMP certification examination. Students who sign up for these exams will receive extra credit for their final grade.

BUS 503 PROJECT MANAGEMENT - AGILE APPROACH (3)

Prerequisites: None

This course provides students with the knowledge and tools to manage projects by providing an overview of the basics of agile project management. It provides the theory and core methodology students will need to manage projects or participate on project teams that are time sensitive and require agile project management principles. This course does not make use of any project management software application, but instead focuses on the conceptual understanding that students need to know in order to successfully manage a project in a fast paced technical environment.

BUS 504 CONTRACT MANAGEMENT & FINANCIAL PLANNING (3)

Prerequisites: None

This is a practical course about designing contracts and analyzing the project budget related to milestones achievement and deliverables scheduling. Students will learn about the project scope and implementation phases that are needed to design the required activities and charter agreement. In addition, they will learn about the Project/Program Evaluation and Review Technique (PERT), Planned Value (PV), Earned Value (EV), Actual

Cost (AC), Budget At Completion (BAC), Estimate To Complete (ETC), Estimate At Completion (EAC), and Variance At Completion (VAC).

BUS 509 LEADING AND MANAGING CHANGE (3)

Prerequisites: None

This class will focus on individual, team, and organizational leadership and will provide students with the foundation for exploring and developing their own individual leadership style. Major areas to discuss are leadership, values, ethics, and decision-making. Change and a leader's goal is to continually improve and look forward and provide the positive changes for the organization; being the visionary is critical to success in any organization and a key attribute for any organizational leader.

BUS 510 REGULATION, GOVERNANCE, ETHICAL AND SOCIAL RESPONSIBILITY (3)

Prerequisites: None

The overall goal of this course is to better prepare students to become responsible business leaders. In this class, students explore the relationship between business and society, and argue that to create a business that will endure business leaders must take into account the needs of the broader society, as well as those of their employees and other stakeholders. The major areas of study in this class will include: business ethics, the legal regulation of business, corporate governance, and corporate social responsibility.

BUS 516 PRINCIPLES OF QUALITY MANAGEMENT (3)

Prerequisites: None

This course covers the philosophy and

concepts of quality management with an emphasis on tools and techniques of quality management for continual improvement in quality and productivity. Students learn techniques to improve organization performance and competitiveness.

BUS 517 - ORGANIZATIONAL CULTURE AND DIVERSITY (3)

Prerequisites: None

As organizations become increasingly diverse, the importance of understanding diversity, and its influences in the organizational culture become more essential. This course offers students a thorough understanding of diversity, beyond cultural diversity. Students planning to be managers and leaders of global organizations will learn in this course how to build and implement broad organizational diversity plans. In addition, students will become aware of the legal and ethical effects of building diverse initiatives and of the factors that build an effective organizational culture.

BUS 518 APPLIED STATISTICS (3)

Prerequisites: None

The course covers topics from both introductory and advanced level courses in statistics with the purpose of preparing students for classes in Business Analytics and Data Mining, and also for students who expect to be using statistics for their research. The course is designed to cover foundation topics in the first one-third of the classes, and classical multivariate statistical methods in the second two-thirds. The introductory part cover topics as: probability theory, distributions on different types of random variables, sampling and sampling distributions, hypothesis testing, statistical inferences, one and two-sample procedures, assessing goodness of fit, analysis of variance, linear least squares, correlation and regression, sample size, analysis of variance, and non-

parametric statistics. The topics covered in the latter 2/3 of the course are classical multivariate methods and cover topics as: multivariate normality, comparison of multivariate means, matrix algebra, principal component analysis, discrimination and classification, linear multivariate regression, analysis of co-variance, canonical correlation.

Optional topics are support vector machines, and model evaluation and selection. Also, Bayesian statistics is of interest for its widespread use. Upon completion of this course, the students is expected to demonstrate an understanding of the principles of probability theory in classical multivariate statistical analyses, and should be able to think critically about data and models, and to draw conclusions from such analyses.

BUS 519 ORGANIZATIONAL AND LEADERSHIP CHANGE (3)

Prerequisites: None

This course explores and analyzes the concept of leaderships including such topics as leadership theory, changing leadership roles, power, decision-making, empowerment, vision, communication, diversity, and ethics. The course provides a balance perspective of theory and practice as it surveys the major theories and research on leadership and managerial effectiveness in formal organizations.

BUS 520 - EMERGING TECHNOLOGIES FOR PRODUCT DEVELOPMENT (3)

Prerequisites: None

This course discusses emerging technologies in the area of product development. Ongoing economic constraints, declining margins, volatile supply chains and other market factors have been instrumental in hastening the adoption of technologies in industries seeking sustained competitive advantages.

Concepts discussed in the context of product development are critical thinking for problem definition, resource utilization, optimization and allocation, managing variability in development work, understanding and managing economic performance measures, capacity management, quality management and harnessing people and technology for successful product development. Emerging technologies range from innovations in ERP systems, Internet of Things, Virtual Reality, 3D Printing, and the use of Artificial Intelligence for product design and technical specifications. Lastly, Big Data Analytics will be briefly discussed in relation to creating customized product solutions and reinventing the value chain in the quest for ongoing competitive advantage.

BUS 521 – MANAGEMENT OF TECHNOLOGY AND INNOVATION (3)

Prerequisites: None

Technology and Innovation are the two pillars of the world we live in. This course will teach students about managing both technology and innovation for sustained competitive advantage and value creation. Through understanding the interconnected nature of technology and innovation, students will understand the impacts of well-managed technology and innovations on other allied concepts such as wealth creation, social and human capital, and knowledge management among others. Lastly, and importantly, this course aims to provide students tools to manage technology and innovation beyond conventional methods using case studies and other strategic frameworks.

BUS 600 RESEARCH METHODS (3)

Prerequisites: None

This course introduces students to research methodology with focus on statistical techniques and the interpretation of results. Students will be provided with the foundation to understand and apply research methods via class lectures and hands-on practice. Students will perform literature search and review, create a working research model and hypotheses, compile a questionnaire, use multivariate statistics to analyze data, and form conclusions based on the results.

BUS 688 SPECIAL TOPICS (1-3)

Prerequisites: None

This course offers a relatively new subject that is not currently available in the catalog, but will be of great relevance to Business Administration. It consists of lectures, readings, homework, presentations and projects determined by the instructor.

BUS 689 INDEPENDENT STUDY (1-3)

Prerequisites: None
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

BUS 700 MANAGEMENT PRACTICE AND ORGANIZATIONAL BEHAVIOR (3)

Prerequisites: None

This course discusses individuals and groups behavior within organizations. It focuses on leadership, team creation, change management and ongoing enhancement processes. Topics consist of change business practices and development, decision making, needs and incentive, interpersonal communications, human knowledge, morale, ethical and the value of work life. The students will learn essential, inventive, and pioneering proficiencies in day-to-day financial, prepared, realistic, and decision-making international economy. They will also learn how to build up theories, views, and principles of organizational behavior to study difficult conditions, recognize problems, and

distinguish important achievement issues. In addition, they will understand how to assess resolutions and build up proper suggestions. It will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior.

BUS 703 LEADERSHIP BEHAVIOR AND MOTIVATION (3)

Prerequisites: None

This course examines theories of action and motivation as they relate to discourse and ethical behavior and explores their application to everyday activities in business. The course discusses theoretical and practical aspects of motivation and action on the individual, group, and organizational levels. Moving beyond conventional positivist treatment of organizational and ethical behavior, this course focuses on an interpretive approach that integrates biological, anthropological, linguistic, philosophical, and systems perspectives in a trans-disciplinary fashion. It will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior.

BUS 710 CURRENT ISSUES IN ACCOUNTING RESEARCH (3)

Prerequisites: None

This is an interdisciplinary course. The readings draw from finance and economics (market effectiveness, bounds to arbitrage, and behavioral finance), and from the accounting literature (equity estimation, earnings management, and analyst behavior). In addition, the course will concentrate on present issues in accounting research. The topics include accounting history, ethics, and international accounting.

BUS 713 MULTINATIONAL BUSINESS FINANCE (3)

Prerequisites: None

This course studies the international financial situation within which international and financial institutions work. It also explains the concepts and practices of global financial management. Currency options, forwards, futures, and operating exposures are taught to help students build up main proficiencies in running transaction exposures to exchange rate risk. In addition, the course explains global financing plans and interest rate tools such as futures, options, and swaps, which describe international investment strategies. The aim of the course is to teach students to assess the global financial and monetary structure, to examine and resolve issues occurring in the global financial functions of a firm, to utilize the theories of exchange rate and interest rate risk management and to create global financing and investment strategies.

BUS 720 INTERNATIONAL INFORMATION TECHNOLOGY MANAGEMENT (3)

Prerequisites: None

This course explains the usage of technology in developed and developing countries. The course will review the use of technology as a deliberate and strategic competitive advantage. It will discuss precise transnational problems in implementing and using technology, including cross-cultural explanations of technology, the result of infrastructure on technology, and the accomplishment of difficult information technology projects in various countries.

BUS 726 SEMINAR IN ORGANIZATIONAL BEHAVIOR RESEARCH (3)

Prerequisites: None

This course focuses on the organization's capability to compete over the long term. It discusses individual, group, and organization

involvements raising efficiency and quality, enhancing competitiveness, increasing proficiencies, improving morale, and renewing dedication to employee participation. It will include both the scientific and systems view of behavioral science knowledge. It will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior.

BUS 728 SEMINAR IN STRATEGY AND INNOVATION (3)

Prerequisites: None

This seminar introduces the innovation of new technology to build new business forms, products, and services. The course demonstrates that innovation is accountable for the stable enhancement in consumers' normal of living all over history. Essential innovation makes new markets and enhances the value of products while decreasing prices. Firms leading the innovation have a tendency to control world markets and support the global competitiveness of their own economy. Therefore, innovation contributes to firms' achievement, economic expansion, and consumer well-being. This seminar will help students to understand the problems, challenging perspectives, research techniques, main answers, and unanswered issues in the area of innovation strategy.

BUS 729 LEADERSHIP BEHAVIOR AND CONFLICT RESOLUTION (3)

Prerequisites: None

This course studies conventional theories that leaders utilize to analyze and effectively resolve conflicts that arise on interpersonal and organizational levels. In addition, new conceptual approaches are discussed that emphasize creativity, identity, and meaning-making within a critical hermeneutic framework, linking linguistic, cultural, philosophical, and ethical elements; and enable

new strategies for negotiation and conflict resolution within business and community settings. The critical hermeneutic participatory research conversation will be the preferred approach used for its capacity to reframe situations, reach new understandings, and generate new possibilities in conflict resolution.

BUS 730 TECHNOLOGY, INNOVATION, AND ENTREPRENEURSHIP (3)

Prerequisites: None

This course discusses the function of technology and innovation of competitive business. Students will learn processes for developing and maintaining managerial change and innovation with methods for managerial design and learning. In addition, the course discusses problems with a variety of phases in the entrepreneurial procedure. Topics demonstrated by case studies, consist of new venture formation, marketing requirements, the business plan, ethics issues, economics of the business and financial support sources. The course also teaches students how to outline research questions focusing on the origin causes of general issues in innovation.

BUS 800 WRITING AND RESEARCH METHODS (3)

Prerequisites: None

This is a doctoral level course. This course brings together knowledge gained from core areas in business and will help students perform research in these topics and thereby provide the foundation to become academic researchers capable of contributing on the cutting edge of research in business areas, particularly within the area of expertise and research interests. The following are 6 core business areas this course will focus on: 1) Business Finance; 2) Micro Economics; 3)

Business Management & Organization; 4) Business Marketing; 5) Business Information Systems; 6) Business Legal & Ethical issues; and 7) Business Topic (TBD).

BUS 801 QUANTITATIVE RESEARCH METHODS (3)

Prerequisites: None

This course offers topics in survey and experimental design and data; statistical analysis including variance analysis, multiple regression, linear model, and factor analysis; and time series study. Students will learn how to understand the statistical results included in academic papers and articles. In addition, they will learn how to relate these techniques using statistical software through practical analysis of research data sets.

BUS 802 QUALITATIVE RESEARCH METHODS (3)

Prerequisites: None

This course provides students with the doctoral level principles of social science/business practices research and the relationship between theory and methods. Particular attention will be placed on qualitative research methodologies. Topics that will be covered include conceptualization and measurement, ethical research techniques, survey design, content analysis, and field studies. Course assignments will be used to apply the methods learned and complement the theoretical knowledge gained from the lectures.

BUS 804 MANAGEMENT AND ORGANIZATIONAL THEORY (3)

Prerequisites: None

This course invites students to discover the most progressive thinking about organizations with proven classic theories and effective business practices. The course will provide students and prospective managers with the opportunity to examine contemporary organizational designs and theories, and to focus on companies that are successfully using these design concepts in a highly dynamic environment. Students will also examine, diagnose, and solve real-life organizational problems using current organizational situations.

BUS 806 EMERGING ISSUES IN MARKETING MANAGEMENT AND RESEARCH (3)

Prerequisites: None

This course is designed to expose DBA/PhD students to the cutting-edge advanced research topics in marketing in order to help them to define and advance their research interests. The course is designed to help DBA/PhD students candidates develop both an appreciation for the intellectual growth of marketing as an academic discipline and a set of skills related to the practice of marketing management. Students will be exposed to the role of marketing in a modern organization and, through the use of case, seminar, and market assignments, will develop skills in planning and executing marketing programs. Students will examine the intellectual underpinnings of marketing as a discipline by examining the development of marketing theories from both a historical as well as philosophical basis. In doing so, they will also be exposed to the basic issues involved with doing scientific research in the social sciences.

BUS 807 EMERGING ISSUES IN STRATEGIC DECISION MAKING (3)

Prerequisites: None

This course brings together knowledge gained from the various functional areas in business administration in ways that will enhance the student's strategic decision making skills, both at the personal and organizational level.

Students will be expected to bring current case studies and or readings to each class meeting in order to discuss the most current and salient points of strategic decision-making. This course also reinforces the following overarching, integrative doctoral program outcomes so that at its completion all students will be able to: 1) Demonstrate high level proficiency for problem solving, decision-making, self-directed learning, coaching, mentoring, and critical thinking skill applications in organizational settings when interacting in a leadership capacity; 2) Utilize the appropriate theoretical foundations and contributions of strategic decision-making researchers when actively participating in the development of strategic business planning; 3) Understand the use and application of statistical measures for strategic decision-making contributions to overall organizational productivity; 4) Conduct doctoral level research for making life-long contributions through publication and conference presentations in the integrative discipline of strategic decision-making; and 5) Demonstrate capability to electronically locate, retrieve, and integrate strategic decision-making information resources.

BUS 812 EMERGING ISSUES IN FINANCIAL DECISION MAKING (3)

Prerequisites: None

This course looks at current financial theories and their applications. Financial Decision Making concepts teach students key skills required for financial management joining strategic decision making theories with daily management decisions. Financial Decision Making is important to on-going development of every organization in the industry. The efficient financial management of firms, large or small, private or public is critical to the growth and financial health of any economy. Topics include three key decisions facing business: Investment, Financing, and Dividend. These topics will include: risk and return, financial decision making, project evaluation, measurement of securities and of the organization, cost of capital, a study of leverage, capital structure, and dividend policy.

BUS 813 SEMINAR IN ORGANIZATIONAL BEHAVIOR RESEARCH WITH EMPHASIS ON LEADERSHIP (3)

Prerequisites: None

This course presents a comprehensive, integrative, and practical focus on leadership in new era organizations. It is based on an organizing framework, which shows how key components work together to form a holistic view of leadership within organizations. The course presents definitions and new perspectives of leadership that have emerged in a global era. It provides students the opportunity to review major concepts and theories of leadership; an exploration of the historical underpinnings and current concepts and practice of shared leadership; the impetus for organizational leadership; leadership and culture; inclusion; capacity-building and leadership development; and finally, the new responsibilities of organizational leadership through social activism.

BUS 901 DOCTORAL DISSERTATOIN (18)

Prerequisites: None

Students may start the dissertation research only after completing all required coursework and passing the qualifying examination. Students will then organize, prepare, present, and defend their completed DBA dissertation paper.

CFL (CLASSROOM FIELD LEARNING)

CFL 591 INTEGRATING ACADEMIC & INTERNSHIP LEARNING (2)

Prerequisites: None

This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591(can be taken concurrently) in order to be eligible to enroll in INT 593.

ERP (ENTERPRISE RESOURCE PLANNING)

ERP 509 INTRODUCTION TO ERP SYSTEMS USING SAP (3)

ITU/SAP University Alliance

Prerequisites: None

Introduction to ERP using SAP is prerequisite course for students who want to pursue other ERP courses. This course is designed for students to get a basic understanding of all the functional departments that exist in a business scenario. It gives an idea about how these functional departments work and how they are integrated in ERP systems to avoid duplication of work, and to provide efficiency and effective use of resources. This course is a general overview of the SAP ERP System concepts and tools. It introduces SAP as one of the ERP systems and explains how the fundamental business processes interact in SAP ERP in the functional areas of Sales and Distribution, Materials Management, Production Planning, Financial Accounting, Controlling, Human Capital Management, Project Systems, and Enterprise Asset Management. The course is presented in lecture format with open discussion and hands-on problem solving exercises.

ERP 510 ABAP - ADVANCED BUSINESS APPLICATION PROGRAMMING (3)

ITU/SAP University Alliance

Prerequisites: None

ABAP is the language for programming SAP's Web Application Server, part of SAP's NetWeaver platform for building business applications. This course introduces the ABAP language environment, including the syntax checking, code generation and runtime system, and various features of ABAP Programming. Though this course starts from basics it's useful if students have basic programming knowledge with object oriented concepts and knowledge of relational database design. Students will get hands-on experience with scenarios, which will be discussed and worked on, in class on SAP system. Students will be given programming tasks to work on.

ERP 511 ENTERPRISE PORTAL TECHNOLOGY USING NETWEAVER (3)

ITU/SAP University Alliance

Prerequisites: None

SAP NetWeaver is SAP's integrated technology platform and is the technical foundation for all SAP applications since the SAP Business Suite. SAP NetWeaver is marketed as a service-oriented application and integration platform. SAP NetWeaver provides the development and runtime environment for SAP applications and can be used for custom development and integration with other applications and systems.

ERP 512 ENTERPRISE PROCUREMENT PROCESSES (MM) (3)

ITU/SAP University Alliance

Prerequisites: None

Today's enterprises face increasingly complex procurement processes. This course introduces the external procurement process. During the course, the students go through the entire procurement process with its typical steps – purchase requisition, purchase order, goods receipt, and entry of incoming invoice and payment. The students get to work on SAP course will quickly build through each of these concepts using Fitter Snacker case study or Quazi case study and configuration so that by

the final day of class, each student will have hands on configuration experience in procurement processes. In doing so, the students will focus on different aspects and become acquainted with additional functions.

ERP 513 SALES ORDER MANAGEMENT WITH ERP (3)

ITU/SAP University Alliance

Prerequisites: None

This course introduces the sales order management process with the SAP ERP Central Component. During the course, the students learn the entire sales order process starting from a sales inquiry, entering sales orders, creating outbound deliveries, posting goods issue and invoicing the customer and entering the incoming payment. The course will quickly build through each of these concepts and configuration using the Quazi Computer case study and by the final day of class, each student will have fully walked through the Sales and Distribution process using the SAP system. In doing so, the students will focus on different aspects and become acquainted with additional functions in the sales order management process chain.

FIN (FINANCE)

FIN 515 MANAGERIAL FINANCE (3)

Prerequisites: None

The course teaches the students financial concepts and tools necessary for effective business planning. Topics include formation of interest rates, income taxes, working capital management, cost of capital, financial forecasting, external sources of capital, company valuation, and bankruptcy.

FIN 516 ENTREPRENEURIAL FINANCE (3)

Prerequisites: None

This course approaches the topic of

entrepreneurial finance from a startup or early stage business owner's perspective. The course assumes that the student has a modest or no background in finance, accounting, or economics. The classroom discussions together with the textbook are used to develop a foundation for understanding the practice of finance and financial decision-making under company startup conditions. We work together to create a basic understanding of the financial concepts, statements, and tools, as well as financial planning required to start a business or advance an early stage company. The financial plan explores the uses of financial analytics and integrating financial proforma statements with the business plan. The course learning process includes examining the roles of capital and its sources for startups and early stage companies; reviewing financing alternatives such as debt, equity, and credit as sources of working capital for entrepreneurs; and exploring other innovative techniques for financing a new venture. Implicit in these areas are the topics of mastering the concepts of revenue generation, operational costs, profitability, and cash flow. Students will explore a variety of financial analytical concepts such as ratios, time value of money, and capital budgeting to assist us with our entrepreneurial financial planning and decision making. The course concludes with a discussion on structuring financial liquidity events for investors.

FIN 517 FINANCIAL INSTITUTIONS (3)

Prerequisites: None

In the Fall of 2007, the US and other international financial markets experienced a major crash proceeded by record stock market highs. In this course students examine the products, markets policies, investment products, and financial institutions that precipitated this global event. Students will draw on a combination of finance research

journals, Internet articles, as well as other international finance textbooks to further supplement our understanding of the Finance Markets and Institutions. Our course utilizes several contemporary journal publications to build a rich discussion on the topics of financial markets and institutions, as well as financial objectives and strategies impact on international business expansion.

FIN 518 FINANCIAL AND SOCIALLY RESPONSIBLE INVESTING (3)

Prerequisites: None

Socially responsible investing is a course that examines one of the fastest growing areas in the global financial markets. The global financial crisis of the 2000s have shown that socially responsible investments (SRIs) have a place in building financially sound investment portfolios while doing social good. The course utilizes financial and global macroeconomics to support developing the basic investment mechanics and strategies. The initial objective of this course is to develop students' qualitative and quantitative skills for understanding the basic principles of socially responsible investing.

FIN 519 CORPORATE VALUATION (3)

Prerequisites: None

The focus of this class is on making investment decisions in real (as opposed to financial) assets. It will acquaint the student with the widely used ideas that have revolutionized the practice of valuation during the past few decades. By the end of the course, students should be comfortable in answering the question: What is a real asset - a new product, a new project, a division, or a company - worth?

FIN 520 INVESTMENT MANAGEMENT (3)

Prerequisites: None

This course offers the basics of investment management. Quoted and private equity investments and entrepreneurial finance are the focus of the topics. This course introduces market and portfolio perspectives, starting with the discounted cash flow methods to the concept of term structure in the valuation of risk-free cash flows, including forward rates and valuing risky or uncertain cash flows. The course prepares students to identify various investment products. Both real world and theoretical views are discussed.

FIN 521 INTERNATIONAL FINANCIAL MANAGEMENT (3)

Prerequisites: None

This course provides students with the framework for making corporate financial decisions in an international environment. Topic include: measurement of currency exposure and of currency risk. In addition, topics about the decision to undertake a global financing program, exchange and capital market, capital budgeting analysis for foreign direct investment, and the value of target firms for cross-border acquisitions are discussed. The course will examine different aspects of the foreign exchange market, the role of governments, and the central banks. The main focus is on the markets for spot exchange, currency forwards, options, swaps, international bonds, and international equities. Multinational financial transactions create unique challenges due to the market complexity, the exchange rate, and the political risks.

FIN 522 BEHAVIORAL FINANCE (3)

Prerequisites: None

The theories of finance and investment have focused on financial tools to characterize and quantify wealth creation and its associated risks. These tools have assisted investors to compute asset price and make investment

decisions. In this course, we study the psychological influences of investor behaviors. Students examine the behavioral biases that people have when making purchasing, budgeting, or investing decisions. The class will also discuss Dual Motive Theory in terms of Ego/Empathy and greed/positive financial impact to understand how brain functions can impact financial behavior and relationships.

FIN 523 MACROECONOMIC THEORY (3)

Prerequisites: None

This course discusses basic principles and theories of macroeconomics, and components and measurement of production, income, and other key economic variables of the U.S. domestic economy. The course focuses on the analysis of the interrelationship among leading, lagging, and coincident indicators; key economic variables; and fiscal and monetary policy within the framework of the business cycle. Students will practice using publicly available economic data and conduct analyses of the state of the economy, forming an educated guess about its future direction, and applying that knowledge for decision-making in the context of their particular business activity.

FIN 525 ECONOMETRICS (3)

Prerequisites: None

This course covers concepts of econometrics and their practical applications for business and economics. From single and multivariable models under classical assumptions, the course moves on to study models that exhibit the problems of multicollinearity, heteroscedasticity, and autocorrelation. In addition, specification errors, and identification problems in single equations and in simultaneous equation systems are also studied. Students will learn how to use an econometric software package to run models to simulate and solve practical problems in the field of business and economics.

FIN 526 INTERNATIONAL ECONOMICS (3)

Prerequisites: None

This course examines basic principles and theories of international economics (the standard trade model and the Heckscher-Ohlin theory); international trade policies (tariff and non-tariff barriers); balance of payments, foreign exchange markets, and exchange rate determination; and the relationship between exchange rates, current accounts, and the economy as a whole, including fiscal and monetary policies in an open-economy.

FIN 534 FINANCIAL AND ECONOMIC ANALYSIS (3)

Prerequisites: None

This course discusses criteria and methods to evaluate the net benefits of investments projects and, once selected for implementation, the best way for a firm to fund such projects, in a way that cash flow is optimized. The course explores the following topics: financial ratios and financial statements, valuation techniques using time value of money tools, evaluating and selecting investment in long-term assets, determination of financial mix (capital structure) to fund long-term investments, short-term financial planning, working capital management, and short-term cash flow planning and forecast.

FIN 604 SECURITIES ANALYSIS (3)

Prerequisites: FIN 515, or equivalent

Security Analysis is about understanding the characteristics of and influences on financial securities, as well as making investment decisions. This course draws on the work of Berk & DeMarzo (2007), Copeland, Shastri, & Weston (2010), Fabozzi, and Modigliani & Jones (2010) to explain, validate, and build on the early theoretical securities pricing work of Bronzin (1907) and Bachelier (1914). This

foundation is augmented by the investment theories of Working (1934), Kendall (1953), Osborne (1959, 1962), Markowitz (1952), Fisher (1907, 1930), Keynes (1920) et al. in asset pricing and valuation; as they have played important roles in the development of modern theories in securities analysis. The class knowledge base is brought up to date with the debates regarding CAPM, APT, and other asset pricing and analytical models.

FIN 605 FINANCIAL DERIVATIVES AND RISK MANAGEMENT (3)

Prerequisites: FIN 515, or equivalent

Derivatives provide users an opportunity to mitigate risk, as well as increase financial returns. They also have a dark side where they can be prone to misuse and abuse. Derivative theory and risk management offers us a framework, together with a set of analytical techniques, for characterizing risks and determining the valuation of an asset, investment, and opportunity. The objective of this course is to become familiar with the basic building blocks of derivatives: forward contracts, future contracts, options, and swaps. Students build on this foundation with the creation of derivative strategies and risk management techniques. Students develop asset including option pricing models from a variety of financial theorists.

FIN 606 CORPORATE FINANCE (3)

Prerequisites: FIN 515, or equivalent

Corporate Finance brings together the academic rigor and practitioner perspectives on making business and economic decisions. The course will draw on a combination of finance research journals, Internet articles, and other finance publications to supplement the understanding of the discipline. The course utilizes several contemporary publications to build a rich discussion on the topics of finance, as well as

how to develop financial objectives. Class time will provide the opportunity for collaborative discussions, exchanges of the impact of Finance on business concepts and globalization opportunities, and the interactive use of finance applications, models, and analytical tools.

FIN 607 MERGERS AND ACQUISITIONS (3)

Prerequisites: FIN 515 and ACT 600, or equivalents

M&A are a powerful tool for building competitive advantage. In a global marketplace it offers strategic advantages for business expansion relative to corporate assets, products, technology & IP, as well as marketing distribution channels among other financial benefits. In this course were develop skills for the obligatory financial analysis of M&As. Students examine a full range of business dynamics and strategy considerations regarding M&As and reach beyond analysis to the synthesis of M&A issues to develop a framework for successful M&A planning, implementation, and post M&A activities.

HCM (HEALTH CARE MANAGEMENT

HCM 509 – SCIENTFIC WRITING AND RESEARCH FOR HEALTHCARE (3)

Prerequisites: None

Through this course, students will become aware of medical language and standard medical terms used in medical journals, grant applications and others. The course enables students to be on par with other medical professionals through their written communication. Topics discussed in this course are healthcare related documentation, access to healthcare journals and databases for research purposes.

HCM 510 A REGULATORY OVERVIEW & COMPLIANCE (3)

Prerequisites: Any Biology background: Academic or Professional

This course will offer a summary of the drug development procedure. The emphasis will be on drug development science, regulation, and business from the U.S. standpoint. Most the lectures will be a concise educational outline of today's subject, followed by dialogue of a main scientific publication that highlights the significant theories covered.

HCM 511 CONCEPTS TO HEALTHCARE MANAGEMENT (3)

Prerequisites: None

This course provides a dynamic introduction to the health sector. In addition it provides an overview of concepts and issues related to healthcare leadership. While the emphasis will be on the American system, a global context will be developed. The basic elements of insurance and payment, service delivery, and life sciences products will be described, and put in the context of the unique economic structure of the sector. The intense challenges of the sector will be explored, as well as both the ethical issues presented and the opportunities that emerge. Through the examination of management topics and healthcare situations, the student will explore the skills and knowledge needed to be successful in a diverse healthcare environment. Topics include organizational design as it relates to the uniqueness of healthcare organizations, managing professionals, and diversity in the workplace. Public policy and technological and practice development as drivers of change will be also addressed.

HCM 513 INNOVATING BIOMEDICAL TECHNOLOGY (3)

Prerequisites: None

This course is recommended for students who are entrepreneurially inclined and would like to develop products and services for biomedical

application. It is highly recommended for students with EE or CE majors. They will learn the medical device/application market trends and regulations for product development. The course is designed to provide students with entrepreneurial spirit to get hands-on experience in developing knowledge, kindling innovative thinking and designing products in the bioscience/biomedical arena. Working in groups or teams, students will learn to research market trends, gap analysis and market needs to develop a concept or design a product. They will also learn to research Intellectual Property and patent databases to further develop their concept and avoid IP infringement pitfalls that are bound to arise.

HCM 519 HEALTHCARE ETHICS (3)

Prerequisites: None

This course invites students to explore issues in medical ethics from a personal and professional career perspective. Materials will include case studies of actual situations encountered by healthcare administrators and providers in the United States. Emphasis will be on learning useful approaches and practical principles for decision-making. This course provides an overview of legal doctrine and critically assessing public policy issues. Duties assigned as per healthcare law such as the duty to treat, informed consent, and malpractice liability, and selected issues in bioethics such as the right to die, physician-assisted suicide, and organ transplantation are dealt in detail. Importance of financing and delivery issues such as insurance coverage and care towards patient are studied.

HCM 525 PRINCIPLES OF MANAGED CARE (3)

Prerequisites: None

This course invites you to learn about the principles of managed healthcare systems in

the United States. Topics covered include: health insurance, network contracting, provider payment, management of utilization and quality, and laws and regulations. Spot quizzes will identify learning transfer and possible gaps. Both interim midterms and a comprehensive exam will ensure overall paced learning. Special attention will be paid to the details of and latest news about the federal Patient Protection and Affordable Care Act of March 2010.

HCM 529 MENTAL HEALTH AND WELLBEING (3)

Prerequisites: None

This course invites students to explore issues in mental health and wellbeing from a personal and professional career perspective. Topics will include materials on support organizations (both local and online), self-care activities, and current important issues. Emphasis will be on learning useful approaches.

HCM 535 DATA ANALYTICS APPLICATIONS IN HEALTHCARE (3)

Prerequisites: None

This course focuses on application of data science and analytics techniques to concepts and problems in healthcare. Data analytics in general and in the context of healthcare in particular involves many steps including data generation, data extraction, data analysis, visualization and reporting. An overview of these data analytics stages will be provided as they apply to healthcare industry. A review of basic predictive analytics concepts such as statistical learning using regression techniques, classifiers and decision trees will be given. Application of these techniques to healthcare issues such as patient monitoring, preventive diagnosis, personalization of treatment for patients will be discussed. The students will learn and analyze the impact of data analytics in planning, process efficiency, and resource

management in healthcare industry.

HCM 536 High Reliability Health Care Organizations (3)

Prerequisites: None

This course focuses on the art and science of leading for highly reliable performance in the modern healthcare industry. Students will learn how individuals can engage in efforts within and across organizations to ensure high reliability by studying case studies related to decision-making and team organization in various healthcare settings at the face of diversity. The course pays special attention to the cognitive and effective dimensions of leading in today's uncertain and dynamic healthcare environments, whether that means motivating a clinical care team, launching a new medical product, ensuring quality and payment coverage across a healthcare system, or coordinating patient access to health services.

HCM 537 Commercializing Medical Devices, Diagnostics and Biomedical Innovations (3)

Prerequisites: None

This course provides an overview of design control, methods and best practices governing the medical device industry, digital health application development and biomedical product as well as regulations and the practical application in the scope of marketing and commercialization. Students will learn through a cross-disciplinary approach, how to launch, and market a new device, a health app or a biomedical product including lifecycle management and intellectual property laws in the context of this industry.

HCM 538 Predictive Analytics and Decision Models in Healthcare (3)

Prerequisites: None

This course explains data-driven modeling methods and decision models to familiarize

students with the field of predictive analytics application in the healthcare industry. Prior course work in business analytics and data visualization will add to this course, which builds on assessing data within the healthcare industry context, understanding data trends and risk assessment. Through this course, students will learn how to build reliable predictive models for developing effective decision models for business strategy and organizational competitive advantage in the healthcare industry. Case studies and problems will be provided in related areas such as launch of a new medical device, payment coverage and better service to healthcare products.

HCM 690 HEALTHCARE INNOVATION MANAGEMENT PROJECT (3)

Prerequisites: MGT 503; Completion of 27 credit hours in the program

This course focuses on using the knowledge obtained throughout the healthcare management core and elective courses in implementing a comprehensive project. The nature of the project will be interdisciplinary and students with different background and skills are encouraged to participate in the project. The project is inspired from real-life scenarios found in the healthcare management industry. The students will form a team that each will tackle different aspect of the project. An example of a project could be a medical device product development project that requires a market survey, business plan development, design specification document, cost and budgeting, manufacturing/implementation plan. The goal of this course is to expose students to real-life product cycle and provide hands-on experience with an industrial project while emphasizing development of soft skills such as teamwork in a classroom setting.

HRM (HUMAN RESOURCE MANAGEMENT)

HRM 528 HUMAN RESOURCE MANAGEMENT (3)

Prerequisites: None

This course examines the principles of human resource management, including recruiting, hiring, orienting, training, developing, disciplining, and rewarding employees. The course provides a management-oriented exploration of human resource management, structure, functional applications, and labor management relations. This course is a humanistic and legal analysis of organizations, focusing on the role of human resource management. There will be an examination of managers and leaders within organizations and their responsibility to maximize performance and make decisions based on ethical criteria. The class will also discuss Dual Motive Theory in terms of Ego/Empathy and ethical/unethical behavior to understand how brain functions can impact human behavior and relationships.

HRM 529 Organizational Development (3)

Prerequisites: None

This course reviews training, employee and organizational development techniques that the organizations use to build group and individual skills. Topics include linking identified needs to business objectives, developing an implementation plan, implementing the plan using a variety of modalities, and assessing results. The students will use a hands-on approach to evaluate organizational needs for employee development. The overarching objective of this course teaches students to assess, develop, facilitate, and evaluate a training program. We will also discuss Dual Motive Theory in terms of Ego/Empathy and self/other behavior to understand how brain functions can impact human behavior and relationships.

HRM 530 EMPLOYMENT LAW FOR BUSINESS (3)

Prerequisites: None

This course emphasizes federal employment statutes. Cases are used to illustrate the various federal courts' interpretation. Federal agencies such as Equal Employment Commission and Department of Labor are studied. Topics on the employment law provide a comprehensive analysis of federal and state laws, which affect the human resource function, including equal employment opportunity, wage and overtime payment, and employment agreements. The course focuses on applying employment laws to develop programs that enable organizations to act positively in meeting both company and work force needs, trying to resolve workplace disputes, prevent litigation, and implement personnel policies and practices in conformity with applicable law.

HRM 533 STRATEGIC COMPENSATION: ISSUES AND OPPORTUNITIES (3)

Prerequisites: None

This class addresses the need for strategically focused compensation systems aligned to the business objectives and examines the related factors that impact employee motivation and productivity in a variety of settings and industry sectors. The course will examine and analyze the various components of compensation systems in contemporary organizations in understanding how and why they add and sustain shareholder and/or stakeholder value.

HRM 535 HUMAN RESOURCES AND INFORMATION TECHNOLOGY (3)

Prerequisites: None

This course offers the students the best practices in use of technology in the human resources field. Topics include the use of human resources information systems, web-based human resources used to develop and support the various functional areas of human resources.

INB (INTERNATIONAL BUSINESS)

INB 553 FUNDAMENTALS OF INTERNATIONAL BUSINESS (3)

Prerequisites: None

This course provides an introduction to globalization and the cultural, economic, political, and legal environments of international business. The course helps students understand international trade, the role of the government in trade, and have an understanding of the international financial system. It will familiarize students with concepts of international strategy, marketing products in the international arena, and international staffing policy.

INB 554 INTERNATIONAL FINANCIAL MARKETS (3)

Prerequisites: None

This course analyzes the international financial markets. Topics include foreign currency, international money markets, banking, and capital markets. The course helps students understand the basics of international finance, the foreign exchange market, exchange rate determination, and currency derivatives. The foundation of understanding foreign exchange management, the world financial markets and institutions will be covered.

INB 556 GLOBAL STRATEGIC MANAGEMENT (3)

Prerequisites: None

This course examines the fact of globalization, and how managers in multinational firms struggle with a complex and rapidly changing international economic environment. The course introduces the business skills of understanding and managing strategic issues in international environment. It will also focus the understanding of the need for awareness of a change in organizations' internal and external environments.

INB 558 GLOBAL MARKETING AND STRATEGY (3)

Prerequisites: None

This course is an introductory survey of global marketing. Students will learn the mechanism of the decision-making process, and challenges of going global. The culture, legal, political, geographic, technological, and economic influences will be examined in the development of a comprehensive global marketing strategy. The student will gain a perspective of the trade operations mechanism and develop skills that will enhance their participation in a global economy.

INB 559 INTERNATIONAL BUSINESS MANAGEMENT (3)

Prerequisites: None

Understanding management in the global business context is the primary focus of this course. The relationship between national culture and management practice is examined by identifying the opportunities and challenges facing global business in the 21st century. Students develop cross-cultural management skills, learn new ways for conducting international operations, and explore how culture influences management within a global business market. Skills developed in this course include critically thinking about the course topics by writing and speaking of key issues in management practices; working in teams to contribute to group projects and exercises; and building a personal network with business professionals and practitioners using social networks, public forums, and community involvement.

INT (INTERNSHIP)

INT 593 PART-TIME/FULL-TIME INTERNSHIP (1, 3)

Prerequisites: CFL 591, can be taken concurrently

This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A maximum of 10 credit hours earned in INT 593 may be applied toward the Master's Degree graduation requirements.

MBN (MASTER OF BUSINESS ADMINISTRATION, CAPSTONE THESIS)

MBN 697 MBA THESIS (3)

Prerequisites: MGT 503; Completion of 27 credit hours in the program

Students should select a topic and work with an advisor to complete their thesis paper. The thesis concludes the program and should be taken after all other courses. The students will prepare an independent thesis and defend it before a committee composed of a number of faculty designated by the chair of the MBA program.

MGT (MANAGEMENT)

MGT 503 ORGANIZATIONAL LEADERSHIP THEORIES (3)

Prerequisites: None

The course will provide an in-depth examination of organizational leadership. This course will explain the principles, strategies and elements of effective organizational leadership. Leadership theories are examined in the context of contemporary, global and matrix organizational environments. Students will get the essential knowledge and skills to be efficient in these varied organizational contexts. Students will build an understanding of the work of organizations and the leaders' roles at all levels to enhance organizational performance. In addition, the course will discuss human behavior in organizations, the role of leaders as they move from strategic to

tactical implementation, and leading organizational change.

MGT 560 PRINCIPLES OF MANAGEMENT (3)

Prerequisites: None

This course features traditional management principles such as planning, managing, leading and controlling. Two textbooks will be utilized during the semester: one for theory & practical tactics of management, and another for self and other-awareness of people principles of management. Students will read and discuss the two texts and engage in classroom activities and business writing. There will be individual and group written essay, and oral presentation assignments. The class will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior and relationships.

MGT 564 PRINCIPLES OF PUBLIC RELATIONS (3)

Prerequisites: None

This course invites students to learn the language of the field of public relations. Also, students will learn to distinguish between the field of public relations and its related fields: marketing, advertising, public affairs, publicity, and propaganda. Students will compile actual research data about a hypothetical public relations campaign. Students will apply basic public relations principles to case studies. For the final exam, students will deliver effective public relations presentations. Students must come to class with their computers. Students should submit their resumes to the ITU EMS (ems.itu.edu) before the first class.

MGT 566 PRODUCTION AND OPERATIONS MANAGEMENT (3)

Prerequisites: None

This course will help students to understand theories, problems and methods applicable to the operations of various business organizations. The focus is on decision making in operational areas such as: facility conditions and use, control and manage resource inputs and outputs, types of transformation procedures, and performance evaluations. This course is relevant to people interested in designing and managing production and business processes, and those who manage interfaces between operations and the other business functions. The body of knowledge encompassed in this course will provide the basis for linking corporate strategy to its production and operations management.

MGT 567 QUALITY CONTROL MANAGEMENT (3)

Prerequisites: None

This course focuses on the understanding of effective quality management. It provides the basic quality concepts and the benefits of a quality approach for an organization. It addresses teamwork by explaining the various team types, the roles and responsibilities of their members and the team-building dynamics. The basic quality and quality management tools are described in the context of problem solving and data analysis for continuous quality improvement. The course discusses various statistical concepts and tools, and how they are applied for process monitoring, control, and improvement. It also analyzes the key elements of customer and supplier relationship and their impact on quality for the organization. The course follows the Body of Knowledge (BOK) for the Quality Process Analyst certification of the American Society for Quality (ASQ) and prepares for the certification examination.

MGT 569 STRATEGIC OPERATIONS MANAGEMENT (3)

Prerequisites: None

This course provides an overview of Strategic

Operations Management with emphasis on the four core themes of operations strategy, a vital topic for any company's objectives: strategy, innovation, services, and supply. We will cover the intrinsic and extrinsic factors within an organization's operations, including the input of: Capital, Technology, Energy, and Know-how; and the output of the final product/service for the customer. It will also cover the big picture of Strategic Operations including; supply management, innovation, sustainability, and human resources. Additionally, this course will cover managing strategic operations within organizations including; managing the transformation process, managing quality, managing inventory, capacity and scheduling management, and managing service operations.

MGT 570 CONTRACTS AND PURCHASING MANAGEMENT (3)

Prerequisites: None

According to the United States Bureau of Labor Statistics, the employment of purchasing managers, buyers, and purchasing agents is expected to increase 7% through the year 2018. This course addresses the expanding needs of private industry, local, state, and federal agencies for professionally trained procurement and contract specialists. More specifically, this course provides an overview of the basic concepts and practices in procurement and contract management, with an emphasis on these activities in the small business environment.

MGT 571 CRITICAL THINKING STRATEGIES IN DECISION MAKING (3)

Prerequisites: None

This course provides students opportunities for analysis, synthesis, prescription, and application of critical thinking and decision making within the organization. Emphasis is placed on preparing managers who can deal clearly, rationally, and creatively with a diverse workforce and dynamic workplace. This course equips students with concrete skills in critical thinking and decision making that will allow them to identify and solve organizational problems, as well as provide strategic direction. This course will also discuss Dual Motive Theory in terms of Ego/Empathy and ethical/unethical behavior to understand how brain functions can impact human behavior and relationships.

MGT 572 HIGH-TECHNOLOGY ENTREPRENEURSHIP (3)

Prerequisites: None

This course is offered for those planning to undertake an entrepreneurial career in starting and building an international company in the high-technology area. A special effort is made to take advantage of ITU's proximity to the entrepreneurial community in Silicon Valley with its fundamental international business thrust. An integrative business plan for a new company in the technology arena is an integral part of the course. Topics covered include: addressing new business opportunities, global trends, high technology, business model design, start ups, venture capital process and tools. This course will cover the basics of building a business plan to meet emerging needs. Concepts and techniques of social entrepreneurship will provide the foundation for learning and communicating.

MGT 573 INTERNATIONAL MANAGEMENT (3)

Prerequisites: None

This course studies the role of managers in global markets. Topics include the external economic and political environment, international strategic planning, partnerships, global human resource management, managing technology, product and service

design, ethics and leadership. The course utilizes innovative techniques and case study analysis from a variety of national, and multinational firms.

MGT 575 PROJECT MANAGEMENT (3)

Prerequisites: None

This course provides an overview of project management history, culture, methodologies, leadership and strategic planning. The course introduces important tools, such as work breakdown structure, scheduling, earned value analysis, and risk management. Case studies from a variety of organizational settings are discussed. The course discusses the 5 processes that must be done for project success: Define, Organize, Execute, Control and Close. The strategic implications of projects will be considered with respect to the organizational vision. This course follows the Project Management Body of Knowledge (PMBOK) of the Project Management Institute (PMI) and prepares for the examinations for the Certified Associate in Project Management (CAPM) or the Project Management Professional (PMP) certifications. The course focuses on the concepts and tools of the different project management elements. It first sets the project management framework and describes the different steps in the project management process. Next, all the key management aspects of a project are addressed: integration, scope, time, cost, quality, human resources, communications, risk, procurement and stakeholder.

MGT 576 Organizational Theory (3)

Prerequisites: None

Organizational Behavior is the study of individual behavior and group dynamics in organizational settings. It focuses on timeless topics such as motivation, leadership and teamwork and more contemporary topics such as organizational citizenship behavior and transformational leadership.

Few, if any of the dramatic challenges facing today's organizations can be handled effectively without a good understanding of human behavior as it is presented in organizational settings. One simplistic way of looking at this course is to view the organization from an internal level with the observation and interpretation of its members' behavior at an individual and group level, and then to look at organizations on an external level, as it interacts with the outer environment.

The objectives of this course rest on the assumption that learning involves not only acquiring knowledge, but also developing skills. Thus, the class lectures, discussions, exercises, articles and cases present the opportunity for the student to acquire the concepts, ideas and theories that are important to any study of organizational behavior and to apply this knowledge to practical issues that enhance the explanation of human behavior at work.

We will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior and relationships.

MGT 577 PROJECT RISK MANAGEMENT (3)

Prerequisites: None

After a brief overview of the project management framework and processes, this course explains how risk management is integrated into the different knowledge areas of a project. The course then addresses the six elements of risk management: risk management planning, risk identification, qualitative risk analysis, quantitative risk analysis, risk response planning, and risk monitoring and control. In this context, the course explores the project management

techniques and approaches to identify, and analyze the full range of project risks for successful project risk management outcomes. The various concepts and tools are illustrated by examples and case studies. This course will also emphasize the communication requirements that successful project managers use to manage risk and uncertainty.

MGT 578 BUSINESS COMMUNICATIONS (3)

Prerequisites: None

Communication is an essential component in every career and life task. This class is intended to provide background and guidelines on what is good communication in a business setting. Activities will be punctuated by theories, attitudes and behaviors of researchers, educators, or business leaders regarding essential communications and leadership practices. There will be frequent opportunities to interact, write on concepts, and present original contributions through the class community environment. It will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior and relationships.

MGT 579 BUSINESS ETHICS (3)

Prerequisites: None

This course introduces ethical decision-making in business environment. It examines the individual, organizational, and macro level issues. The course does not attempt to determine correct ethical action. In the complex business environment in which managers confront ethical decision-making there is no absolute right or wrong answer in most cases. Since there is no general agreement on the correct ethical business norms, critical thinking and relevant decision making are examined. It will also discuss Dual Motive Theory in terms of Ego/Empathy and ethical/unethical behavior to understand how brain functions can impact

human behavior and relationships.

MGT 580 BUSINESS LAW (3)

Prerequisites: None

Business law reviews issues with the legal problems confronting businesses such as court procedures, contracts and property law. Other topics include court systems, litigation, and alternative dispute resolution; constitutional and administrative law; tort law and, product liability; contract law and, agency law; business organizations; and government regulation of businesses including antitrust law, employment law, and securities regulation.

MGT 581 MANAGING EMOTIONS, MANAGING SELF AND OTHERS (3)

Prerequisites: None

This course will describe the aspects of Emotional Intelligence and managing yourself and others, starting with self-awareness, empathy, and regulating emotions for self and others to sustain healthy and authentic relationships. Other aspects include positive and negative emotional contagion, EI's effect on morale, leading and professionalism. It will include a review of Dual Motive Theory, understanding how brain functioning of ego and empathy can impact behavior and relationships. Finally, the class will study evaluations of cognitive, emotional and social competencies and scholarly research showing how humans flourish.

MGT 582 TEAM AND GROUP DYNAMICS (3)

Prerequisites: None

Team and Group Dynamics are an essential component in every career and life task. In this course, students will learn and apply the skills required for effective teamwork that applies in

many industries. Our activities will be punctuated by theories, attitudes and behaviors of researchers, educators or business leaders regarding essential teams and group dynamics. There will be frequent opportunities to interact, write on concepts, and present original contributions through the class community environment.

We will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior and relationships.

MGT 583 GLOBAL ENTREPRENEURSHIP AND INNOVATION (3)

Prerequisites: None

This course focuses on methods and know-how of effectively managing innovation and entrepreneurship. Throughout the semester the theory and practice of managing innovation in small and large companies will be discussed. Topics such as strategies, business models, risks, fund raising techniques are explained. The course emphasizes learning and practical issues through readings, case analyses, written assignments and in-class discussion. The case studies will include companies from around the world that have been successful in innovating repeatedly and those who were not able to re-invent and hence failed. The assignment will combine both strategy and implementation of innovation and entrepreneurship so students can critically evaluate approaches to managing innovation and entrepreneurship and provide practical help in this context.

MGT 584 SUPPLY CHAIN MANAGEMENT (3)

Prerequisites: None

The business world today is becoming increasingly global and complex. The overall success of an organization relies more and more on the efficiency and effectiveness of its supply chain. Having a superior product means nothing unless it is delivered to customers on time and in perfect condition. With the strategic combination of people, tools, processes and technologies, effective supply chain management can boost customer service, improve bottom line and enable an organization to successfully compete in the global marketplace.

Formerly known as, MKT 584 "Supply Chain Management" August 2015 - July 2016.

MGT 593 INTRAPRENEURSHIP – INNOVATION FROM WITHIN (3)

Prerequisites: None

This course speaks directly to the needs of an organization seeking to create an innovative business opportunity within the existing structure of the organization. The methods from this class are widely used by the most successful innovators in start-ups as well as established companies. This class will present the differences between entrepreneurship and intrapreneurship. Innovation and creativity are key components of intrapreneurship.

MGT 608 BUSINESS STATISTICS (3)

Prerequisites: Calculus, Algebra II, or equivalent

Recommended: Previous knowledge of Calculus, Algebra II, or equivalent

With many unfamiliar concepts and complex formulas, business statistics can be confusing and demotivating experience for students that do not have a strong mathematics background. They can have trouble recognizing the importance of studying statistics and making connections between business problems and the statistical tool that can be used to solve them. This seventh edition of Business Statistics: For Contemporary Decision Making has been designed to provide students with better explanations and examples thus providing a smoother path to understanding and the

ability to choose the correct techniques to apply for a given problem.

MGT 609 THE BUSINESS OF COACHING (3)

Prerequisites: MGT 561, or equivalent

This course will survey the broad field of corporate and private coaching. Coach training programs, certifications, and networking organizations will be reviewed. Students will learn what is required to start a coaching business and have the opportunity to speak to coaching professionals in a variety of coaching fields. The final project for the students will be to write a business plan for the coaching business of their choice.

MGT 611 LEAN SIX SIGMA (3)

Prerequisites: Previous knowledge of Calculus, Algebra II, or equivalent

Six Sigma is a proven methodology for solving problems in many areas of business, science, and industry. It is essentially a structured approach to the scientific method of problem solving based on the DMAIC acronym (Define, Measure, Analyze, Improve, and Control). The methodology helps in design, development, monitoring, and evaluation of processes, products, or services. The Six Sigma methodology incorporates business process, statistical, quality, and project management principles and practices with a goal of creating a systematic and data-driven decision making environment. Many successful companies utilize the principles of Six Sigma to meet growing customer expectations and to deliver better products and services in today's competitive marketplace. This course covers an overview of the Six Sigma principles, process, and implementation, and provides required information for taking Six Sigma Green Belt or Black Belt certification examination.

MGT 612 ADVANCED PROJECT MANAGEMENT (3)

Prerequisites: MGT 575, or equivalent

This course offers a study of the human and the operational sides of project management. The human side includes discussion on negotiating and conflict management, leveraging diversity, and selling project management. The operational side includes scope control techniques, risk management, and organizing for success. The students will learn how to effectively engage the project team, deal with the inevitable conflicts, and use intellectual and cultural diversity to encourage creative problem solving.

MGT 690 PITCHING A BUSINESS PLAN TO VENTURE CAPITALISTS (3) – CAPSTONE PROJECT

Prerequisites: MGT 503; Completion of 27 credit hours in the program

In today's extremely competitive world of raising money for startup companies, it is absolutely critical to have an effective and well-conceived pitch deck that compliments the project's vision and strategy. Only 1 of every 200 business plans submitted to venture capitalists (VCs) gets funded, so it is vital to present a well thought-out presentation that includes all of the elements that VCs (or any type of potential investor) will be looking for in deciding whether to invest in your company or not. Whether the student is interested in starting their own company someday, wants to work for a startup, or just wants to learn more about venture capital, Silicon Valley and startups in general, this will be a great opportunity to discover how startup companies have successfully raised money.

All new students are required to take Outbound exam with Peregrine Academic Services. The Outbound exam is required to be taken in the capstone course, either MBN 697

Master Thesis or MGT 690 Pitching a Business Plan to Venture Capitalists. Taking the Outbound exam will have a fee which is currently $34. The Outbound exam is REQUIRED not OPTIONAL. Information on how to take the exams will be included in the course syllabus. Any new student who does not take the Outbound exam, will not be eligible for graduation. Current students are encouraged to take the exam.

MIS (MANAGEMENT INFORMATION SYSTEM)

MIS 527 TECHNOLOGY AND OPERATIONS MANAGEMENT: CREATING VALUE (3)

Prerequisites: None

The course explains the design, management, and development of technology and operating systems. It explores diverse quantitative problems that occur often in the business environments. It discusses how such problems can be properly solved with a join business insight and technology tools. Topics such as capacity management, service operations, organized decision making, limited optimization and simulation are included. This course teaches the model of complex business situations and the tools to enhance business performance. This course offers an outline of the field of operations technology. A managerial perception is assumed and highlight is placed on the understanding of how technologies for manufacturing, distribution, and service developments are used for competitive advantage.

MIS 537 MANAGEMENT INFORMATION SYSTEMS (3)

Prerequisites: None

This course explains the concept of managing information systems as a part of a broader socio-technical system and their impacts on people and processes in the business environment. Critical thinking is an important and essential part for the understanding of important issues associated with the management aspects of information systems. The course focuses on how the organization has used and can use its information resources to best serve its needs.

MIS 538 BUSINESS DATABASE APPLICATIONS (3)

Prerequisites: None

This course provides a basic overview of the concepts, principles, skills and techniques of business database systems and of database application system development. The course provides an approach to the design and use of databases for business applications. The study focuses on query languages and application generation. Use of database software applications are a necessity in current business environments.

MIS 539 BUSINESS TELECOMMUNICATIONS (3)

Prerequisites: None

This course offers an overview of communications technology used in many business applications - local area network, wide area network, broadband network, wireless, and voice network. The course helps the students understand the role of internet protocols. In addition, it provides training to analyze network requirements, design, and implement local area networks.

MIS 540 INFORMATION RESOURCE MANAGEMENT (3)

Prerequisites: None

This course explains the concept of viewing information systems resources from a strategic resource standpoint. The course will provide pragmatic tools for implementing the IRM within the organization. Topics will include Information System outsourcing, total cost of ownership, Information System planning and strategic analysis, management of IT human

resources, traditional project management theory, and project management techniques. It will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact behavior and relationships.

MIS 541 MANAGING GLOBAL INFORMATION SYSTEMS PROJECTS (3)

Prerequisites: None

This course helps the students learn how to plan and manage global information systems projects by focusing on initiating, planning, executing, controlling and closing projects. Topics such as integration, scope, timing, cost, quality, human resource, technology, communications, risk, and procurement are discussed. The students will learn how to monitor project plans and communicate reports to clients. The course will have a team project that will require students to conduct literature review or survey of current practices in the industry.

MIS 542 INFORMATION SYSTEMS INNOVATION (3)

Prerequisites: None

This course provides the tools and the skills to leverage emerging information technologies in order to create new business opportunities for both new entrepreneurial ventures and traditional firms. The course helps the students to understand, evaluate, and apply difficult topics such as new innovative and entrepreneurial information technologies.

MIS 543 HUMAN-COMPUTER INTERACTION (3)

Prerequisites: None

This course focuses on key factors in Human-Computer interaction. Topics include design elements, test procedures, experimental tools, and human-computer environments contributing to the development of successful user interfaces are discussed. Additionally,

research topics will be explored in the areas of design principles, methodologies, implementation, and evaluation of user interfaces.

MIS 544 BUSINESS DECISION SUPPORT SYSTEMS (3)

Prerequisites: None

Focus of this course is to study decision making process in business environment. Managerial role in decision making and steps involved in the process will be discussed. Theoretical modeling of decision making and practical applications will be explored using Microsoft Excel and/or other software packages. Part of the course, decision support models such as break-even analysis, goal seeking, linear programming, decision tree analysis, statistical modeling, etc. will be used in defining decision support systems to address various business scenarios.

MIS 545 DATA MINING AND BUSINESS INTELLIGENCE (3)

Prerequisites: None

This course teaches the students business potential of big data and analytics, data warehousing, how to develop and retain data warehouses, and how to use this data for business benefit and as a source for business intelligence. Business intelligence is the use of logical software devices to study big data about an organization and its competitors in business planning and decision-making. In developing data warehouses, the course will teach the students the inter-relationships among operation, decision support structures, plan and the removal and cleaning process used to create a high quality data warehouse. Data mining theories and the use of data mining devices and techniques for decision-making and for creating business intelligence are discussed.

MIS 546 DATA SCIENCE FOR BUSINESS (3)

Prerequisites: None

Data Science for Business introduces the fundamental principles of data science, and walks the student through the "data-analytic thinking" necessary for extracting useful knowledge and business value from the data they collect. The course provides examples of real-world business problems so the student will not only learn how to improve communication between business stakeholders and data scientists, but also learn how to intelligently participate in and manage their company's data science projects. This course will help the student discover how to think data-analytically and fully appreciate how data science methods can support business decision-making.

MIS 547 SOFTWARE DEVELOPMENT PROCESS MANAGEMENT (3)

Prerequisites: None

This course helps the students to understand the software development process at both the project and organization levels. In addition, it provides the students with the tools to analyze software cost and schedule transaction issues, and teaches them how to apply the principles and techniques to practical situations. Topics include statistical decision theory, and software risk management.

MIS 548 KNOWLEDGE MANAGEMENT (3)

Prerequisites: None

Knowledge management (KM) is considered a competitive resource in organizations that promotes innovation, improves efficiency and effectiveness, and provides a sustainable competitive advantage in today's global environment. This course acquaints the student with organizational and managerial issues and examines Knowledge Management process and systems for supporting KM. Principles of developing systems for KM are explored.

System architectures, tools and techniques, and their use in capturing, storing, locating, evaluating, disseminating, and using information and knowledge will be discussed. Application of these principles and techniques through the use of information/communication technologies is studied in the context of their impact on organization.

MKT (MARKETING)

MKT 551 COMPETITIVE MARKETING STRATEGIES (3)

Prerequisites: None

This course presents ways of finding new marketing opportunities, and enhancing marketing performance. Competitive marketing strategy describes how firms identify opportunities to create customer value and communicate this value efficiently. The key issue is to understand the drivers of greater customer and creating competitive advantage in the marketplace. The course explains the efficiency of strategic marketing decisions. The course offers strategy development by discussing important analysis of various cases from consumer, supplier, and technological markets; production and service businesses for-profit and non-profit sectors. Students will learn how to build a marketing plan.

MKT 582 MARKETING MANAGEMENT (3)

Prerequisites: None

This course presents an approach to understand and manage the marketing function. The students will learn how to develop a written marketing plan to determine and integrate elements of a marketing strategy. Topics include market segmentation, positioning and research; product decisions; pricing; channels of distribution; advertising; promotion; new product development; and

marketing budgets. The course will introduce the role of marketing in the U.S. economy and the interaction of marketing with specific business functions and with society.

MKT 583 ENTREPRENEURIAL MARKETING (3)

Prerequisites: None

This course provides entrepreneurs with an understanding of marketing for new and small enterprises. It addresses marketing strategies. The Students will apply marketing concepts, such as creating and nurturing relationships with new customers, suppliers, distributors, employees and investors. This course brings together theory and practice to develop a comprehensive entrepreneurial business marketing plan.

MKT 585 INTERNATIONAL MARKETING (3)

Prerequisites: None

The course presents to the students the major factors of the international marketing decisions. The student will learn about the forces that influence the global marketing environment. The course introduces students to principles, policies, procedures, ethics, and techniques used in efficient and effective international market. International product, price, promotion, and distribution issues are discussed.

MKT 586 MARKETING RESEARCH (3)

Prerequisites: None

The broad objective of the course is to provide a fundamental understanding of marketing research methods employed by well-managed firms. The course is aimed at the manager who is the ultimate user of the research and thus is responsible for determining the scope and direction of research conducted. In the course, we will cover the types of research design, techniques of data collection and data analysis.

Emphasis will be on the interpretation and use of results rather than on the mathematical derivations. The course focuses on helping managers recognize the role of systematic information gathering and analysis in making marketing decisions, and develop an appreciation for the potential contributions and limitations of marketing research data. This course examines the role of marketing research within the overall marketing program and within the company or organization seeking research information. It describes the research process and identifies the most common and potent research methods and techniques while providing an opportunity to learn by applying them to a class field project.

MKT 588 CONSUMER BEHAVIOR (3)

Prerequisites: None

This course focuses on how to assess customer behavior and interprets this knowledge into marketing strategies. Topics include customer satisfaction and dissatisfaction, and the role of quality, TQM, and cycle time. In addition, the course introduces concepts such as, motivation, perception, knowledge, attitude, and culture on customer decision-making. The course is designed for students interested in consumer, service, high-tech, or not-for-profit marketing. This course evaluates consumer or customer behavior in the marketplace. This course will help future and current consumer oriented professionals, service oriented performers in the high technology or non-profit sectors. The course will also discuss Dual Motive Theory in terms of Ego/Empathy and ethical/unethical behavior to understand how brain functions can impact human behavior and relationships.

MKT 589 E-COMMERCE (3)

Prerequisites: None

This course provides introduction to e-

Commerce and related subjects. The course will cover e-Commerce infrastructure and its related technologies. Various business models used in e-commerce will be discussed in the lecture. The student will have knowledge of e-commerce when s/he finishes this course.

MKT 590 MARKETING WITH SOCIAL MEDIA (3)

Prerequisites: None

In this course, students will gain the knowledge and skills to effectively use social media to market their business. The Social Media Marketing course will teach students the basics of content creation and management for social media including blogs, podcasts, and posts. Students will be introduced to the most popular platforms such as Facebook, Twitter, YouTube, LinkedIn, and Pinterest. Students will learn which platforms are the best fits for their company and metrics for measuring social media marketing success. This course will also address the legalities of social media, search-engine optimization, and crowd sourcing.

MKT 591 ADVERTISING STRATEGY (3)

Prerequisites: None

This course will teach the students the new world of Marketing Communication, and the importance of advertising and e-advertising. Topics include analyzing advertising campaigns, advertisements in a structured way, brand equity through advertising strategy, advertising effectiveness and creativity, and end-to-end advertising strategy campaign.

MKT 592 SUPPLIER/SELLER MANAGEMENT (3)

Prerequisites: None

This course will explain all aspects of outsourcing, including planning, finding the right vendor, and negotiating effectively. Topics include relationship building, creating a culture of cooperation, and skills in dealing with vendors. The course will teach the buying and selling processes that corporations use in business-to-business transactions. The focus of the course is on the concept of selling, improving value, and meeting the needs of clients through effective questioning, analysis, sales planning and presentations. The students will learn the major phases of the sales process, the sales objectives for each phase, the client needs, and the solutions' presentation. It will also discuss Dual Motive Theory in terms of Ego/Empathy and self/other behavior to understand how brain functions can impact human behavior and relationships.

MKT 613 ADVANCED MARKETING (3)

Prerequisites: MKT 582, or equivalent

The course will explain the importance of marketing, which include market research, competitor analysis and the consumer analysis. The student will explore the marketing process, and concept. In addition, the course will provide a study of the relationship between the marketing mix, and the changing business environment.

FACULTY

Amal Mougharbel, PhD, Université de Corse Pascal Paoli, Business Management,

Department Chair

CORE FACULTY

- **Ramesh Konda**, PhD, Nova Southeastern University, Computer Information, Core Faculty and Assistant Chair
- **Ghofraniha, Jahan**, PhD, University of British Columbia, Electrical Engineering
- **Hussein, Magdy**, PhD, Capella University, Organization and

Management
- **Wiggin, Patty**, MBA, DBA Candidate, International Technological University

ADJUNCT FACULTY

- Abdeljabbar, Wael, Ed.D. Fielding Graduate University
- Allen, Karen Haley, MBA, University of San Francisco, Human Resources and Organization Development
- Amistad, Felino Anthony, JD, California Southern University, Law
- Arnoldussen, Barbara, DBA candidate, International Technological University, RN, PHN, San Jose State University, Nursing, Project/Program Management
- Brooks, Duane, EdD Candidate, University of Nebraska, Educational Leadership
- Flaig, John, PhD, California Southern University, Engineering and Technology Management
- Flores, Jimmie, PhD, PMP, RMP, CAPM, SSBB, SPHR, GPHR, Security+, ITIL,
- University of Phoenix, Information Systems and Technology, PhD, Fielding Graduate University, Human and Organizational Development
- Gopal, Venkatesh, PhD, Anna University, BioTechnology
- Guim, George, EdD, University of San Francisco, Economics and Organization & Leadership
- Halawi, Leila, DBA, Nova Southeastern University, Information Technology
- Management
- Hyatt, Stephen, PhD, University of Windsor, Windsor, Engineering and Quality
- Mengina, Prasad V., MS, Engineering, University Of New Orleans, SAP
- Omran, Carmelita, DBA candidate, Walden University, Finance and

Management
- Paterson, Soly, MBA, San Jose State University, Engineering and Quality
- Rahimian, Esmail, PhD, California Coast University, Management
- Tehrani, Nik, PhD, Northcentral University, E-Commerce

DEPARTMENT OF COMPUTER SCIENCE

MISSION
The Department of Computer Science strives to prepare its graduates for successful careers as computer scientists or software engineers in all fields of society that experience computerization in any form and in the software industry.

INSTITUTIONAL LEARNING OUTCOMES
ILO #1: Problem Solving

ILO #2: Critical Thinking

ILO #3: Communication literacy

ILO #4: Collaboration and Teamwork

ILO #5: Technical literacy

ILO #6: Research skills and Information literacy

ILO #7: Individual Responsibility

MASTER OF SCIENCE IN SOFTWARE ENGINEERING
Software Engineering is an established discipline that comprises requirement analysis, design, construction, testing, as well as the economics, and management issues of the creation and maintenance of software. A Software Engineer has the special knowledge and skills necessary to develop and maintain large, complex software systems. A Software

Engineer approaches all of these problems in a pragmatic and organized way and is concerned with the theoretical and practical aspects of technology, cost, and social impact of effective and efficient software.

Degree programs in software engineering have many courses in common with computer science. However, when it comes to techniques concerned with the reliability of software and with developing and maintaining software that is correct from the start of its development, the engineering knowledge and experience provided in SE programs go beyond what general CS programs provide. It is considered a necessity by many professionals and educators in the SE field that students of SE should participate in the development of software to be used in earnest by others.

ITU's curriculum for a MSSE is concerned with the technical and management issues of SE, but primary emphasis is placed on the technical aspects of building and modifying high quality software systems. It thus allows the students to prepare for careers in businesses that build and sell computers and/or software, in Internet based companies, electronic business organizations, diverse research and development laboratories, aerospace companies, banks, and insurance companies. The development of this graduate curriculum has taken the recommendations of the Joint Task Force on Computing Curricula of the IEEE Computer Society and the Association for Computing Machinery of August 2004 into consideration.

PROGRAM LEARNING OUTCOMES (PLOS)

Upon completion of this program, graduates will:

PLO #1: Be able to identify and apply current and emerging software engineering technologies required for the creation of reliable, predictable, well-engineered software systems. (Mapped to ILO #1, ILO #2)

PLO #2: Be able to utilize multiple programming paradigms, including object-oriented, functional, logic, and emerging programming technologies. (Mapped to ILO #1, ILO #2)

PLO #3: Show understanding of SE principles and practices as described in the SWEBOK, and other emerging software development processes. (Mapped to ILO #5, ILO #6)

PLO #4: Have sufficient skills in human factors to be able to interact with stakeholders from multiple disciplines on the systems engineering level. (Mapped to ILO #3, ILO #7)

PLO #5: Have working skills in SE management including team building, leadership, project planning, selection of tools and processes appropriate to a project. (Mapped to ILO #1, ILO #4)

CAREER OPPORTTUNITIES

Jobs within software engineering include, but are not limited to: Software Development Engineering, Software Applications Engineering – analysis, design, construction, testing, as well as the economics, and management issues of the creation and maintenance of software. A Software Engineer has the special knowledge and skills necessary to develop and maintain large, complex software systems.

PROGRAM REQUIREMENTS

Required Courses:

4 Core Courses: 12 credit hours

1 Capstone Course: Project or Thesis: 3 credit hours

1 Internship: 1 credit hour

Elective Courses: 11-20 credit hours

Internship: 1-9 credit hours

Cross Disciplinary Course: Up to 3 credit hours

(counts as Elective)

Transfer Credits: Up to 9 credit hours (counts as Elective)

36 Total credit hours

Required Core Courses

SWE 500 Software Engineering

SWE 600 Advanced Software Engineering

SWE 602 Software Requirements Elicitation

SWE 680 Software Architecture

Capstone courses

SWE 690 Capstone Project

OR

SWE 695 Master's Thesis

COMPUTER SCIENCE CONCENTRATION

Computer Science is the science of computation using a programmable computing machine, of developing the programs for the computation, developing algorithms for solving computational problems, of acquiring, storing, managing data and information needed in those computations, and of estimating or predicting the feasibility and time constraints of arriving at solutions.

Graduate programs in computer science (CS) differ from undergraduate programs not so much in the topics they cover but in the depth in which the topics are covered. The student has to master deep knowledge of algorithms, operating systems, compilers, internals of databases, visual and sound recognition, robotics, and - in general – has to acquire sufficiently well-founded theoretical knowledge to contribute to computerization in fields not yet known.

The Computer Science concentration is concerned with the theoretical as well as the practical issues of CS. The theoretical basis must be mastered because CS has a strong relation to mathematical and algorithmic thinking. An essential portion of a computer scientist's work consists of understanding and researching algorithms, as well as developing new ones.

This curriculum prepares the graduates for successful careers in the demanding and ever-growing job market in all fields of society that experience computerization in any form, be it web page design, IT security, software development in medicine, education, business administration, robotics, Internet of Things, and more. A solid knowledge of the computer science principles underlying all computerization and program development, augmented by training in leading edge practical skills will enable graduates to play leadership roles in industry as well as to pursue PhD degrees. The development of this graduate curriculum has taken the recommendations of the Joint Task Force on Computing Curricula of the IEEE Computer Society and the Association for Computing Machinery of August 2004 into consideration.

EMPHASIS LEARNING OUTCOMES (ELOS)

Upon completion of this program, graduates will be able to:

ELO #1: Lead and organize Information Technology (IT) implementations at companies and institutions. (Mapped to ILO #1, ILO #3, ILO #4, ILO #5, ILO #7)

ELO #2: Invent and improve algorithms for storing, accessing, processing, and analyzing collected data. (Mapped to ILO #1, ILO #2, ILO #5, ILO #6)

ELO #3: Invent real time computation methods for analysis and processing of data in robotics (optical, sound, and other real time data from digital sensors). (Mapped to ILO #1, ILO #2, ILO #5, ILO #6)

ELO #4: Create innovative and useful features to modern operating systems (multiprocessor, multiprocessing, distributed). (Mapped to ILO #2, ILO #3, ILO #4, ILO #6)

ELO #5: Contribute to research and

development of algorithms in all areas that are now and in the future subject to computerization. (Mapped to ILO #1, ILO #2, ILO #3, ILO #4, ILO #5, ILO #6, ILO #7)

ELO #6: Clearly explain Computer Science concepts in research, development, and educational institutions. (Mapped to ILO #2, ILO #3, ILO #5, ILO #6)

ELO #7: Show proficiency and skills in the most important areas of state of the art computer science. (Mapped to ILO #1, ILO #3, ILO #5)

CAREER OPPORTUNITIES

Computer scientists often work in organizations that develop new technologies and algorithms. Examples include: pattern recognition and signal processing for self-driving cars, artificial intelligence, and data mining. The development of new algorithms often requires a deep understanding of mathematics including knowledge in certain areas of abstract algebra for developing new encryption technologies or counteracting attempts at breaking them. They often work doing research in computer science, as well as working as information technology consultants in banking, insurance companies, and higher education.

COMPUTER SCIENCE CONCENTRATION REQUIREMENTS

In addition to all required MSSE courses, the following courses are required:

CSC 501 Discrete Structures
CSC 680 Advanced Computer Algorithms

The Computer Science concentration capstone can replace the Software Engineering capstone.
4CSC 690 Capstone Project
OR
4CSC 695 Master's Thesis

INFORMATION AND CYBERSECURITY CONCENTRATION

Hardly a day goes by when we don't hear about hacking of bank records or data bases, penetration into sensitive government and business information and the damage this causes to our economy and security.

The Information and Cybersecurity concentration offers a holistic education in a variety of security technologies that goes beyond what the thousands of training courses in cyber security offer in order to combat this development, such as network security, risk and data management, preventative measures, computer ethics, digital signatures, and cryptography. The curriculum gives students the technical knowledge to take on a diverse set of industry-specific challenges.

Once students graduate from this concentration, they will be thoroughly educated cyber security professionals with practical skills and in high demand. They will understand the core problems behind cyber security and will develop solutions from the ground up.

EMPHASIS LEARNING OUTCOMES (ELOS)

Upon completion of this program, graduates will:

ELO #1Secure organizations' on-premise and cloud-based computing resources. (mapped to ILO #1, ILO #2, ILO#5, ILO#6)

ELO #2: Demonstrate in depth knowledge of IS techniques to provide leadership for effective solutions to security problems. (mapped to ILO #1, ILO #3, ILO #4, ILO #7)

ELO #3: Have sound knowledge of IS techniques that play a role in organizational processes and decision-making. (mapped to ILO #2, ILO #4, ILO #5, ILO #7)

ELO #4: Communicate effectively risk management issues and their impacts to a

variety of audiences. (mapped to ILO #1, ILO #3, ILO #5, ILO #6)

ELO #5: Understand the legal and appreciate the ethical importance of ICS for individuals as well as organizations. (mapped to ILO #3, ILO #6, ILO #7)

ELO #6: Business enabler in organizations such as finance, insurance, healthcare, e-commerce, and mail services. (mapped to ILO #1, ILO #2, ILO #4, ILO #7)

ELO #7: Work as security expert in federal agencies for whom cyber security is of highest importance such as DOD, DHS, and FBI. (mapped to ILO #1, ILO #5, ILO #6, ILO #7)

CAREER OPPORTUNITIES

Information Technology (IT) Security Analyst, IT Security Operations, Information Security Analyst, Information Security Engineer, Network Security Analyst, SSA IT Specialist, Cyber Security Analyst, Cyber Security Advisor, Cyber Security Researcher, Cyber Security Data Analyst, Information System Security Officer (ISSO), and more.

INFORMATION AND CYBERSECURITY CONCENTRATION REQUIREMENTS

In addition to all required MSSE courses, the following courses are required:

ICS 501 Introduction to Cyber Security

ICS 601 Advanced Cyber Security

The Information and Cybersecurity concentration capstone can replace the Software Engineering capstone.

ICS 690 Capstone Project
OR
ICS 695 Master's Thesis

ELECTIVE COURSES

Electives from the MSSE curriculum must be chosen so that the total number of credit hours in the MSSE program is at least 36.

AMS 510 Linear Algebra

AMS 512 Applied Mathematics Methods

AMS 520 Optimization Techniques

AMS 530 Numerical Analysis

AMS 540 Discrete Mathematics

AMS 552 Probability, Statistics, and Reliability for Engineers

AMS 722 Advanced Applied Mathematics Methods

CSC 501 Discrete Structures

CSC 502 Principles of OS & Distributed Systems

CSC 505 The UNIX/Linux OS

CSC 509 C Programming

CSC 511 OO Programming with C++

CSC 512 Data Structures

CSC 515 iPhone Application Development

CSC 518 OO Programming with Java

CSC 519 Android Phone Application Development

CSC 520 Python Programming

CSC 522 R Language Programming

CSC 525 HTML/CSS Programming

CSC 527 Mobile Web Programming

CSC 530 JavaScript Programming

CSC 532 Client Programming with JS/jQuery

CSC 535 Server Programming With PHP

CSC 545 Programming In GO

CSC 550 Big Data

CSC 555 Bio Informatics

CSC 560 Introduction to Data Science

CSC 570 Web Security Fundamentals

CSC 575 Topics in Computer Science

CSC 580 Computer Algorithms

CSC 620 Programming Language Theory

CSC 625 Advanced HTML5

CSC 631 Data Mining

CSC 633 Machine Learning

CSC 650 Big Data Analytics (CPO-SAS/SPSS)

CSC 660 Advanced Data Science

CSC 670 Network & Data Security

CSC 680 Advanced Computer Algorithms

CSC 688 Special Topics (1 to 3 credit hours)

CSC 689 Independent Study (1 to 3 credit hours)

CSC 720 Formal Methods

CSC 730 Cryptography & Cryptanalysis

CSC 750 Coding Theory

ICS 502 Cyber Attack Countermeasures

ICS 520 Personal Computer Security

ICS 525 Principles of Ethical Hacking

ICS 550 Security Policies

ICS 601 Advanced Cyber Security

ICS 620 Computer Malware

ICS 630 Digital Forensics Technology

ICS 680 Theory of Cryptographic Systems

ICS 688 Special Topics (1 to 3 credit hours)

ICS 689 Independent Study (1 to 3 credit hours)

SWE 518 User Interface Design & Implementation

SWE 520 Principles of Ethical Hacking

SWE 525 Version Control Tools/GIT

SWE 530 Cloud Computing Security

SWE 535 Cloud and Virtualization Security (CPO)

SWE 540 SQA/Manual Testing

SWE 542 SQA/manual/auto/perf Testing

SWE 544 SQA/Software Testing Tools

SWE 546 SQA/Performance Testing

SWE 550 Software Project Management (CPO-ACP)

SWE 560 Principles of Database Systems

SWE 561 Cloud Computing

SWE 562 Oracle Database

Management/Administration

SWE 570 Internet of Things Architecture and Security

SWE 610 Ruby on Rails

SWE 615 Angular JS

SWE 620 Scala Programming

SWE 632 Software Risk Management

SWE 633 Software Refactoring

SWE 640 Artificial Intelligence

SWE 688 Special Topics (1 to 3 credit hours)

SWE 689 Independent Study (1 to 3 credit hours)

INTERNSHIP

CFL 591 Integrating Academic & Internship Learning (2 Credit hours)

INT 593 Internship (1-3 credit hours)

COURSE DESCRIPTIONS

CSC 501 DISCRETE STRUCTURES (3)

Prerequisites: None

This course is about discrete structures and forms an introduction to the theoretical side of computer science. Discrete structures and discrete mathematics turn out to be the "calculus'' of computer science--these are the structures that students will use to model real-world problems, to build algorithms upon, and to program with (both for modeling problems as well as use in data-structures and algorithms).

In this course students will learn about various discrete structures (numbers, sets, relations, functions, trees, graphs), how to talk about them (propositional and predicate logic), how to prove things about them (using contradiction, construction, induction, combinatorics), and how to read and write literate formal mathematics. Students will also get a quick introduction to key applications to algorithmic analysis (like asymptotic worst-case running time analysis for algorithms).

This "calculus of computer science'' will serve students as a foundation for computational thinking.

CSC 502 PRINCIPLES OF OS & DISTRIBUTED SYSTEMS (3)

Prerequisites: None

The course begins with basic principles of a monolithic OS, as exemplified by Linux, MacOS, and Windows, then advances to more sophisticated details of processes, preemptive multiprocessing, lightweight processes, and interrupts various types of interprocess communications, demons, file systems, signals, and paging, which are present on each independent node of the network. Then it advances to the specific software subsets on each node of the aggregate operating system composed of the multitude of nodes. Then it advances to the higher level of the global system management components given for each node that coordinate the nodes' activities to form a collaboration. Coordination of the cooperation of an individual node's kernel OS and management component by the management system. In a properly functioning integration the whole distributed system should exhibit transparency which means that it appears to the user as one single OS entity.

CSC 505 THE UNIX/LINUX OS (3)

Prerequisites: Recommended knowledge of C

Linus is a Unix like operating system that has been ported to more hardware platforms than any other OS. It is the leading OS on servers, big computers including supercomputers, embedded systems, and mobile devices such as android. This course focuses on the practical usage of the basic Linux operating system features. It introduces the student to the general principles of modern operating systems: preemptive multiprocessing; and of Linux in particular: shells, environment, shell variables, processes, threads, interprocess communication, the Unix file system, and shell scripts. Upon completion of this course the student will be able to work efficiently in a Linux or Unix environment, to tailor an environment to specific needs, to understand the basics of Linux system administration, to understand security risks, to write C programs that use system calls, and to write scripts for the C shell.

CSC 509 C PROGRAMMING (3)

Prerequisites: None

The course is an introduction to the C language as per the chapters of the book by Kernighan & Ritchie. The key topics covered will be C basics including Control Flow, Functions, Pointers, Structures, Memory Allocation/DE Allocation, Input/output (command line & files). The course will be very hands-on and students will be expected to test code from C books (list will be given in class), and thus understand the concepts.

CSC 511 OO PROGRAMMING WITH C++ (3)

Prerequisites: None

Recommended: Knowledge of C

This class teaches Objected Oriented Programming using C++. Prior exposure to C is helpful but not required as the basic concept of C programming will be reviewed. The topics covered include: Syntax of C++, classes and objects, encapsulation, inheritance, polymorphism, design for reuse, programming with objects, the standard template library, namespaces, exceptions, type casting, and file input/output.

CSC 512 DATA STRUCTURES (3)

Prerequisites: None

Recommended: Knowledge of C++ or Java

This course discusses the definition, design, and implementation of abstract data structures, including arrays, stacks, queues,

heaps, and linked structures. Other data structures include hash tables, trees, and graphs. Students will also learn algorithms for manipulating theses structures, searching, and sorting, and the simpler graph algorithms. An introduction to the analysis of some sorting and searching algorithms is also covered.

CSC 515 IPHONE APPLICATION DEVELOPMENT (3)

Prerequisites: None

This course provides a training in iPhone application development including: Introduction to Objective-C; iPhone technologies: multi-touch interface, accelerometer, GPS, maps, proximity sensor, dialer, address book and calendar. It helps students to understand the business aspects of an application development.

CSC 518 OO PROGRAMMING WITH JAVA (3)

Prerequisites: None

This course focuses on the Java language as a tool for object-oriented programming. It introduces the student to the basic features of the Java language: primitive data types, terminal window-keyboard I/O, file I/O, classes, constructors and initialization, references vs. objects, access modifiers, memory maps, control structures, arrays, inheritance, function overloading and overriding, dynamic binding, interfaces, command line arguments, and exception handling. Some instruction to the platform-independent Java GUI API with Swing will be provided.

CSC 519 ANDROID PHONE APPLICATION DEVELOPMENT (3)

Prerequisites: CSC 518

This course teaches the use of SDKs released by Google to facilitate the development of applications for the Android Phone. Android Phones are Linux based and are programmed in Java. This alone bodes very well for any software development on that platform: The Linux OS, the most powerful and easiest to manage of all operating systems, and the Java programming language with its superior GUI development capabilities. Knowledge of SDKs is certainly an advantage when developing for the Android platform.

CSC 520 PYTHON PROGRAMMING (3)

Prerequisites: None

Programming and problem solving using Python. Emphasizes principles of software development, style, and testing. Topics include procedures and functions, iteration, recursion, arrays and vectors, strings, an operational model of procedure and function calls, algorithms, exceptions, object-oriented programming.

CSC 522 R LANGUAGE PROGRAMMING (3)

Prerequisites: None

This course is an introduction to the R programming language, which is the premier language for statistical computing, machine learning, and data mining. Basic facilities of R contained in the course include mathematical, graphical, and interactive web applications. R is an open-sourced language used extensively in industry and in academia research. The course demonstrates methods for obtaining data from various sources, along with manipulating that data into a format that can be easily used in machine learning and data mining algorithms. The course covers a multitude of interactive visualization techniques along with the ability to share visualizations through web applications. This course provides insight into functional programming. The course covers reading and writing to and from various sources, R built in data types, controlling the flow of execution, using operators, functions, and R packages.

The course includes methods of sharing analytic results in professional formats used by technical journals.

CSC 525 HTML/CSS PROGRAMMING (3)

Prerequisites: None

This course will examine how to create web pages using HTML code. The use of Cascading Style Sheets (CSS) will also be covered. Basic website development tools and website design will be studied though the creation of several HTML/CSS web site projects.

CSC 527 MOBILE WEB PROGRAMMING (3)

Prerequisites: CSC 525, CSC 530

This course is for experienced front-end Web developers who'd like to learn what it takes to create great mobile experiences. In order to succeed in this class, they should be comfortable with HTML, CSS, and JavaScript, and should have experience creating Web apps, either professionally or for fun. This course will teach Web developers how to build Web experiences that adapt to the different screen sizes and capabilities that mobile devices offer, and how to scalably optimize media for mobile and desktop. This course will cover programming touch interaction, as well as how to optimize form field input for mobile devices and use APIs like geolocation and the accelerometer, and ensuring their web experiences work great when network conditions are suboptimal. They will gain the tools to investigate performance in mobile applications, with a strong understanding of mobile networking, battery usage patterns and optimizing paint techniques to build smooth animations on mobile. Upon completion, the web developers will understand what it takes to build great web experiences on mobile devices, have gained experience with the tools they need to test performance, and be able to apply their knowledge to their own projects in the future.

CSC 530 JAVASCRIPT PROGRAMMING (3)

Prerequisites: CSC 525

This course introduces JavaScript as a programming language. It will talk about variables, data types, conditionals, loops, arrays, event handlers, objects, string, forms, cookies, and functions. It will teach students how to use JavaScript to access and manipulate BOM (Browser Object Model) and DOM (Document Object Model), and how to use JavaScript to make Web pages interactive. It will teach students how to interact HTML, CSS, JavaScript, and DOM within a Web page.

CSC 532 CLIENT PROGRAMMING WITH JS/JQUERY (3)

Prerequisites: CSC 525, CSC 530

jQuery is a JavaScript library designed to simplify the client-side scripting of HTML. It is designed to make it easier to navigate a document, select DOM elements, create animations, handle events, and develop Ajax applications. The topics of the course include: Basic jQuery syntax, jQuery element selectors, jQuery event handling, Ajax using jQuery, jQuery UI library.

CSC 535 SERVER PROGRAMMING WITH PHP (3)

Prerequisites: CSC 525

PHP is one of the best server-side technologies for handling Web content easily and efficiently. PHP is a free, open-source language devoted primarily to handling dynamic web pages and used by millions of sites worldwide. It can be integrated with HTML and handle databases. The course starts with the development environment and the language syntax. It introduces the concepts of OOP in PHP at different levels. It also covers the interactions with HTML web pages and databases. PHP Ajax support is introduced as the advanced topic. Practical examples and

sample codes will be given. Upon successful completion of this course, students will gain hands-on experience with PHP syntax and constructs such as variables, arrays, strings, loops, user-defined functions and how to integrate HTML and PHP code to manage and process data.

CSC 545 PROGRAMMING IN GO (3)

Prerequisites: None

Go, also commonly referred to as golang, is a programming language developed at Google in 2007 by Robert Griesemer, Rob Pike, and Ken Thompson. It is a statically-typed language with syntax loosely derived from that of C, adding garbage collection, type safety, some dynamic-typing capabilities, additional built-in types such as variable-length arrays and key-value maps, and a large standard library. Go projects are for networking, distributed functions, or services: APIs, Web servers, minimal frameworks for Web applications, and the rest. In its weekday modality the course is taught over 15 weeks with 2 hours lecture and 1 hour lab per week..

CSC 550 BIG DATA (3)

Prerequisites: Knowledge of Java

This course will introduce the basic concepts, tools, techniques, and applications. This course will cover the most up-to-date Big Data Technology including Hadoop Distributed File System (HDFS) and MapReduce engine as well as Business Intelligence tools.

CSC 555 BIO INFORMATICS (3)

Prerequisites: None

Recommended: Knowledge of C++ or Java

This course starts with a brief introduction to molecular biology. It then investigates the main algorithms used in Bioinformatics. After a brief description of commonly used tools, algorithms,

and databases in Bioinformatics, the course describes specific tasks that can be completed using combinations of the tools and Databases. The course then focuses on the algorithms behind the most successful tools, such as the local and global sequence alignment packages: BLAST, Smith-Waterman, and the underlying methods used in fragment assembly packages. Lecture topics include Dynamic Programming for pairwise alignment; Hidden Markov Models for pattern recognition, conducting profile-based searches and transmembrane protein structure prediction; phylogenetic tree construction and RNA structure prediction, and the use of SNPs and haplotypes in genomic variation, in pharmacogenomics, in genome-wide association studies and in personalized medicine. The course is self-contained and does not assume any background knowledge in biology, although an interest is molecular biology is helpful. The course will be complemented by hands-on, computer lab sessions that will allow the participants to practice with some of the major tools and databases. Students will solve hands-on problems on HIV, BRCA1 gene, Thalassemia, etc.

CSC 560 INTRODUCTION TO DATA SCIENCE (3)

Prerequisites: None

A practitioner of data science is called a data scientist. Data science leverage all available and relevant data to effectively predict a model that can be easily understood by non-practitioners. A major goal of data science is to make it easier for others to find and coalesce data with greater ease. Data science technologies impact how we access data and conduct research across various domains, including the biological sciences, medical informatics, social sciences and the humanities.

CSC 570 WEB SECURITY FUNDAMENTALS (3)

Prerequisites: None

Recommended: Knowledge of HTTP, TCP/IP, SQL, and operating systems

This course introduces students to the fundamentals of computer security as the first step towards learning how to protect computers from hackers. The course begins by explaining the very basic concepts of computer security and provides substantial technical details to keep students interested and involved. It includes hands-on labs and graded and non-graded assignments for each unit that provide an opportunity to practice what the students learn. It also includes a few security games to make learning more exciting and interactive. Students are expected to be familiar with standard computer operations (e.g., login, cut & paste, email attachments, etc.) before enrolling in the course. This course will give students a clear vision on how all seven layers will work in IOS model and different levels of security in each layer.

CSC 580 COMPUTER ALGORITHMS (3)

Prerequisites: none

This course will cover algorithm design, sorting, searching, graph algorithms, stacks, queues, and dictionary implementations, divide and conquer algorithms, dynamic programming, randomized algorithms, amortized analysis, lower bound analysis, NP-Completeness.

CSC 620 PROGRAMMING LANGUAGE THEORY (3)

Prerequisites: None

Recommended: Knowledge of Discrete Mathematics for Computer Science

This course provides an overview of common programming paradigms, including imperative, object-oriented, logic, and functional programming, and discusses the fundamental concepts underlying the design, definition, and implementation of modern computer languages. Students will get practical experience with languages that exemplify a particular paradigm.

CSC 625 ADVANCED HTML5 (3)

Prerequisites: CSC 525, CSC 530

This course is for Web developers who have solid experience in the basics of HTML5. This course will take the Web developers deep into the advanced techniques and functions that HTML5 has to offer. This course will first explore some JavaScript basics - writing to an HTML page, using variables and functions, interacting with HTML, looping and drag and drop functions. Then the course will continue by exploring how to utilize and create custom media controls. The course will cover the more popular CSS3 features such as transform, translation and animation, and HTML5 Form API, Canvas, Geolocation, Drag and Drop, Web Storage, Communication, Messaging, History, Offline, indexDB, File, Web Workers, and finally, HTML5 for Mobile Apps. Upon completion, the Web developers will have a deeper understanding of how to take advantage of the many new features and functions that HTML5 has to offer.

CSC 631 DATA MINING (3)

Prerequisites: None

This course provides an introduction to the theoretical concepts and practical applications of data mining. Data mining facilitates the extraction of hidden predictive information from large complex databases. It is a powerful new technology with enormous potential to help organizations and institutions extract and interpret important information. The course content includes the conceptual framework of data mining, descriptions and examples of

standard methods used in data mining. Internet related data mining techniques are also covered. Data processing, statistical modeling, data warehousing and online analytical processing, data conditioning and cleaning, data transformation, text and web mining, mining massive datasets, data stream mining, data mining algorithms, association and correlation, pattern mining, classification, cluster analysis, outlier detection, knowledge discovery, knowledge representation, and validation.

CSC 633 MACHINE LEARNING (3)

Prerequisites: None

Recommended: Knowledge of basic computer science principles and skills, probability theory, and linear algebra.

Machine learning is a fast-moving field with many recent real world commercial applications. The goal of Machine Learning is to build computer model that can produce useful information whether predictions, associations, or classifications. The ultimate goal for many machine learning researchers is to build computing systems that can automatically adapt and learn from their experience. This course will study the theory and practical algorithms in Machine Learning. It reviews what machine learning is about, how it evolved over the past 60 years, why it is important today, basic concepts and paradigms, what key techniques, challenges and tricks. It also cover examples of how machine learning is used/applied today in the real world, and expose students to some experience in building and using machine learning algorithms. This course will also discuss recent applications of machine learning, such as to robotic control, speech recognition, face recognition, data mining, autonomous navigation, bioinformatics, and text and web data processing.

CSC 650 BIG DATA ANALYTICS (CPO-SAS/SPSS) (3)

Prerequisites: CSC 550

This course emphasizes the key aspects of data analytics for students intending to pursue certain professional certification, i.e., SPSS or SAS, upon the completion of the course. The first module introduces the fundamental statistical thinking to the computer scientist, including probability, random variables, and statistical inference. Then, predictive modeling techniques, such as linear and logistic regression, are covered to make transition to the supervised and unsupervised data mining techniques. In the last module of the course, some popular big data platforms, namely, Hadoop/Mahout and Spark/MLlib, are discussed from the data analytics point of view. Examples from the text and social media mining application are covered in the second and the third module. The commercial software (student version) is required and used through the first and second modules, such that the students can be fluent in the application to meet the certification requirement thus limited programming requirement.

CSC 660 ADVANCED DATA SCIENCE (3)

Prerequisites: CSC 560

Recommended: Knowledge of R Language

This course builds on Introduction to Data Science by introducing the idea of data products and encouraging students to build products base on data analyses.

CSC 670 NETWORK & DATA SECURITY (3)

Prerequisites: None

Recommended: Knowledge of Information Assurance Fundamentals and Data communications

The course covers theory and practice of the

security aspects of the web and Internet. It surveys cryptographic tools used to provide security, such as shared key encryption (DES, 3DES, RC-4/5/6, etc.); public key encryption, key exchange, and digital signature (Diffie-Hellmann, RSA, DSS, etc.). It then reviews how these tools are utilized in the internet protocols and applications such as SSL/TLS, IPSEC, Kerberos, PGP, S/MIME, SET, and others (including wireless). System security issues, such as viruses, intrusion, and firewalls, will also be covered.

CSC 680 ADVANCED COMPUTER ALGORITHMS (3)

Prerequisites: none

This course covers advanced methods of algorithmic design, analysis, and implementation. Techniques to be covered include amortization, randomization, network flow, linear programming, approximation algorithms, computational complexity, and NP completeness analysis. Domains include FFT, number theoretical algorithms, RSA encryption - decryption, various breaking attempts (factorization), primality checking, Diffie-Hellman key exchange, ElGamal encryption, algebra-based encryptions such as AES, cryptographic hash functions, pattern matching, and bioinformatics.

CSC 688 SPECIAL TOPICS (3)

Prerequisites: None

Special topics courses cover subjects not currently contained in the curriculum, but are designed to address especially relevant trends or developments related to the discipline.

CSC 689 INDEPENDENT STUDY (1-3)

Prerequisites: None

Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

CSC 690 CAPSTONE PROJECT (3)

Prerequisites: Department approval and completion of 27 credit hours of the MSSE program

A capstone is the summative component of the master's degree program submitted by a graduate student. The Capstone Project is designed to demonstrate the in-depth learning and higher-order thinking of the student. It is meant to be an analysis of knowledge, breaking the information down into its component parts, and also the synthesis of new knowledge, assembling the parts into a new coherent whole. The capstone is also meant to be practical and useful. The student should choose an area that is uniquely and personally important and research or perform a project in that area. The Capstone Project is performed by arrangement with the project advisor. The student must conduct independent research in an approved topic in software engineering, prepare a report and defend it before a faculty advisor.

CSC 695 MASTER'S THESIS (6)

Prerequisites: Department Chair approval and completion of 27 credit hours of the MSSE program.

The master's thesis must be arranged with the capstone thesis advisor. After the topic is approved independent research in computer science toward the MS degree must be conducted. The research must result in some new insights into the academic or practical concepts of the CS world. These must be analyzed, explained, and documented in the thesis. After completing the thesis the student must defend it before a committee of faculty appointed by the Department Chair.

CSC 720 FORMAL METHODS (3)

Prerequisites: None

This course will focus on fundamental mathematical models of computation. It will discuss both the inherent capabilities and limitations of these computational models as well as their relationships with formal languages. Rigorous arguments and proofs of correctness will be emphasized. Particular topics to be covered include: (1) Finite automata, regular languages, and regular grammars. (2) Deterministic and nondeterministic computations on various automata. (3) Context free grammars, languages, and pushdown-automata. (4) Turing machines, Church's thesis, and undecidable problems.

CSC 730 CRYPTOGRAPHY & CRYPTANALYSIS (3)

Prerequisites: None

This course analyzes ways to protect information during transfer in computer systems and networks. It includes the mathematics of cryptography, Number theoretical concepts, RSA theory, Diffie-Hellman key exchange, ElGamal Discrete Logarithm and their application and use in distributed systems, secure internet services, digital signature, intrusion detection and firewalls; coding based encryption; post-quantum cryptography. Some factoring methods to be studied include Fermat, Pollard Rho, and Elliptic Functions.

CSC 750 CODING THEORY (3)

Prerequisites: AMS 750

This class gives an introduction to coding theory. This course introduces examples for codes (ISBN, UPC, etc.) including binary codes, the meaning of important code parameters, detecting errors, correcting errors, sphere packing bound, and binary linear codes. Abstract algebra: fields and vector spaces, polynomial extensions of GF(2). Encoding linear codes: Introduction to generator matrices and parity check matrices, Hamming codes. Linear Algebra over GF(2), nullspace of a matrix, relation between generator and parity matrix. Error correcting codes, cyclic codes (BCH and Reed-Solomon codes), Goppa codes; syndrome decoding, the Patterson Algorithm.

ICS 501 INTRODUCTION TO CYBERSECURITY (3)

Prerequisites: None

Overview of the field of Cyber Security: history and basics of cryptography, risk and data management, fundamental concepts, preventative measures, rules, regulations and legal issues, security testing and assessment, identity and access management, database security, computer ethics, digital signatures.

ICS 502 CYBER ATTACK COUNTERMEASURES (3)

Prerequisites: ICS 501

Countermeasures for the preventing of cyberattacks. Firewalls – design, types and comparisons, intrusion detection, network access controls, network and browser encryption, network management, and secure systems development, cloud security.

ICS 520 PERSONAL COMPUTER SECURITY (3)

Prerequisites: None

Beginner's computer security course for small office or home users. Learn to stop hackers, worms, viruses, spyware, web bugs and identity theft. Learn vulnerabilities found in web browsers, email and operating systems. Protect against online purchase dangers, install firewalls, manage cookies, restrict ports, analyze log files, evaluate wireless networks and examine encryption.

ICS 525 PRINCIPLES OF ETHICAL HACKING (3)

Prerequisites: None

Recommended: Knowledge of C++, Java, or Python

In this course students will learn and practice hacking techniques used by malicious, black-hat hackers as a means to learn best defense from these same hackers. The course is an in-depth study using hands-on lab exercises. While these hacking skills can be used for malicious purposes, this course teaches you how to use the same hacking techniques to perform a white-hat, ethical hack, on your organization. The course trains for the CEH (Certified Ethical Hacker Certificate). Students will be trained to penetrate, test and hack their employers' own computer system in order to safeguard it from real (malicious) hackers. The Ethical Hacker is a trustworthy employee of an organization trained to attempt to penetrate networks and/or computer systems by using the same methods and techniques as a malicious hacker. Through this the individual can learn and master the malicious hackers methods find the weak pointes in an organization's network or computer systems and build safeguards against hacking attempts. The CEH is the most desired information security training program for any IT security professional.

ICS 550 SECURITY POLICIES (3)

Prerequisites: None

The policies governing administration, management and enforcement of security issues are a separate, necessary element of Cyber Security, not based on some other more fundamental Cyber Security topic. They relate to network security, server security, application security. Explain the vulnerability of small firms. Examples: Policies for enforcing encryptions and strong passwords. Rewards for followers, punishment for non-followers; information in all its forms will be protected from unauthorized modification. All existing systems will be equipped with approved antivirus software. All new equipment and software will be controlled before installation. Set antivirus software for automatic update. No foreign equipment, including private USB thumb drives, are allowed to be used. Employees must know the policies.

ICS 601 ADVANCED CYBER SECURITY (3)

Prerequisites: ICS 501

Cryptographic systems, communications and network security, security operations, security in the SW life cycle, investigations, resource protection, incidence response, implications of quantum computing.

ICS 620 COMPUTER MALWARE (3)

Prerequisites: ICS 520

Definition of computer malware (viruses, worms, Trojan horses, rootkits, backdoors), Infectious malware, the functioning of malware, coding of malware, self-replication, techniques for evading detection; reasons for vulnerability to malware; anti-malware strategies, anti-virus software. Dangers of malware: identity theft, file and data corruption industrial espionage.

ICS 630 DIGITAL FORENSICS TECHNOLOGY (3)

Prerequisites: None

Recommended: ICS 520

General tools and techniques used in forensic analysis, investigating digital media and physical memory for securing evidence in criminal investigations, investigating computer crime; digital forensic software, mobile forensic analysis.

ICS 680 THEORY OF CRYPTOGRAPHIC SYSTEMS (3)

Prerequisites: ICS 601

A deeper coverage of modern encryption system and the necessary mathematics. Classical cryptographic constructions, basic cryptographic algorithms, symmetric cryptography; public-key cryptography: RSA, AES (Rijndael) stream cypher, Diffie-Hellman, El Gamal, coding based cryptography: McEliece – Niederreiter. Basic issues and concepts of Network and Data Security such as data confidentiality, data and user authenticity, data integrity, key management and distribution; digital signatures.

ICS 688 SPECIAL TOPICS(1-3)

Prerequisites: None

Special topics courses cover subjects not currently contained in the curriculum, but are designed to address especially relevant trends or developments related to the discipline.

ICS 689 INDEPENDENT STUDY (1-3)
Prerequisites: None
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

ICS 690 CAPSTONE PROJECT (3)

Prerequisites: Department approval and completion of 27 credit hours of the MSSE program.

The capstone project is a report, analysis, project, or program, submitted by a graduate student. It is designed to demonstrate the in-depth learning and higher-order-thinking of the student. It is meant to be an analysis of knowledge, breaking information down according to the analytical strength of the student's thinking as well as synthesis of knowledge and assembling the parts into a new coherent whole.

ICS 695 MASTER'S THESIS (6)

Prerequisites: Department chair approval and completion of 27 credit hours of the MSSE program.

The master's thesis must be arranged with the capstone advisor. After the topic is approved independent research in Information Security toward the MS degree must be conducted. The research must result in some new insights into the academic or practical concepts of the Information Security world. These must be analyzed, explained, and documented in the thesis. After completing the thesis, the student must defend it before a committee of faculty appointed by the department chair.

SWE 500 SOFTWARE ENGINEERING (3)

Prerequisites: None

In this class, students will learn the elements of engineering and the relationship of engineering to software practice. It also covers how those principles and practices apply to the design, development, and maintenance of software throughout the entire software lifecycle. The course introduces traditional and contemporary approaches to software engineering practice. These include: requirements development, architecture and detailed design, modeling, testing strategies, process selection, project management, how to interact with other engineers on large-scale systems, and more. This course includes a capstone team where students gain practical experience designing a software system from start to finish using software modeling techniques such as UML, as well as a variety of project management methods and tools. This is not a programming course, but a background in object-oriented programming (OOP) will be valuable in helping the student understand the demands of the capstone project.

SWE 518 USER INTERFACE DESIGN & IMPLEMENTATION (3)

Prerequisites: None

This course introduces the principles of user interface development and the iteration of design-implementation-evaluation. It will study the important design principles to design good UI. Students will see different techniques for prototyping user interfaces and learn techniques for evaluating and measuring usability.

SWE 520 PRINCIPLES OF ETHICAL HACKING (3)

Prerequisites: None

Recommended: Knowledge of C++, Java, or Python

In this course students will learn and practice hacking techniques used by malicious, black-hat hackers as a means to learn best defense from these same hackers. The course is an in-depth study using hands-on lab exercises. While these hacking skills can be used for malicious purposes, this course teaches you how to use the same hacking techniques to perform a white-hat, ethical hack, on your organization. The course trains for the CEH (Certified Ethical Hacker Certificate). Students will be trained to penetrate, test and hack their employers' own computer system in order to safeguard it from real (malicious) hackers. The Ethical Hacker is a trustworthy employee of an organization trained to attempt to penetrate networks and/or computer systems by using the same methods and techniques as a malicious hacker. Through this the individual can learn and master the malicious hackers methods find the weak pointes in an organization's network or computer systems and build safeguards against hacking attempts. The CEH is the most desired information security training program for any IT security professional.

SWE 525 VERSION CONTROL TOOLS/GIT (3)

Prerequisites: None

This course is designed to make the participants experts in git tool. It starts with fundamental concepts like git branch and continues to advanced topics like design and git work flow. The course covers different components of git and github and how they are used in software development operations. The course also covers Installation & Configuration of github and other tools and techniques like github desktop, SourceTree and Sparkle share as well. Participants will also get to implement one project towards the end of the course. Companies use git for creating and managing open source API's and to help the open source community. It is github, a git repository hosting service founded just a few years ago to build software better, together. Most of the high paying companies are using git and github for their new, innovative and upcoming Software Languages. Open source software can now be made using github and you will be able to share your repositories with other developers so that they can also contribute. github concepts can be implemented in Big Data and Hadoop technology, Java Projects and other frameworks as well. Some of the trending repositories in github are Scala and AngularJS.

SWE 530 CLOUD COMPUTING SECURITY (3)

Prerequisites: SWE 561

This class provides students a comprehensive understanding cloud security fundamentals and advanced expertise in cloud environments. Starting with a detailed description of cloud computing, the course covers all major domains in the latest Guidance document from the Cloud Security Alliance, and the recommendations from the European Network and Information Security

Agency (ENISA) with expanded material and extensive hands-on activities. Students will learn to apply their knowledge as they perform a series of exercises as they complete a scenario bringing a fictional organization securely into the cloud.

SWE 535 CLOUD AND VIRTUALIZATION SECURITY (CPO) (3)

Prerequisites: SWE 561

This course introduces the concepts and techniques of implementing and securing cloud computing through the use of virtualization and distributed data processing and storage. Topics include operating system virtualization, distributed network storage, distributed computing, cloud models (IAAS, PAAS and SAAS) and techniques for securing cloud and virtual systems. Practical experience of integrating private, public, and hybrid clouds and virtual servers securely into an existing IT infrastructure will also be covered.

SWE 540 SQA/MANUAL TESTING (3)

Prerequisites: None

This course is a comprehensive introduction to Software Testing and Quality Assurance. The following topics will be taught: Software Development Methodologies, The Role of Quality Assurance in a Software Development Life Cycle, Common Software Testing Life Cycles, Software Testing Types and Definitions, Test Planning, Test Design, Test Cases Development, Test Execution & Results Analysis, and Test Matrices.

SWE 542 SQA/MANUAL/AUTO/PERF TESTING (3)

Prerequisites: None

Testing of software can be done in both Automation and Manual testing method, but it totally depends on the project requirement,

budget associated with the project, and which testing method will be benefited to the project. Automation Testing is a method which uses automation tools to run tests that repeat predefined actions, matches the developed program's probable and real results. Manual testing is a method used by software developers to run tests manually. This course will teach the following: Software testing concepts; Black Box Testing, White Box Testing, Integration Testing, System Testing, Unit Testing, and Acceptance Testing; and Test Management tools: QC/ALM, Defect tracking tool, Jira and automation tool, and QTP/Selenium.

SWE 544 SQA/SOFTWARE TESTING TOOLS (3)

Prerequisites: None

This course introduces the QA with test methodologies and procedures. During the course, the students go through the Manual Testing and Automation of Client/server and web based applications. The course will quickly build through each of these concepts and configuration so that by the final day of class, each student will have fully tested the application manually and convert manual test cases into automation scripts. In doing so, the students will focus on different aspects and become acquainted with additional functions.

SWE 546 SQA/PERFORMANCE TESTING (3)

Prerequisites: None

This course provides an introduction to the complexities of software performance testing and delivers testing skills that participants can immediately apply back on the job. The following topics will be addressed: understand the performance testing process: planning, preparation, execution, and reporting; relate performance testing to the development process; understand

performance goals and objectives; learn how to deal with environment and architecture issues; define operational profiles and load definitions; understand and select the various types of performance tests; and define and select appropriate measurements.

SWE 550 SOFTWARE PROJECT MANAGEMENT (CPO-ACP) (3)

Prerequisites: None

This course provides an overview of software project management history, culture, methodologies, leadership, and strategic planning. The course introduces important tools, such as work breakdown structure, scheduling, earned value analysis, and risk management. Case studies from a variety of organizational settings are discussed. The course discusses the 5 processes that must be done for traditional project management success: (Define, Organize, Execute, Control, and Close) and Complex Project Management (Agile PM and Extreme PM). The strategic implications of projects will be considered with respect to the organizational vision. The course follows the Project Management Body of Knowledge (PMBOK) of the Project Management Institute (PMI) and allows the students to prepare for the examinations for the Agile Certified Practitioner ACP. The course focuses on the concepts and tools of the different software project management elements. It first sets the software project management framework and describes the different steps in the software project management process. Next, all the key management aspects of a software project are addressed: integration, scope, time, cost, quality, human resources, communications, risk, procurement, and stakeholder.

SWE 560 PRINCIPLES OF DATABASE SYSTEMS (3)

Prerequisites: None

This is an advance level course on the principles of database systems. Main topics include, but are not limited to: an overview of the relational data model and relational query languages; recursive queries, datalog, and fixed-points; query processing and optimization; database design, dependencies, normal forms, and the chase procedure. Additional topics may include: information integration, complex objects, semistructured data, and XML.

SWE 561 CLOUD COMPUTING (3)

Prerequisites: None

Recommended: Knowledge of Operating Systems

Introduction to cloud computing, cloud architecture and service models, the economics and benefits of cloud computing, horizontal/vertical scaling, thin client, multimedia content distribution, multiprocessor and virtualization, distributed storage, security and federation / presence/ identity/ privacy in cloud computing, disaster recovery, free cloud services and open source software, and example commercial cloud services.

SWE 562 ORACLE DATABASE MANAGEMENT/ADMINISTRATION (3)

Prerequisites: None

This course introduces Oracle as a practical example of a widely used database system, teaches basic database concepts, data definition and manipulation languages (SQL), general architecture of database management systems, transaction management, concurrency control, security, distribution, and query optimization.

SWE 570 INTERNET OF THINGS ARCHITECTURE AND SECURITY (3)

Prerequisites: None

The objective of the course is to introduce students to the principles, technology and applications of the Internet of Things (IoT). The course includes a coverage of the key principles and building blocks of IoT (architecture), the key enabling technologies (devices, networking and management), and the issues of security of the IoT systems. At the end of this course the student would be able to describe the key IoT technologies in detail, explain issues in developing large-scale IoT systems, explain applications of IoT and demonstrate a deep understanding of at least one IoT research topic.

SWE 600 ADVANCED SOFTWARE ENGINEERING (3)

Prerequisites: SWE 500

This class goes into greater depth in learning the practices and principles of software engineering. The course also includes a brief review of some of the material from SWE 500. In this course, we expand our understanding of software modeling to include real time, concurrency, and embedded systems software engineering. It also goes into more depth in software metrics, project estimation techniques, risk management, software reliability, new and emerging directions for software development. This is also a team-oriented capstone project course, and one of the deliverables at the end of the semester is a fully-formed, professional level software design from the project team.

SWE 602 SOFTWARE REQUIREMENTS ELICITATION (3)

Prerequisites: SWE 500

Requirements Elicitation is the process of identifying the real problems that the software stakeholder tries to solve, of defining a system and its technical environment, and of identifying the requirements of that system such that it solves these problems for users, customers and other stakeholders. The objective of the class is to prepare software engineers for the task of developing effective requirements under a variety of development modalities. The student, at the conclusion of this course, will understand requirements engineering for Waterfall, V-Model, Spiral Model, Agile Methods, Cleanroom Engineering, the [Rational] Unified Process, as well as other approaches. The student will also understand, and gain experience with, the Unified Modeling Language, including use cases and other facilities of UML. Finally, it will introduce the student to the concepts necessary to moving from requirements to architecture, to design, to implementation. This is not a design or programming course, but an understanding of the principles and practices of software engineering are essential for the software requirements engineer.

SWE 610 RUBY ON RAILS (3)

Prerequisites: None

Recommended: Knowledge of HTML, JavaScript, database

This course offers a comprehensive introduction to Ruby on Rails, an open source web application framework for the Ruby Programming language. Ruby on Rails makes it easy to build a modern Web application. It includes everything that is needed to build applications.

SWE 615 ANGULAR JS (3)

Prerequisites: None

Recommended: CSC 530 or previous programming experience in JavaScript

AngularJS provides a layer on top of JQuery and DOM, reduces boilerplate code and improves maintainability. The best use of AngularJS is the consistent manner in which a

new developer can generate the code for the structure and the layout. Once the structure is ready, the developer can concentrate more on look and feel rather than routine boiler plate code and cruft. The chapters covered include Introduction, Directives and Controllers, Unit Testing, Forms, Input and Services, Server Side communication using http.

SWE 620 SCALA PROGRAMMING (3)

Prerequisites: None

This course is an introduction to software programming using Scala, a programming language evolved from Java. The main advantage of Scala is its versatility. It has combined features of scripting language, objective oriented language and functional programming language. The last feature is particularly useful in Web and multicore applications that require concurrent data processing. Scala has been adopted by some leading high-tech companies. For example, in 2009, Twitter announced that it had switched large portions of its backend from Ruby to Scala and intended to convert the rest. To make learning easier, we will first introduce scala as a scripting language. We will then describe its objected oriented features (including class, object, inheritance, polymorphism, etc.) and finally move on to its main functional programming features (including currying, pattern matching, lazy evaluation, tail recursion, immutability, etc.).

SWE 632 SOFTWARE RISK MANAGEMENT (3)

Prerequisites: None

This course introduces the field of software risk management which includes the software estimation, planning and control process. Risk management in software includes critical factors that impact estimates, methods for selecting metrics and measures, proper software sizing, as well as processes that identify and manage risks in the software development process as well as the operational phase of the software life cycle. Risk management and software estimation and measurement, when used properly in the software engineering context expedite the software estimation process, help generate more accurate estimates, and contribute to safe and resilient software engineering projects. Risk techniques also mitigate safety and security issues and form a total software success paradigm for software development projects.

SWE 633 SOFTWARE REFACTORING (3)

Prerequisites: SWE 500

Software Refactoring is a change made to the internal structure of software to make it easier to understand and cheaper to modify without changing its observable behavior (Fowler 1999). Improving the design of existing code. Various techniques and refactoring patterns. Increasing software understandability and productivity, reducing software complexity, aging, and maintenance costs. Refactoring in the context of agile development, during debugging and code review. Refactoring tools for important languages and OSs. Various categories of refactoring, small and big refactoring. Refactoring of UML design models.

SWE 640 ARTIFICIAL INTELLIGENCE (3)

Prerequisites: None

Recommended: Knowledge of Discrete Mathematics

This course introduces the foundation of simulating or creating intelligence from a computational point of view. It covers the techniques of reduction, reasoning, problem solving, knowledge representation, and machine learning. In addition, it covers applications of decision trees, neural networks, support vector machines and other learning paradigms.

SWE 680 SOFTWARE ARCHITECTURE (3)

Prerequisites: SWE 600

Every computer software system has an architecture, even if it is an ad hoc architecture. Modern software systems are larger, include more interoperability of their components, and often involve many programmers and engineers, working together to achieve a predictable design. When there is no coherent architecture for the design, the engineers and programmers often find themselves working at cross-purposes, constantly reworking their product to satisfy previously undefined requirements. This class is focused on the high-level concern of the architecture of a software system. Therefore, we will not be doing any computer programming. The course interests will include the requirements development, system context, and relationships between the various components and structures in a software architecture. At the end of this course students will be prepared to participate in a software (or systems) engineering project at the high level of development where they design the fundamental architecture for that system. Students will understand requirements development, project strategies and tactics, patterns of architecture, and architectural styles and idioms.

SWE 688 SPECIAL TOPICS(1-3)

Prerequisites: None

Special topics courses cover subjects not currently contained in the curriculum, but are designed to address especially relevant trends or developments related to the discipline.

SWE 689 INDEPENDENT STUDY (1-3)
Prerequisites: None
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

SWE 690 CAPSTONE PROJECT (3)

Prerequisites: Department Chair approval and completion of 27 hours of the MSSE program.

The capstone project is a report, analysis, software project, or program, submitted by a graduate student. It is designed to demonstrate the in-depth learning and higher-order-thinking of the student. It is meant to be an analysis of knowledge, breaking information down according to the analytical strength of the student's thinking as well as synthesis of knowledge and assembling the parts into a new coherent whole.

SWE 695 MASTER'S THESIS (3-6)

Prerequisites: Department Chair approval and completion of 27 credit hours of the MSSE program.

The master's thesis must be arranged with the master's thesis advisor. After the topic is approved independent research in software engineering toward the MS degree must be conducted. The research must result in some new insights into the academic or practical concepts of the SE world. These must be analyzed, explained, and documented in the thesis. After completing the thesis, the student must defend it before a committee of faculty appointed by the Department Chair.

CFL 591 INTEGRATING ACADEMIC & INTERNSHIP LEARNING (2)
Prerequisites: None
This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591(can be taken concurrently) in order to be eligible to enroll in INT 593.

INT 593 P/F INTERNSHIP (1, 3)
Prerequisites: CFL 591
This course consists of participation in a full-time or part-time internship experience,

related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A maximum of 10 credit hours earned in INT 593 may be applied toward the Master's Degree graduation requirements.

FACULTY

- Cornel Pokorny, PhD Engineering Sciences, Technical University Vienna, Department Chair
- Hann So, MS Engineering Management, Santa Clara University, Assistant Department Chair

CORE FACULTY

- Xiaoshu Qian, PhD. Electrical Engineering, Univ. of Rhode Island, M.S. Computer Science, Univ. of Rhode Island
- Richard Sun, PhD Computer Science, University of Illinois
- Ming Hwa Wang, PhD Computer Science, Illinois Institute of Technology

ADJUNCT FACULTY

- Qamar Asghar, MS Mechanical Engineering, University of Tennessee
- Ahmed Ben Ayed, PhD Computer Science, Colorado Technical University
- Mar Castro, MS Software Engineering, Cal State Fullerton
- Tushar Chandra, MSCS & Engineering, Arizona State University
- Arijit Das, MS Computer Science, Oregon State University
- Donna Dulo, JD, MS Computer Science, Naval Postgraduate School
- Ahmed Ezzat, PhD Electrical and Computer Engineering, University of New Hampshire
- Patricia Hoffman, PhD Applied Mathematics, UC Santa Cruz
- Dongming Liang, PhD Computer Science, York University
- Dick Liu, PhD EE Computer Systems Laboratory, Stanford University, MS Computer Science, Pennsylvania State University
- Leandro Loss, PhD Computer Science, University of Nevada
- Srinivasan Mandyam, PhD Computer Science, Indian Institute of Science
- Tony Nguyen, MS Computer Science, Santa Clara University
- Da-Qi Ren, PhD Computer Engineering, Concordia University Montreal
- Richard Riehle, PhD Software Engineering, Naval Postgraduate School
- Zhupei Shi, PhD Physics, New York University
- Gurminder Singh, PhD Computer Science, University of Alberta, Canada
- Jeremy Tzeng, PhD EECS, UC Berkeley
- Alex Wu, PhD Mechanical Engineering, UC San Diego
- Yurong Xu, PhD Computer Science, Dartmouth College
- Victor Yu, MA Geographical Information System, University of Akron, BS Computer Science, Franklin University, Adjunct Faculty
- Fang Yuan, PhD Applied Statistics, University of Alabama
- Matt Zhang, PhD Computer Science, North Carolina State University

DEPARTMENT OF DIGITAL ARTS

MISSION

The pace of technology, innovation and creativity is constantly on the rise calling for increasing demands for new methods of learning and curriculum. The ITU Digital Arts Department strives to fulfill this need by being open and proactive in integrating the latest

technologies and ideas with the most timeless fundamentals of art and science. We constantly encourage and engage in regular dialogue between our faculty, students and industry in order to ensure our program nurtures the world's most creative innovators and leaders in the field of digital arts.

INSTITUTIONAL LEARNING OUTCOMES (ILOS)

ILO #1: Problem Solving

ILO #2: Critical Thinking

ILO #3: Communication literacy

ILO #4: Collaboration and Teamwork

ILO #5: Technical literacy

ILO #6: Research skills and Information literacy

ILO #7: Individual Responsibility

MASTER OF SCIENCE IN DIGITAL ARTS

In a world of smartphones, tablets, wearable computers, and Virtual Reality (VR) and Augmented Reality (AR), the role of a digital artist is more important than ever. Not only is there an insatiable appetite for new content, but also the skills demanded from a designer, storyteller and artist to create that content has extended far beyond traditional skill-sets. An infinite number of opportunities await those with the proper abilities and imagination.

ITU's Digital Arts (DA) program is taught by experienced industry professionals who integrate design fundamentals, professional skills and entrepreneurial innovation into a unique program tailored to the modern artist who dares to innovate and create their own vision of the future. Students will learn to produce live action, interactive and augmented media. The program prepares students to become leaders in digital art production, advertising, film, gaming, AR, VR, mobile and app industries. Graduates of this program will build multimedia portfolios with thesis papers designed for peer-reviewed publications in academic and industrial journals.

The Digital Arts program requires successful completion of 36 credit hours. The program offers concentrations in different disciplines. Concentration and elective courses provide flexibility in customizing the program to meet professional and personal goals.

PROGRAM LEARNING OUTCOMES (PLOS)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will:

PLO #1: Apply foundational digital production skills to create stories, visualizations and designs. (Mapped to ILO #1: Problem Solving.)

PLO #2: Create professional grade digital productions by utilizing general production pipelines from conception to production, marketing and distribution. (Mapped to ILO #5: Technical Literacy.)

PLO #3: Analyze products and situations to effectively articulate and identify opportunities for innovation and experimentation in art, design and product development. (Mapped to ILO #3: Communication literacy and ILO #2: Critical Thinking.)

PLO #4: Apply collaborative skills and evaluate team dynamics to successfully complete team-oriented master digital art projects. (Mapped to ILO #4: Collaboration and Teamwork.)

PLO #5: Apply understanding of software, hardware and the production process to identify appropriate industry standards to complete digital productions. (Mapped to ILO #5: Technical Literacy and ILO #6: Research Skills and Information Literacy.)

PLO #6: Create a portfolio of projects that showcase multiple art and media skills in design, animation, filmmaking and interactive design. (Mapped to ILO #7: Individual Responsibility and ILO #5: Technical Literacy.)

CAREER OPPORTUNITIES

ITU's Digital Arts program can prepare a student for a career in Film, Design, Digital Marketing, Production, Interactive Media, Computer Graphics, UI/UX, Video Games, 3D Modeling and 3D Printing, Animation, Video, Audio, Photography, Augmented Reality, and Virtual Reality.

MASTER OF DIGITAL ARTS PROGRAM REQUIREMENTS

Required Courses:

4 Core Courses: 12 credit hours

1 Capstone Course: Project or Thesis: 3 credit hours

1 Internship: 1 credit hour

Elective Courses: 11-20 credit hours

Internship: 1- 9 credit hours

Cross Disciplinary Course: Up to 3 credit hours (counts as Elective)

Transfer Credits: Up to 9 credit hours from a graduate program of a regionally accredited school

36 Total credit hours

GRADE POINT AVERAGE (GPA)

A minimum 3.0 cumulative GPA is required for granting of the Master's and Doctoral degree.

REQUIRED CORE COURSES

DGA 501 New Media Production

DGA 511 General Production Pipelines

DGA 621 Producing Digital Media

DGA 631 Digital Media Startup

REQUIRED CAPSTONE COURSE

DGA 690 Master's Project

OR

DGA 692 Master's Thesis

MASTER OF DIGITAL ARTS CONCENTRATIONS

UI/UX

Production

Digital Marketing

Interactive Media and Games

If students complete with a passing grade in the Digital Arts program concentration, they will be eligible to graduate with a Digital Arts degree in their selected concentration (e.g. Digital Arts in Production, etc.). The project or thesis topic should be on the selected concentration. If a student has declared a concentration and does not complete the required concentration courses by graduation, the student will graduate with a Digital Arts degree, with no concentration. Please note that concentrations will only appear on the transcript, and not on the diploma.

DECLARING OR CHANGING A CONCENTRATION

(FOR DIGITAL ARTS PROGRAM ONLY)

Digital Arts program concentrations may be declared starting at the point of admissions. If a student does not declare a concentration during the admissions process, the student will be enrolled in the Digital Arts program. Students may add or change their Digital Arts program concentration at any point before the completion of 19 credit hours. Any approved transfer credit will be counted towards the 19 credit hours. Requests to declare or change concentrations must be made by the first day of the trimester in which the student will attempt the 20th credit hour in order to be considered.

REQUIRED COURSES FOR EACH CONCENTRATION

UI/UX Concentration (9 credit hours)
Students must take DGA 518 UI/UX:

User Interface and User Experience and DGA

528 Dynamic UX and one (1) of the following courses:

DGA 507 Design Fundamentals
DGA 512 Web Graphic Design

DIGITAL MARKETING CONCENTRATION (6 CREDIT HOURS)

Students must take DGA 523 Social Network Marketing and Publishing and one (1) of the following courses:

MKT 585 International Marketing
MKT 590 Marketing with Social Media
MKT 551 Competitive Marketing Strategies

PRODUCTION CONCENTRATION (9 CREDIT HOURS)

Students must take all of the following courses:
DGA 526 Screenwriting
DGA 527 Production
DGA 522 Editing I

INTERACTIVE MEDIA AND GAMES CONCENTRATION (9 CREDIT HOURS)

Students must take DGA 508 CG Software Fundamentals and an additional two (2) of the following courses:
DGA 524 Virtual Reality/Augmented Reality
DGA 529 Introduction to Games programming Unity, SpriteKit using C#, and Swift
DGA 661 Unity 2D/3D Game Development Platform
DGA 510 Intro to Game Development
DGA 609 3D Modeling and 3D Printing

ELECTIVE COURSES

Electives from the MSDA curriculum must be chosen so that the total number of credit hours completed is at least 36.

DGA 503 Storyboard Design

DGA 504 Global Storytelling

DGA 507 Design Fundamentals

DGA 508 CG Software Fundamentals

DGA 509 Basic Image Manipulation

DGA 510 Intro to Game Development

DGA 512 Web Graphic Design

DGA 513 Documentary Production

DGA 515 Sound Design

DGA 516 Production Sound Recording

DGA 517 Post Production Sound Recording

DGA 518 UI/UX: User Interfaces and User Experiences

DGA 519 Still Life and Figure Drawing

DGA 520 Motion Graphics

DGA 521 Digital Media Distribution

DGA 522 Editing I

DGA 523 Social Network Marketing and Publishing

DGA 524 Virtual Reality/Augmented Reality

DGA 526 Screenwriting

DGA 527 Production

DGA 528 Dynamic UX

DGA 529 Introduction to Games Programming Unity, SpriteKit using C#, and Swift

DGA 531 Beginning Augmented Reality

DGA 532 Beginning Virtual Reality

DGA 606 Animation I

DGA 607 Storyboards and Layouts

DGA 608 CG Modeling

DGA 609 3D Modeling and 3D Printing

DGA 610 Rigging for 3D Animation

DGA 611 Lighting and Compositing

DGA 612 Concept Art and Storyboarding

DGA 615 Zbrush

DGA 617 Motion Capture

DGA 622 Editing II

DGA 626 Animation II

DGA 641 Augmented Reality Design and Production

DGA 642 Virtual Reality Design and Production

DGA 661 Unity 2D/3D Game Development Platform

DGA 688 Special Topics (1 to 3 credit hours)

DGA 689 Independent Study (1 to 3 credit hours)

MKT 551 Competitive Marketing Strategies

MKT 585 International Marketing

MKT 590 Marketing with Social Media

CSC 515 iPhone Application Development

CSC 518 OO Programming with Java

CSC 519 Android Phone Application Development

CSC 520 Python Programming

CSC 525 HTML/CSS Programming

CSC 530 JavaScript Programming

SWE 518 User Interface Design and Implementation

INTERNSHIP

CFL 591 Integrating Academic and Internship Learning (2 credit hours)

INT 593 Part-time/Full-time Internship (1-3 credit hours)

COURSE DESCRIPTIONS

DGA 501 NEW MEDIA PRODUCTION (3)

Prerequisites: None

An introduction to digital media production, it provides design theory and hands-on experience. The course will cover basic principles of graphic and interface design, which will be applied to the course deliverables, including print, web, mobile, and video productions. Students will also learn about the big picture of project development, including vital skills such as scheduling, budgeting, creating and working within deadlines, and operating in a team-based environment.

DGA 503 STORYBOARD DESIGN (3)

Prerequisites: None

Today, Storyboard use is not exclusive to the narrative forms of Film and Animation, but is also widely used in the design of Video Games, Interactive GUI's, Product Presentations and more. Using stories, designs and flowcharts from actual productions, this course will show students of any drawing skill level an overview of how to effectively design and construct storyboards from thumbnails to presentation layouts.

DGA 504 GLOBAL STORYTELLING (3)

Prerequisites: None

In a world where the noise of mass and personal communications can overwhelm any message and idea, the role of storytellers who can tell inspiring, persuasive stories and is more important than ever. This course will demonstrate how to apply the universal heroes' journey in a way that transcends global cultures and civilizations. Students will explore the universal communication tool known as "stories" from its traditional forms such as fairytales, folklore and mythology through today's digital, augmented transmedia as a means of entertainment, education and communication.

DGA 507 DESIGN FUNDAMENTALS (3)

Prerequisites: None

This course blends classical visual language fundamentals with project-based design learning applicable to the media and tech industries. Students will learn how to apply core principles of typography, color, and composition to digital products. The emphasis of the course on design 98 methodologies in both theory and practice are instrumental in improving design performance, problem solving skills, and making students into better designers. Course projects will enable students to build a portfolio of digital design solutions across mobile, web, games or film.

DGA 508 CG SOFTWARE FUNDAMENTALS (3)

Prerequisites: None

This course will provide an overview of the computer graphics process utilized today in print, commercials, games, television and movies. The course will offer the student a hands-on tutorial covering modeling, rendering, lighting, animation and compositing. Students will get to construct a 3D model and take it through all phases of the computer graphic process culminating in a

finished scene realistically composited into a 2D background. Other subjects covered include principles of rigging, animation, motion tracking and camera moves with examples provided. Lab fees may apply.

DGA 509 BASIC IMAGE MANIPULATION (3)

Prerequisites: None

In this modern digital age, the basic principles of photography have not changed. But the tools and techniques of how we arrive at our final image continue to evolve. This class will introduce students to the principles of photography and then explore the tools and aesthetics employed by professionals and amateurs alike to alter or enhance their images. Techniques and skills acquired will then be applied to projects. This class will require a laptop or tablet that can handle the specifications of the software Adobe Photoshop.

DGA 510 INTRO TO GAME DEVELOPMENT (3)

Prerequisites: None

What are the different elements to a game? What makes a great game? Computer game development requires all facets of Computer Science, including Computer Graphics, Artificial Intelligence, Algorithms, Data Structures, Networking, and Human-Computer Interaction. It also requires knowledge of other disciplines including Economics, Mathematics, Physics, and Psychology. The value of this course goes beyond culminating Computer Science. It is largely a hands-on course where real-world skills including design, teamwork, management, documentation, and communications are critical. This course will delve into topics such as the game engine, rendering, user interfaces, sound, animation, and game hacking. This course will also cover designing MMORPGs and mobile games.

DGA 511 GENERAL PRODUCTION PIPELINES (3)

Prerequisites: None

This course covers the general procedures and methodologies to produce a production pipeline from start to finish. One will be lead through the production process breaking down each phase in a step-by-step fashion and will be introduced to easily applied principles of scheduling each task. Students will learn to apply these principles to breakdown and schedule in either real-time rendering projects — such as a video game or image rendered projects— from animated shorts to features.

DGA 512 WEB GRAPHIC DESIGN (3)

Prerequisites: None

This course provides students with instruction in graphic editing software. Projects will use tools, layers and filters to design, edit and create digital images for the Web, apps and digital and interactive media. Topics covered will include: Basic Web design tenets, Using color effectively, Understanding fonts, Designing navigation, Creating graphics that don't distract from your site, and Using multimedia (sound, animation, and other media) on your site.

DGA 513 DOCUMENTARY PRODUCTION (3)

Prerequisites: None

This course is designed to introduce students to a complete beginning-to-end production process, with the goal of creating a class documentary project. Students will learn every step required to produce and create a finished film, including preproduction planning, camera operation and shooting, lighting, interview techniques, storytelling strategies, editing, motion graphics, and more. An understanding of these tools and procedures are essential for any student who wishes to work in film, or who desires to produce

compelling narrative content in a variety of media.

DGA 515 SOUND DESIGN (3)

Prerequisites: None

This course provides an introduction to sound design principles for multimedia in a broad and diverse manner. Students will develop skills in recording, digital editing and mixing with industry standard software and techniques.

DGA 516 PRODUCTION SOUND RECORDING (3)

Prerequisites: None

This course is designed to acquaint and introduce students to the basic principles of audio recording and production through classroom lecture, and hands on training, as well as guided and individual studio projects. Students will learn recording techniques, including the choice of microphones and their placement, as well as mixing multi-track audio utilizing equalization, compression, reverb, and panning, with an emphasis on acoustics and the physics of sound. Class projects will focus on recording audio for distribution within, TV, radio, computer gaming, and film. Students will attend lectures and gain experience in production as they complete the projects assigned in the course.

DGA 517 POST PRODUCTION SOUND RECORDING (3)

Prerequisites: None

This course will teach students the specific techniques and strategies used during the audio post-production process. Students will learn how to spot, edit, and assemble dialogue, sound effects, Foley, and music, in addition to mixing and prepping the audio using the industry standard, Pro Tools and other DAW technologies. The course begins with a real-world overview of audio post production, including its evolution, methods, sound crew,

and media formats. It then explores techniques and tips for recording location sound, using sound effects libraries, editing production dialogue, and directing and recording a Foley session. Students will learn strategies for working with composers and music supervisors, how to edit songs to fit a scene, and how to record and mix score music. In addition, students will learn how to assemble a predub or temp mix (to group and sub-mix tracks into stems for the final dub), create the final dub, and prepare the mix for foreign distribution and final delivery.

DGA 518 UI/UX: USER INTERFACES AND USER EXPERIENCES (3)

Prerequisites: None

This course offers students an engaging introduction and hands-on practice in the fundamental areas of human centered user experience (UX) design. This course will explore design-thinking strategies ranging from behavioral psychology basics to techniques for user research, design ideation, rapid prototyping and usability evaluations. Students will learn how to gather and translate user needs into clear and responsive user interface (UI) solutions. Students will demonstrate their creative problem solving skills by building a design portfolio across a range of UX / UI projects throughout the course.

DGA 519 STILL LIFE AND FIGURE DRAWING (3)

Prerequisites: None

Digital Art calls on a variety of disciplines beyond proficiency with particular software. There are basic skills and techniques that bring creative ideas to strong, visual presentation. Still-life and Figure drawing are foundations on which most visual expression is built. In a series of sessions using both the Human Figure and Inanimate Objects, learn drawing

techniques to capture form, light and shadow, perspective and composition.

DGA 520 MOTION GRAPHICS (3)

Prerequisites: None

This course will explore the fundamental principles of motion graphics, which blend art and technology to create dynamic visuals for the screen. Students will become familiar with the processes of creating effective animated graphics, suitable for broadcast, films, titles, or commercials. One will learn to create engaging visual imagery, generate unique ideas, and to apply color palettes that support a concept. This course will teach students advanced techniques of motion-graphics creation through the use of software programs utilized by design and animation companies worldwide.

DGA 521 DIGITAL MEDIA DISTRIBUTION (3)

Prerequisites: None

The business of media is distribution. It is the art and method of maximizing profits in the delivery and consumption of your work. But the business model and methods of media distribution now change and evolve at ever increasing rates. This course will expose students to industry concepts of networks, life-cycles, ultimates and windows, as well as how those concepts apply to new media such as VOD, apps, tablets, clouds and beyond. Upon completion, students will have an understanding of media business model fundamentals and be prepared to position themselves at the vanguard of the rapidly changing world of digital media distribution.

DGA 522 EDITING I (3)

Prerequisites: None

This course offers students an in-depth understanding of editing principles is one of the core competencies of cinematic storytelling for movies, television, video games, advertising, animation and new media. Logical, intelligent editing is essential for clearly communicating story information and making video greater than the sum of its parts. The theory, practice, history, and techniques of editing will be covered in this comprehensive overview. Students will explore the art and function of editing the moving image for narrative, documentary, and non-traditional web material through an introduction to industry leading non-linear editing systems.

DGA 523 SOCIAL NETWORK MARKETING AND PUBLISHING (3)

Prerequisites: None

In the vast sea of opportunities offered by today's technology and networks, how can you most effectively use social media to achieve your career goals? Many traditional forms of media and networking are simply not enough to reach and captivate today's media savvy audience. To successfully reach your online and offline audiences you must fully utilize creative, problem-solving, design and communication skills. This class will explore established concepts of personal narrowcasting, blogs and tweets as well as modern takes on subjects such as data visualization and vanity metrics vs. validated learning. Finally, all of these concepts and skills will be applied utilizing affordable and accessible digital publishing tools to deliver the latest apps and media.

DGA 524 VIRTUAL REALITY/AUGMENTED REALITY (3)

Prerequisites: None

This course focuses on the design and evaluation of Augmented Reality (AR) and Virtual Reality (VR) systems, algorithms, and applications related to the hardware, software, interaction, psychology, technology, and research that are used. Class topics will include systems for presenting information to all five senses (visual, auditory, haptic,

olfactory and gustatory), methods for users to interact with objects within virtual environments, and evaluation techniques for assessing effectiveness, as well as vision-based marker and feature tracking, model-to-view space transformations, mobile application development, and interaction techniques. Students will interact with various display and interface 100 devices throughout this course, develop prototype applications, and evaluate them. Through a combination of traditional lecture, literature review, and hands-on work, students will learn to critically evaluate different alternatives, build prototype systems, and design comparative evaluations to test the effectiveness of various (AR) and (VR) applications.

DGA 526 SCREENWRITING (3)

Prerequisites: None

Screenwriting is the foundation of cinematic storytelling, and is also a primary tool for animation and video game development. This class will teach students the fundamentals of compelling plots and great drama, the nuances of realistic character development, tips and tricks for writing visually compelling scenes, and how to make your dialog jump off the page. Through story analysis and writing exercises, students will learn to take apart any story to see what makes it work, and will author their own short screenplays all the way from idea to finished script.

DGA 527 PRODUCTION (3)

Prerequisites: None

This course is designed to introduce students to a complete beginning-to- end production process, with the goal of creating a class project. Students will learn every step required to produce and create a finished film, including pre-production planning, camera operation and shooting, lighting, interview techniques, storytelling strategies, editing, motion graphics, and more. An understanding of these tools and procedures are essential for any student who wishes to work in film, or who desires to produce compelling narrative content in a variety of media.

DGA 528 DYNAMIC UX (3)

Prerequisites: None

This course will explore how web technologies are making it easier for websites to become more interactive and behave more like native applications. Students will learn to identify and improve static web designs through the use of dynamic web content, make web pages more interactive without sacrificing usability or accessibility, learn how to deal with touch-screen devices, and learn to give on-screen feedback effectively This course is intended for • UX, UI and Web designers – both beginners and advanced • Marketers • Developers

DGA 529 INTRODUCTION TO GAMES PROGRAMMING UNITY, SPRITEKIT USING C#, AND SWIFT (3)

Prerequisites: None

Learn to code in Swift Apple's new coding language. Learn to make apps in Xcode and learn how to make games with SpriteKit. The course is step by step and project-based, so you will learn programming Swift and C# concepts and apply them immediately to real indie games as you go. • Build an entire game yourself • Step by step in class • Learn Swift and C# • Learn Sprite kit and Unity Requirements: Students must have knowledge of programming in Java, C, C++ or equivalent, course might requires a MAC computer for the Swift and SpriteKit loaded with latest version of Xcode.

DGA 531 BEGINNING AUGMENTED REALITY (3)

Prerequisites: None

Augmented reality, virtual reality, mixed

reality… these systems can provide users with astonishingly immersive content. What are the sciences involved in this new technology, and what are the content integration issues to building these virtual places? This course focuses on the design and evaluation of Augmented Reality (AR) systems, algorithms, and applications related to the hardware, software, interaction, psychology, algorithms, technology, and research that are involved. With the proliferation of powerful, always-on, Internet-connected mobile devices such as smart-phones, tablets and newer head-worn displays, sophisticated applications that combine location-specific content with the current user view are becoming more possible. Application developers for these devices require a broad set of technical and design skills to create effective interactive AR experiences. Topics will include vision-based marker and feature tracking, model-to-view space transformations, mobile application development, and AR interaction techniques. Through a combination of traditional lecture, literature review, and hands-on work, students will learn to critically evaluate different alternatives, build prototype systems, and design comparative evaluations to test the effectiveness of various AR applications. Students will be expected to implement several techniques as part of this course. This course welcomes students with a diverse set of backgrounds, including (but not restricted to): computer science, math, physics, digital art, engineering, architecture, and psychology.

DGA 532 BEGINNING VIRTUAL REALITY (3)

Prerequisites: None

During this course, students will explore the techniques and technologies that need to be brought together to allow Virtual Reality, and other realities along the Mixed Reality Continuum and organic life forms to interact within virtual worlds. Commercial displays, trackers and graphics hardware have enabled many new applications and venues, including: entertainment, training and learning activities, exercise, assessment, rehabilitation and socialization. Class topics include systems for presenting information to all five senses (visual, auditory, haptic, olfactory and gustatory), methods for users to interact with objects within virtual environments, and evaluation techniques for assessing effectiveness. Students will interact with various display and interface devices throughout this course, develop prototype applications, and evaluate them. The format of the course will be a combination of traditional lecture, literature review, and hands-on work. Because the definition and purpose of Virtual Reality is in flux and evolving rapidly, this course will be colloquium in nature, focused on synthesizing existing literature from multiple related fields and sources, in order to understand and make use of these changes to VR.

DGA 606 ANIMATION I (3)

Prerequisites: DGA 508

Students will develop an understanding of a wide variety of applications used in animation and learn the principles behind 2-D, 3-D, and motion graphics. Through an exploration of 2-D animation concepts, design and techniques, each student will become familiar with animation language and eventually garner the basics used for modeling, positioning and rendering 3-D objects using Autodesk Maya, one of the leading animation software packages for the film and gaming industries.

DGA 607 STORYBOARDS AND LAYOUTS (3)

Prerequisites: DGA 503

In this course, students will learn advanced storyboarding and the layout process as it relates to the narrative structure. Emphasis is placed on the full storyboard process from initial sketch (thumbnails) to final, sequential panels. Using supplied stories, design and

flow chart examples, students will learn to apply the essentials of drawing to a production, from initial storyboard sequences to final production layouts. Through interactive lectures, discussions, demonstration and studio work, students will be able to translate narrative concepts into effective visual communications for film and video productions, animation, motion graphics, multimedia apps, video games, and theme park attractions.

DGA 608 CG MODELING (3)

Prerequisites: DGA 508

3D modeling involves digitally constructing shapes in a virtual space and is utilized in fields ranging from movies, animations, video games, architecture, medical and industrial visualizations, and a host of new applications and media such as creating virtual actors and Augmented Reality (AR). In this course, students will learn the techniques used by movie and video game industry experts to create professional 3D Models. They will use industry techniques and applications to create new worlds by designing and modeling their own objects, creatures, and environments. This class requires a laptop computer or tablet running Adobe CC Photoshop.

DGA 609 3D MODELING AND 3D PRINTING (3)

Prerequisites: DGA 508

This course instructs students in the best industry standard practices and production pipelines for creating 3D assets using Autodesk Maya, one of the leading software packages for the film and gaming industries. Students will explore the tools and techniques needed to model a wide array of characters, objects, architectures, and environments. Students will build a strong understanding of the methods and principles of 3D modeling. Aspects of the production pipeline will be covered, but the main focus will be from concept design to final

sculpture. In addition to learning the basics of 3D modeling with Maya, we will be learning some basics of 3D printers, such as MakerBot Replicator 2. Students will learn the differences between printing materials, techniques to have more predictable results, limitations of current 3D printers and even will be able to print out some objects by the end of the class session!

DGA 610 RIGGING FOR 3D ANIMATION (3)

Prerequisites: DGA 508

This course introduces the basic techniques of character set-up and rigging as used in 3D animation. This course will cover such principles and skills as how to set up a skeleton for an animated character, joint hierarchies, forward kinematics, inverse kinematics, constraints, and how to create facial rigs and blendshapes for facial animation.

DGA 611 LIGHTING AND COMPOSITING (3)

Prerequisites: DGA 508

This course covers the art and science of lighting, shading, and compositing to create computer graphics images (CGI). The lighting and shading portion of the course investigates the look, shading, and atmosphere techniques that brings characters and scenes to life. The compositing portion of the course focuses on the integration of CGI elements with live action footage. The course begins with introduction to the history of photographic lighting and compositing and ends with students learning to create and integrate their own CGI elements through both individual and team based projects.

DGA 612 CONCEPT ART AND STORYBOARDING (3)

Prerequisites: DGA 503

A critical phase for cinema pre-production is

in design, planning and storyboarding. Stories unfold through concept designs that include characters, props, wardrobe, locations, sets, color palettes, and environments. No matter what the size of their cinematic project, this course will get students ready for production and a unique integrated approach to quick, realistic and aesthetic designs relevant to their story and characters. Students will learn to generate pre-production material from concept illustrations and character designs to color studies, storyboards and wardrobe designs.

DGA 615 ZBRUSH (3)

Prerequisites: DGA 608

ZBrush is a very powerful 3D sculpting and texturing tool. The course covers the most popular tools and techniques for digital painting and sculpting in ZBrush, and explains how to export the models and texture maps to other programs for use in games, film, fine art, or 3D printing. The course also highlights the new features in ZBrush 4, such as ShadowBox, clip brushes, and LightBox. Exercise files are included with the course. Topics include: navigating the canvas, using perspective and floor, creating a mesh with a ZSketch, extracting from an existing mesh, managing subdivision levels, working with alphas, masking off parts of a model, using deformation, using subtools, deforming with Transpose, painting and texturing, and creating UV maps. Software used: ZBrush and/or Photoshop.

DGA 617 MOTION CAPTURE (3)

Prerequisites: DGA 610

Motion capture, often called mocap, is the process of digitizing a performance from an actor or animal. It is commonly used for reference or a method to get animation data quickly. This course will cover topics such as: skeletal rigs, animation retargeting, data cleanup, and on set preparation. Software used: Maya and or Motion Builder.

DGA 621 PRODUCING DIGITAL MEDIA (3)

Prerequisites: DGA 511

The skills necessary to produce today's media are more demanding than ever. Whether it is movies, games, motion graphics, interactive apps and other new media, this class will help students apply universal business production processes essential to take a media project from concept to completion. Topics covered in this course include concept and story development, pre-visualization, bidding, budgeting, financing, scheduling, talent and asset management, and distribution.

DGA 622 EDITING II (3)

Prerequisite: DGA 522

The techniques learned in Editing 1 are now applied to the creation of short videos. Students will write and plan short narratives, shoot these projects with basic video cameras, then assemble their work using editing software. The class will cover the technical foundations of nonlinear editing and its software, and provide an introduction to image adjustment tools such as digital mattes, color correction, time remapping (slow and fast motion), title generators, and motion graphics. Video compression and codecs will also be covered.

DGA 626 ANIMATION II (3)

Prerequisites: DGA 606

Using principles introduced in DGA 606 Animation 1, this class offers more advanced and detailed explorations into animation concepts, techniques and processes including acting, gesture, storytelling, 2-D and 3-D forms, software proficiency and project management from concept through to completion of an animated project. This will lead to final projects where students will work individually and with others to complete an animated project which be included in one's student showreel.

DGA 631 DIGITAL MEDIA STARTUP (3)

Prerequisites: DGA 511

The state of innovation sets the tone, direction and growth of jobs and entire new industries. The heart of new and innovative ideas is the modern start-up. Master the creative, technical and business skills required to conceive and create one's own disruptive idea, then launch it into a new startup. This is project-driven and can be a companion class to the Digital Arts Master Project where students conceive and produce a project from their own original ideas and designs.

DGA 641 AUGMENTED REALITY DESIGN AND PRODUCTION (3)

Prerequisites: DGA 524 and DGA 508

A Journeyman Level course that gives students an opportunity to learn about Mixed Reality and a specific subclass referred to as Augmented Reality as a technology, a human computer interaction paradigm, and an electronic medium. Today's powerful, always on, Internet-connected mobile devices, wearables and newer head-worn displays, require sophisticated applications and content that combine location specific information with the current user view. Application developers for these devices require a broad set of technical and design skills to create these effective interactive AR experiences. Students will work individually and in teams to explore the potential of AR. Students with backgrounds in visual design, industrial design, architecture, video production, and visual storytelling are welcome, as are students with significant programming, HCI or computer graphics backgrounds.. Through a combination of traditional lecture, literature review, and hands on work, students will learn to critically evaluate different alternatives, build prototype systems, and design comparative evaluations to test the effectiveness of various AR applications. Students will be expected to implement several techniques as part of this course.

DGA 642 VIRTUAL REALITY DESIGN AND PRODUCTION (3)

Prerequisites: DGA 508 and DGA 524

Virtual Reality Design and Production is a Journeyman Level course designed to instruct students the fundamentals of Virtual Reality content design and production. Course content will focus on digital story development, methodology, technical skills and the software proficiency necessary to create deeply immersive, multisensory, interactive experiences. Through a combination of lectures, class discussion, hands on experience, in depth topic presentations, and readings from current industry relevant literature, students will be exposed to a wide range of interesting and exciting research in the broadly defined field of virtual reality, 3Duser interaction and spatial user interfaces. Students will have the opportunity to conduct a semester-long term project, working hands on with leading edge virtual reality hardware such as the Oculus Rift virtual reality headset, the Oculus /Samsung Gear VR wireless headset, Google Cardboard phone based viewers, and the HTC Vive.

DGA 661 UNITY 2D/3D GAME DEVELOPMENT PLATFORM (3)

Prerequisites: DGA 508

Many of today's games were created using a game engine, such as Crytek, Unreal Engine, Unity or even a proprietary one written in house. These game engines provide many built in functionalities that aid in the game making process. This course will teach you how to make games from your own assets (3D models, textures, and character rigs). Student will also be writing their own C# scripts. Software: Maya, Photoshop and Unity.

DGA 688 SPECIAL TOPICS (1-3)

Prerequisites: None

Special topics courses cover subjects not

currently contained in the curriculum, but are designed to address especially relevant trends or developments related to the discipline.

DGA 689 INDEPENDENT STUDY (1-3)
Prerequisites: None
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

DGA 690 MASTER'S PROJECT I (3)

Prerequisites: Approval from a faculty advisor

This is a capstone project culminating in applying and demonstrating the knowledge base and skillets acquired throughout the MSDA program and meeting all departmental Program Learning Outcomes. One is eligible for Master's Projects only within the final two semesters prior to graduation. One will need to get approval and work closely with a faculty advisor to map out a study plan and create Student Learning Outcomes for a Master's Project before enrolling in this capstone program.

DGA 692 MASTER'S THESIS (3)

Prerequisites: Department Chair's approval and completion of 27 credit hours of the MSDA program.

The master's thesis must be arranged with the master's thesis advisor. After the topic is approved independent research in Digital Arts toward the MS degree must be conducted. The research must result in some new insights into the academic or practical concepts of the Digital Arts world. These must be analyzed, explained, and documented in the thesis. After completing the thesis the student must defend it before a committee of faculty appointed by the Department Chair.

CFL 591 INTEGRATING ACADEMIC AND INTERNSHIP LEARNING (2)
Prerequisites: None

This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591(can be taken concurrently) in order to be eligible to enroll in INT 593.

INT 593 Part-time/Full-time INTERNSHIP (1, 3)
Prerequisites: CFL 591
This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A maximum of 10 credit hours earned in INT 593 may be applied toward the Master's Degree graduation requirements.

FACULTY
Jake Wachtel, MS, USC Annenberg School for Communication and Journalism, Digital Social Media, Award-winning Producer and Journalist, Department Chair

CORE FACULTY
- Dave Lo, BFA, Academy of Art University, Computer Arts, BS, Georgia Institute of Technology, Computer Science, Motion Picture Computer Artist
- Michael Kimball, Emmy Award-winning Sound Designer and Sound Engineer

ADJUNCT FACULTY
- Stacey Houghton, MFA, Rochester Institute of Technology, Computer Graphics Design, Graphic Artist, UI/UX Designer, Web Designer
- Gokce Kasikci, MFA, San Diego State University, Multimedia, Art Director, Computer Graphics Design, Graphic Artist, UI/UX Designer, Web Designer

- Chris Petrocchi, BS, San Jose State University, Animator, Concept Artist and Art Director in television, games and film
- Tom Rubalcava, Designer, Director, Animator and Storyboard Artist in film, television, and commercials
- Koji Steven Sakai, Masters, Professional Writing, USC, Screenwriter, Producer, Novelist and Journalist
- Shanan L. Sabin, MBA, USC Marshall School of Business, Marketing, Award-winning Marketing Leader, Expertise in Integrated Campaigns, Global Market and Brand Strategy
- Michael Snyder, Journalist, Editor, Broadcaster, Educator, Screenwriter, and Animation Developer
Allen White, Filmmaker, Screenwriter, and Film Journalist

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

MISSION

The Department of Electrical and Computer Engineering strives to prepare its graduates for success in professional careers, combining the rigor of science, the power of engineering and the thrill of innovation.

INSTITUTIONAL LEARNING OUTCOMES (ILOS)

ILO #1: Problem Solving

ILO #2: Critical Thinking

ILO #3: Communication literacy

ILO #4: Collaboration and Teamwork

ILO #5: Technical literacy

ILO #6: Research skills and Information literacy

ILO #7: Individual Responsibility

MASTER OF SCIENCE IN COMPUTER ENGINEERING

MISSION

The Department of Electrical and Computer Engineering strives to prepare its graduates for success in professional careers, combining the rigor of science, the power of engineering and the thrill of innovation.

PROGRAM LEARNING OUTCOMES (PLOS)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

PLO #1: Fundamentals: Outline up-to-date technologies in computer engineering. (Mapped to ILO #5)

PLO #2: Engineering Ability: Demonstrate an understanding of established and emerging engineering techniques, and problem-solving skills. (Mapped to ILO #1)

PLO #3: Research Ability: Solve problems in engineering through self-learning and research activities. (Mapped to ILO #6)

PLO #4: Career Responsibility: Apply professional ethics in the definition, planning, and execution of engineering projects. (Mapped to ILO #7)

PLO #5: Critical Thinking: Analyze engineering challenges to make evidence-based choices between various paradigms. (Mapped to ILO #2)

PLO #6: Communication Skills: Present technical issues professionally in both oral and written communications. (Mapped to ILO #3)

PLO #7: Team Work: Provide support for

team projects in a way that promotes effective team dynamics to achieve team goals. (Mapped to ILO #4)

CAREER OPPORTUNITIES

MSCE requires knowledge combination of Computer Science and Electrical Engineering to accommodate the dual role of computer engineers who are competent on system, algorithm, software, and hardware designs.

Typical areas include: Design and development of Distributed systems, Embedded systems, Computer-control systems; Computer-Aided designs; FPGA development; ASIC design, firmware development, etc. Positions in the fields are included but not limited: system design engineer, system administrator, hardware designer, firmware designer, software engineer, verification engineer, test engineer, product engineer, quality-control engineer, custom support engineer, application engineer, and more.

PROGRAM REQUIRMENTS

Required Courses:

4 Core Courses: 12 credit hours

Capstone Course: 3 credit hours

Or Thesis: 3 credit hours (Approval is required)

Or Thesis: 6 credit hours (Publication and approval are required)

Internship: 1 credit hour

Elective Courses:

Computer Engineering Related: 6 credit hours

Cross Disciplinary (MBA, EM, DA) Elective: Up to 3 credit hours

Transfer Credits: Up to 9 credit hours from a graduated program of a regionally accredited school

Internship: 1 - 9 credit hours

36 Total Credit hours

REQUIRED CORE COURSES

CEN 500 Computer Engineering

CEN 510 Algorithms and Data Analysis

(Alternative: CEN 508 Scientific Computing, or CEN 520 Artificial Intelligence Application Development *or CSC 580 Computer Algorithms)*

CEN 551 Computer Architecture

CEN 556 Distributed Computing Systems

CAPSTONE COURSE

(Select one from list)

EEN 646 Capstone Course 1

CEN 600 Capstone Course 2 (CEN 600 shall be effective to all students in prior catalog years.)

CEN 643 Capstone Course 3

CEN 698 Master Thesis I

CEN 699 Master Thesis II

ELECTIVE COURSES

Computer Engineering Related Courses (6 credit hours):

AMS 510 Linear Algebra

AMS 512 Applied Mathematics Methods

AMS 514 Fast Fourier Transformation & Applications

AMS 520 Optimization Techniques

AMS 530 Numerical Analysis

AMS 540 Discrete Mathematics

AMS 552 Probability, Statistics and Reliability for Engineers

AMS 722 Advanced Applied Mathematics Methods

AMS 750 Abstract Algebra

AMS 760 Advanced Optimization Techniques

CEN 540 Network Security Techniques

CEN 542 Digital Image Processing

CEN 548 Computer Network Systems

CEN 565 Applications of Medical Image Systems

CEN 568 Network Storage Systems

CEN 581 Principle of Internet of Things

CEN 653 Challenge of Mobile Device Design

CEN 688 Special Topics

CEN 689 Independent Study

CEN 691 Research Project

CEN 692 Research Project

CEN 693 Research Project

CSC 505 Unix/Linux Operating System

CSC 550 Big Data

CSC 560 Introduction to Data Science

CSC 631 Data Mining

CSC 633 Machine Learning

DGA 524 Virtual Reality/Augmented Reality

EEN 505 Digital Design in HDL

EEN 520 ASIC Design I

EEN 521 FPGA Design and AI Applications

EEN 525 ASIC Design II

EEN 753 Advanced Machine Learning Engineering

EEN 758 Advanced Embedded System Design

SWE 561 Cloud Computing

SWE 640 Artificial Intelligence

OTHER ELECTIVE COURSES

Any course in MSEE, MSCE, MSSE or MSCS can be accepted as an elective course

One course cross disciplinary (MBA, EM or DA) can be accepted as an elective course

INTERNSHIP

CFL 591 Integrating Academic & Internship Learning

INT 593 Part-time/Full-time Internship

DEPARTMENT OF COMPUTER AND ELECTRICAL ENGINEERING

The Master of Science in Electrical Engineering (MSEE) degree program focuses on the following areas:

CHIP DESIGN

Integrated Circuit (IC) chips constantly bring revolutionary computing power to the world, empowering intelligent and automatic devices. AI chips implement artificial intelligence (AI) algorithms on IC chips to lead advanced technologies in engineering.

SYSTEM DESIGN

System designs including embedded systems accomplish Internet of Things (IoT) from distributed systems to data collectors. Computer algorithms, networks, communications, scientific computing, software and coding skills are important knowledge to students for victorious in the field.

PROGRAM LEARNING OUTCOMES (PLOS)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

PLO #1: Fundamentals: Explain current and emerging technologies in Chip Design or System Design in electrical engineering. (Mapped to ILO #5)

PLO #2: Engineering Ability: Demonstrate an understanding of established and emerging engineering techniques, and problem-solving skills. (Mapped to ILO #1)

PLO #3: Research Ability: Conduct independent research to solve challenges in electrical engineering. (Mapped to ILO #6)

PLO #4: Career Responsibility: Apply professional ethics in the definition, planning, and execution of engineering projects. (Mapped to ILO #7)

PLO #5: Critical Thinking: Analyze engineering challenges to make evidence-based choices between various paradigms and alternative options. (Mapped to ILO #2)

PLO #6: Communication Skills: Present technical issues clearly and professionally in both oral and written communications. (Mapped to ILO #3)

PLO #7: Team Work: Support team effort through collaboration to achieve project goals. (Mapped to ILO #4)

CAREER OPPORTUNITIES

MSEE requires knowledge not only in Electrical Engineering but also computer algorithms and programming skills to accomplish the roles of chip design or system design engineers.

Typical career fields include: IC Chip Design, Electronic Design Automation, Embedded System Design, Computer-Aided Design, Computer-Control Systems, Sensor Designs, Bioelectronics Systems, etc. Positions in the fields are included but not limited: Logic Design Engineer, Circuit Design Engineer, Physical Design Engineer, Verification Engineer, Test Engineer, Reliability Engineer, Application Engineer, and more.

PROGRAM REQUIREMENTS

Required Courses:

4 Core Courses: 12 credit hours

Capstone Course: 3 credit hours

Or Thesis: 3 credit hours (Approval is required)

Or Thesis: 6 credit hours (Publication and approval are required)

Internship: 1 credit hour

Elective Courses:

Electrical Engineering Related: 6 credit hours

Cross Disciplinary (MBA, EM, DA) Elective: Up to 3 credit hours

Transfer Credits: Up to 9 credit hours from a graduated program of a regional accredited school

Internship: 1 - 9 credit hours

36 Total Credit Hours

REQUIRED CORE COURSES

EEN 500 Electrical Engineering

EEN 511 VLSI Design

EEN 541 Digital Signal Processing and System Analysis

CEN 510 Algorithms and Data Analysis

(Alternative: CEN 508 Scientific Computing, or CEN556 Distributed Computing systems or CSC 580 Computer Algorithms)

Capstone Course

EEN 646 Capstone Course 1

CEN 600 Capstone Course 2

(CEN 600 shall be effective to all students in prior catalog years.)

EEN 627 Capstone Course 4

EEN 698 Master Thesis I

EEN 699 Master Thesis II

Elective Courses

Required minimum of 6 credit hours from one of the focus areas:

MATH COURSES

AMS 510 Linear Algebra

AMS 512 Applied Mathematics Methods

AMS 514 Fast Fourier Transformation & Applications

AMS 520 Optimization Techniques

AMS 530 Numerical Analysis

AMS 540 Discrete Mathematics

AMS 552 Probability, Statistics and Reliability for Engineers

AMS 722 Advanced Applied Mathematics Methods

AMS 750 Abstract Algebra

AMS 760 Advanced Optimization Techniques

CHIP DESIGN

CEN 520 Artificial Intelligence Application Development

CEN 548 Computer Network Systems

CEN 581 Principle of Internet of Things

EEN 505 Digital Design in HDL

EEN 520 ASIC Design I

EEN 521 FPGA Design and AI Applications

EEN 525 ASIC Design II

EEN 528 Algorithms for Electronic Design Automation

EEN 555 Deep Learning in Engineering

EEN 616 Mixed Signal IC Design

EEN 618 RF IC Design

EEN 629 System On Chip (SOC) Design

EEN 630 Quantum Devices

EEN 635 Introduction to MEMS Design

EEN 688 Special Topics

EEN 689 Independent Study

EEN 691 Research Project

EEN 692 Research Project

EEN 693 Research Project

EEN 714 Advanced Microprocessor Design

EEN 717 Advanced Analog IC Design

EEN 719 Advanced RF IC Design

EEN 732 Advanced Nanotechnology

EEN 736 Advanced MEMS Design

EEN 749 Advanced Digital Signal Processing

SWE 640 Artificial Intelligence

SYSTEM DESIGN

CEN 540 Network Security Techniques

CEN 542 Digital Image Processing

CEN 548 Computer Network Systems

CEN 581 Principle of Internet of Things

CSC 580 Computer Algorithms

CSC 505 Unix/Linus Operating System

DGA 524 Virtual Reality/Augmented Reality

EEN 505 Digital Design in HDL

EEN 506 Electromagnetic Fields and Waves

EEN 513 Microprocessor Design

EEN 515 Analog IC Design

EEN 521 FPGA Design and AI Applications

EEN 531 Nanotechnology

EEN 555 Deep Learning in Engineering

EEN 577 Green Energy

EEN 629 System on Chip Design

EEN 637 Bioelectronics and Bioengineering

EEN 671 Introduction to Wireless Communication Systems

EEN 688 Special Topics

EEN 689 Independent Study

EEN 691 Research Project

EEN 692 Research Project

EEN 693 Research Project

EEN 698 Master Thesis I

EEN 699 Master Thesis II

EEN 714 Advanced Microprocessor Design

EEN 749 Advanced Digital Signal Processing

EEN 753 Advanced Machine Learning Engineering

EEN 758 Advanced System Design

EEN 766 Advanced Communication Systems

EEN 774 Advanced Wireless Communications

SWE 561 Cloud Computing

SWE 640 Artificial Intelligence

Any course in MSEE, MSCE, MSSE or MSCS can be accepted as elective course

One course cross disciplinary (MBA, EM or DA) can be accepted as elective course

INTERNSHIP

CFL 591 Integrating Academic & Internship Learning

INT 593 Part-time/Full-time Internship

DOCTOR OF PHILOSOPHY IN ELECTRICAL ENGINEERING

The Doctor of Philosophy Degree in field of Electrical Engineering is conferred by Department of Electrical Engineering, International Technological University, primarily in recognition of competence in the subject field and the ability to investigate engineering problems independently, resulting in a new contribution to knowledge in the field. The work for the degree consists of advanced studies in engineering, mathematics and related physical sciences, engineering research, preparation of a dissertation based on that research, dissertation defense and publication.

PROGRAM LEARNING OUTCOMES (PLOS)

All PLOs are mapped to the relevant ILOs and contained within parentheses. Upon completion of this program, graduates will be able to:

PLO #1: Fundamentals: Formulate comprehensive solutions to problems in specialized aspects of electrical engineering. (Mapped to ILO #1, ILO #5)

PLO #2: Research Ability: Produce independent scholarly research which contributes innovative ideas and concepts to the fields of science and/or engineering. (Mapped to ILO #2, ILO #6)

PLO #3: Career Responsibility: Perform career duties promptly, responsibly and professionally. (Mapped to ILO #7)

PLO #4: Communication: Produce clear, professional communication including for use in teaching, conferences, and publications. (Mapped to ILO #3)

PLO #5: Team Work: Manage team efforts towards an engineering and/or educational goal. (Mapped to ILO #4)

CAREER OPPORTUNITIES

PhD Program in Electrical Engineering prepares its graduates to be professionals and leaders in the fields of electrical and computer engineering in industry, academic, research, or other services of society.

PROGRAM REQUIREMENTS

60 credit hours beyond Master's degree including:

30 hours of coursework and Independent Study

30 hours of Doctoral Dissertation

Passing a qualification exam consists of written and oral parts is required for admission of candidacy.

Passing a comprehensive examination in oral is required with presenting dissertation topic proposal and sufficient preparation for advanced research for the proposed dissertation topic.

Passing a comprehensive final defense examination in oral is required to defend the PhD dissertation.

Publication in an internationally recognized academic journal is required to complete the PhD dissertation.

Maximum 15 credit hours with grade of B or above may be transferred from PhD level courses of a regionally accredited University with approval of the Department Chair.

DOCTORAL COURSES

Courses with number 700 or above in the Electrical Engineering and Math courses are designed as PhD courses. Other courses may be accepted as PhD courses with the approval of the PhD advisor and chair of the EE Department.

PROGRAM COMPLETION

Thesis Advisor
It is the student's responsibility to obtain consent from a faculty member in the student's major department to serve as his/her prospective thesis advisor upon acceptance into the PhD program.

A PhD student and his/her advisor jointly develop a study plan for courses and research in a particular area, and submit to the chair of the department for approval.

Study Program and Course Work
The student is required to complete a minimum of 60 credit hours of graduate credit beyond the master's degree. Of these, 30 credit hours may be earned through course work and independent study, and up to an additional 30 credit hours through the thesis process. All thesis hours are graded on a Pass/No Pass basis. A maximum of 15 semester hours may be transferred from other accredited institutions at the discretion of the PhD advisor and the Department Chair.

QUALIFICATION EXAMINATION

The qualification exam must be administered within two years of the date of admission for

full-time students and within three years for part-time students. The qualification exam can be retaken only once.

The qualification examination will be in written form. There will be three fields within the examination. Mathematics is a required field. The student may choose the two other fields from among the four fields listed below:

VLSI DESIGN
Analog Sensors & Bio Design

Digital Signal Processing and Communication

System Design

Each field will cover at least three courses, for example:

- VLSI Design (EEN 714, EEN 732, EEN 758)
- Analog Sensors & Bio Design (EEN 717, EEN 719, EEN 736)
- DSP & Communication (EEN 749, EEN 766, EEN 774)
- System Design (EEN 739, EEN 753, EEN 758)

ADMISSION TO CANDIDACY
A student who passes the qualification examination is considered as advanced to candidacy. Upon advancement to candidacy, the PhD student must approach his/her PhD advisor to assist with formation of a doctoral committee.

DOCTORAL COMMITTEE
The committee must consist of at least five members, including the PhD advisor, the Department Chair and at least one other member of the Electrical Engineering department. The committee must also include at least one member from outside the department, preferably from outside the University. Either the PhD advisor or Department Chair will serve as the chair of the committee.

The Doctoral Committee will review the proposed dissertation topic and recommend any necessary changes. For the candidacy to proceed, the committee must approve the topic.

COMPREHENSIVE EXAMINATION
Upon approval of the dissertation topic by the doctoral committee, the candidate shall request a comprehensive examination. The examination shall be an oral exam, the results of which demonstrate to the committee's satisfaction sufficient preparation in depth and breadth for the necessary advanced research. The comprehensive examinations must be completed within one year of passing the qualification examination. Comprehensive examinations may be repeated only once, in whole or in part, at the discretion of the PhD advisor.

DISSERTATION RESEARCH
The period following the comprehensive examination is devoted to research for the dissertation, although such research may begin before the examination is completed. After the research topic is approved by the Doctoral Committee, the PhD candidate should begin the completion of dissertation research.

PUBLICATION
One or more refereed articles, based on the dissertation research, must be accepted for publication in an internationally recognized academic journal, such as IEEE, IEE, ACM, or other journals approved by the Doctoral Committee.

TEACHING REQUIREMENT
PhD candidate must teach at least one Master level course in order to demonstrate teaching ability. The course being taught must be completed prior to a dissertation defense.

DISSERTATION DEFENSE
The dissertation must be made available to all examiners one month prior to the

examination. The oral examination shall consist of a presentation of the dissertation results and the defense. Dissertation defense is open to the public, but only members of the Doctoral Committee may vote. The dissertation defense passes only through a unanimous vote.

PROGRAM COMPLETION

At least one month prior to degree conferral, the candidate must submit to the Doctoral Program Council of the University two copies of the final version of the dissertation. The dissertation will not be considered as accepted until approved by the Doctoral Committee and publication acceptance. Each member of the Doctoral Committee must indicate his/her final approval by signature.

The University reserves the right to evaluate the undertakings and the accomplishments of the degree candidate in total, and award or withhold the degree as a result of its deliberations.

TIME LIMIT FOR COMPLETING DEGREES

All requirements for the doctoral degree must be completed within eight years following acceptance into the Ph.D. program. Extensions will be allowed only in unusual circumstances and must be approved in writing by the Doctoral Program Council.

DEPARTMENTAL RESEARCH ACTIVITIES

Five research labs are established within the department: Artificial Intelligence (AI), Bioelectronics (BE), Embedded Systems (EM), Green Energy (GE), and System-on-Chip (SoC). Research focuses on cutting-edge innovation and application, including autonomous movement, deep-learning, image processing, non-invasive glucose sensors, smart battery management system, and close-loop of energy-management systems.

COMPUTER ENGINEERING COURSE DESCRIPTIONS

CEN 500 Computer Engineering (3)

Prerequisites: None

This course provides general review of technical concepts and current developments in computer engineering with relevance to digital design in HDL, distributed computing architectures, computer algorithms, computer networks, computing techniques, and artificial intelligence. Experts in the fields introduce fundamental and up-to-date knowledge of science and technology in computer engineering including Neural Networks, Machine Learning and Deep Learning, Big Data Parallel Processing, Data Mining Computing, and Computing Software.

CEN 508 Scientific Computing (3)

Prerequisites: None

Recommended: AMS 510

This course covers fundamental scientific computing and optimization techniques used in various computer and electronic engineering fields. The techniques include interpolation methods (linear and non-linear interpolation, piece-wise interpolation, Splines, surface interpolation), solving linear systems of equations and partial differential equations using numerical methods. The Least Squares Fitting algorithm is addressed to solve the Engineering Regression through predictive modeling, profiling, optimizations and Monte Carlo simulations. Matrix Eigen functions are introduced to derive the QR factorization and multivariate Linear Regression to solve the Data Mining dimensionality reduction algorithms such as Principal Component Analysis, Singular Value Decomposition, and Factor Analysis. Machine learning technique such as Neural Networks, Support Vector Machines, and Artificial Intelligence are also briefly introduced. Time series frequency and spectrum analysis techniques are addressed

on time domain engineering problems. Reliability engineering concept, modeling and computing techniques are demonstrated for both hardware device and software testing. Utilize several computing software such as MATLAB, R, SAS/JMP to help students conduct the scientific project.

CEN 510 Algorithms and Data Analysis (3)

Prerequisites: None

Recommended: Working knowledge of Data Structure and AMS 552

This course discusses software and hardware interfaces between computer and peripheral devices and computer algorithms as applied in computer and electrical engineering fields. It covers fundamental techniques of design, analysis and implementation, including recursion, dynamic programming, randomization, dynamic data structures, graph theory, NP-completeness, and optimization algorithms. Big data, data mining, and data analysis techniques will be introduced.

CEN 520 Artificial Intelligence Application Development (3)

Prerequisites: None

This course introduces recent deep learning software, libraries and tools for the development of artificial intelligence (AI) applications. AI applications produce large amounts of data and use computational power to learn information. Central problems of AI research including reasoning, knowledge, planning, learning, communication, perception, autonomous navigation and the manipulation of objects are discussed for the application development.

CEN 540 Network Security Techniques (3)

Prerequisites: None
Recommended: CEN 548

This course is designed to develop knowledge and skills for security in the network systems and focuses on design and implementation of network security solutions. The key areas of the network security are intrusion detection, virtual private networks, firewalls, web security, packet filtering, network layer security, and electronic mail security.

CEN 541 Deep Learning for Computer Vision (3)

Prerequisites: None

Recommended: CEN 508 or CEN 510

The course focuses on methods of deep learning for computer vision, image processing algorithms and systems. Challenges of image acquisition, images structure and operations such as geometric, arithmetic, logical convolution, transforms, calibration, correction, and enhancement, data collection with various sensors and cameras, high-level algorithms and real-time implementation for 2D and 3D objective recognition and reconstruction will be discussed. After gaining background knowledge, the course will review the latest algorithms using deep/machine learning to solve problems in computer vision and machine perception. Convolutional neural networks will be used to analyze and understand the potential of the state of the art tools in visual pattern recognition. Engineering guidelines and scalability issues will be addressed to solve tasks such as object detection, image classification or automatic textual captioning.

CEN 542 Digital Image Processing (3)

Prerequisites: None

Recommended: CEN 508 or CEN 510

The course provides image processing algorithms and systems. It covers image acquisition, image data structures, and images operations such as geometric, arithmetic,

logical convolution, transforms, calibration, correction, and enhancement. Course project is required to encourage students implementing and investigating image processing algorithms using Matlab.

CEN 548 Computer Network Systems (3)

Prerequisites: None

This course covers the theory and practice of essential computer network hardware and software. Topics include communication networks (e.g. local area networks (LANs), wide area networks (WANs) and protocols), network topologies, protocol hierarchy, network reference models, circuit vs. packet switching, signal transmission, modulation and multiplexing, Media Access Control (MAC), error detection, flow control, congestion control, routing (different routing protocol, such as RIP, IGRP, EIGRP, OSPF, IS-IS and BGP. This includes the standard protocols of IEEE and IETF, and Network Operating Systems (NOS). The class will also cover OSI (open system interconnection), TCP/IP, and the networking architecture, and cyber security.

CEN 551 Computer Architecture (3)

Prerequisites: None

Recommended: Working knowledge of Digital Logic and Circuit

This course focuses on principles of computer architecture, offering students an overview of computer systems, CPU and GPU designs, computer arithmetic, instruction set architecture, pipelining, microprogramming techniques, memory hierarchies and management, input/output subsystem organization, and performance measurement. Its purpose is to prepare students to understand the internal organization of computers, and how architecture affects performance.

CEN 556 Distributed Computing Systems (3)

Prerequisites: None
Recommend: CEN 510

The course focuses on parallel and distributed computing frameworks and techniques. It covers cutting-edge techniques including multiprocessing, multithreading, synchronization, cluster/MPI, cell computing, general purpose GPU (CUDA/STREAM), and stream computing. Several main topics will be included map-reduce, stream processing, cloud computing, remote service invocation (RPC), web services, service registration and discovery, data synchronization, service replication, and fault tolerance. The course project will be issued for solving/benchmarking some computing intensive problems, such as Monte-Carlo simulations, partial differential equations, image processing, etc., using different parallel computing frameworks.

CEN 565 Introduction to Medical Image Systems (3)

Prerequisites: None

The course introduces imaging processing systems applied in medical field, including CT, Ultrasound, Radionuclide, and Magnetic Resonance. The focus is on the physical principles, instrumentation methods, and imaging algorithms. The medical interpretation of images, and the clinical, research and ethical issues in medical imaging are included.

CEN 568 Intelligent Network Storage Systems (3)

Prerequisites: None

Recommended: CEN 548

This course will introduce distributed systems designed to offer access to storage resources over a network. It will cover network file system, network storage architecture, security issues in data transferring over networks, performance measurement, file service types, and file servers. In addition, topics of data

redundancy, data throughput, Samba, and load balancing will be covered.

CEN 581 Principle of Internet of Things (3)

Prerequisites: None

This course provides the fundamentals of Internet of Things. It focuses on system collaborating various device protocols, coordinating recovery data from sensors, providing local control of assets, and best reuse of existing resources and infrastructures. Related technologies, architectures, and protocols aimed at improvement of system efficiency, resources sharing, interoperability, and intelligent use of sensors will be introduced. With seamlessly connected sensor devices and cloud database, IoT makes information management systems more efficient, intelligent, and globally applied. User interfaces of mobile devices with app implementation and system security will be discussed.

CEN 600 Capstone Course 2 (3)

Prerequisites: None

Recommended: CEN 520

Intelligent Systems: The course provides fundamental knowledge and practice in the design and evaluation of intelligent systems using an extensive range of tools and techniques. The course emphasizes the use of artificial intelligence algorithms to solve real-world problems that are difficult to express using traditional approaches. It explores the essential theory behind methodologies for developing systems that demonstrate intelligent behavior including dealing with uncertainty, learning from experience, and following problem-solving strategies found in nature.

CEN 643 Capstone Course 3 (3)

Prerequisites: None

Recommended: CEN 542

Advanced Digital Image Processing: This course introduces techniques and algorithms for advanced digital image processing. It covers segmentation, shape and texture, morphology, recognition and classification, compression techniques, real-time image, video coding, etc. Matlab is used to implement and test various image-processing algorithms.

CEN 653 Challenge of Mobile Device Design (3)

Prerequisites: None

Recommended: CEN 500 or EEN 500

This course emphasizes the challenges of mobile device design and technologies. The key topics include condensed and precise structure design, reliability and quality, security, and energy efficiency.

CEN 688 Special Topics (1-3)

Prerequisites: None

The course offers a relatively new subject that is not currently available in the catalog, but will be of great relevance to computer engineering. It consists of lectures, readings, homework, presentations and projects determined by the instructor.

CEN 689 Independent Study (1-3)

Prerequisites: Approval by Department Chair
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

CEN 691 Research Project (1)

Prerequisites: Approval by Department Chair

Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in computer or

electrical engineering, prepare a technical report, and defend it in front of a faculty advisor.

CEN 692 Research Project (2)

Prerequisites: Approval by Department Chair

Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in computer or electrical engineering, prepare a technical report, and defend it in front of a faculty advisor.

CEN 693 Research Project (3)

Prerequisites: Approval by Department Chair

Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in computer or electrical engineering, prepare a technical report, and defend it in front of a faculty advisor.

CEN 698 Master Thesis I (3)

Prerequisites: Approval by Department Chair

Thesis research is arranged with thesis advisor upon an approval by chair of the department. Students will conduct independent research in computer engineering, prepare a thesis, and defend it in front of a committee consists of a number of faculty designated by department chair.

CEN 699 Master Thesis II (3)

Prerequisites: Approval by Department Chair

Master Thesis II is a continuance of Master Thesis I. It is upon recommendation of student's thesis advisor and approval of chair of the department. Paper submitting for publication is required.

CFL 591 Integrating Academic & Internship Learning (2)

Prerequisites: None

This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591 in order to be eligible to enroll in INT 593.

INT 593 Internship (1-3)

Prerequisites: CFL 591

This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A student may take a maximum of 10 credit hours of INT 593.

ELECTRICAL ENGINEERING COURSE DESCRIPTIONS

Courses numbered 700 or above are designed for PhD-EE program. Master students are eligible to take 700 series as elective courses.

EEN 500 Electrical Engineering (3)

Prerequisites: None

This course provides a general review of technical concepts and current developments in electrical engineering, with emphasis on the following: Integrated Circuit (IC) Design; Artificial Intelligence as applied in Electrical Engineering; Signal Processing and Communication in Telecom and Wireless; Internet of Things (IoT) and Intelligent Systems implemented with Embedded System Design. Experts in the fields teach the course.

EEN 505 Digital Design in HDL (3)

Prerequisites: None

The course introduces VHDL and Verilog, two IEEE standards of hardware design languages, skills of design and verification, synthesis consideration, timing/power effective designs.

EEN 511 VLSI Design (3)

Prerequisites: None

Recommended: College Level Physics

This course provides an overview of IC (integrated circuit) design and methods. The course introduces the IC design procedure, basic analog and digital circuits, operational principles, schematic and layout techniques, circuit simulation, clock distribution, power distribution, high-speed circuits and low-power design techniques. The implementation of artificial intelligence on a chip will be discussed. Course project will be assigned on practice of circuit/layout design using EDA tools.

EEN 513 Microprocessor Design (3)
Prerequisites: None
Recommended: CEN 551

The course introduces various microprocessor architectures, characteristics, and applications. It delivers to students a specific microprocessor design to understand each functional block design and design considerations.

EEN 515 Analog IC Design (3)
Prerequisites: None

Recommended: Working knowledge of Electrical Circuits

This is the introductory course to analog circuit design and starts by giving a thorough grounding in solid-state physics and basic circuit concepts. Transistor device characteristics are explored in depth as well as simple transistor stages. The course also involves design and analysis of multi-stage BJT and CMOS analog amplifiers, Frequency response of cascaded amplifiers and gain-bandwidth considerations, concepts of feedback, stability, and frequency compensation. Each student will be assigned a small design project to be completed before the end of the course.

EEN 520 ASIC Design I (3)

Prerequisites: None

Recommended: Working knowledge of Digital Structure

The course focuses on ASIC design principle, consideration, and design implementation with logical design, verification, synthesis, and design analyses of function, timing, power, signal integrity, design-for-testability and others. A design project with a front-end ASIC design flow will be assigned for practice.

EEN 521 FPGA Design and AI Applications (3)
Prerequisites: None

Recommended: EEN 505

The course introduces the principle of design in Field Programmable Gate Array (FPGA). The revolutionary increased FPGA functions with high performance of multipliers, microprocessors, DSPs, GPUs provide direct incidence to FPGA implementations in artificial neural networks (ANNs) and other intelligent systems. Practicing with course projects, students will develop solid understanding and hands-on experience in this exciting digital design area.

EEN 525 ASIC Design II (3)
Prerequisites: None

Recommended: Working knowledge of Digital Structure

The course emphasizes on back-end ASIC design implementation with floorplan, placement and routing, layout verification and parameter extraction, design for manufacture

and post-layout analysis with consideration of timing-driving and power-aware layout. A design project with a back-end ASIC design flow will be assigned for practice.

EEN 528 Algorithms for Electronic Design Automation (3)

Prerequisites: None

Recommended: EEN 500

This course emphasizes on the data structures and algorithms that are applied on building state-of-art Electronic Design Automation (EDA) systems. Efficient data structures that can handle millions of gate design and algorithms that can works on these data structures will be studied in this course. The course introduces design represented in Boolean functions using binary decision diagrams (BDD), and-invertor graphs (AIG), and programmable logic array (PLA). BDD and SAT (satisfiability) based algorithms are used to solve many optimization problems. Students will learn how to code algorithms using academic tools like SIS, ABC, CUDD and MINISAT.

EEN 541 Digital Signal Processing and System Analysis (3)

Prerequisites: None

Recommended: AMS 514

This course focuses on analysis of discrete-time signals in both time and frequency domains, modeling of electrical systems, and the design of finite impulse response (FIR) and infinite impulse response (IIR) filters. The sampling theorem, reconstruction process, discrete Fourier transform (DFT) and its computation with the fast Fourier transform (FFT) and applications are discussed. Design and implementation of FIR and IIR filters and multi-rate signal processing, decimation, interpolation, least mean square (LMS), normalized least mean square (NLMS), sample rate conversion, and efficient implementation are covered.

Application of communications systems and system analysis are introduced. Students will learn Fourier techniques, applications in communications systems, and implementation of signal processing software and hardware.

EEN 555 Deep Learning in Engineering (3)

Prerequisites: None

Recommended: CEN 510 or Equivalent

This course provides an introduction to deep learning for engineering. Students will acquire a general background in deep learning, including state-of-the-art techniques in supervised and unsupervised learning. In supervised learning, both classic learning and deep learning techniques will be covered. The course will also cover Deep Learning Networks and Applications.

EEN 577 Green Energy (3)

Prerequisites: None

The course focuses on solar energy, especially the principles and operational characteristics of modern solar cells. Main topics to be covered will be solar energy principles, principles of diode, solar cell, concentrated solar cell, thin film solar cell, multi-cell structure, power conversion (DC to AC, grid), power storage (battery, fuel cell, etc.) and other green energy source (hydro, wind, biomass, etc.) comparison.

EEN 616 Mixed Signal IC Design (3)

Prerequisites: EEN 511 or EEN 515

The course focuses on the intersection of the digital and analog design worlds. The course will introduce various SPICE simulators for circuit analysis as well as Matlab for system analysis. The students will be expected to have basic analog circuit and digital design knowledge, and to have used the principal EDA tools like SpectreRF and Verilog. The

course will cover mixed signal subsystems such as A/D converters, digital PLLs, embedded CPUs with thermal sensors, DDR PHYs and others. Mixed-signal issues like substrate noise will be explored in detail. The course will also include a significant design project with a simple embedded CPU.

EEN 618 RF IC Design (3)
Prerequisites: EEN 515

This course covers fundamentals of CMOS RFIC design. The course will start with basic electromagnetics like high-Q inductor design, and then move into device modeling and layout issues. It will examine in detail the primary CMOS RF subcircuits like LNAs, power amplifiers, fractional N synthesizers, mixers and filters. A design practice will be done using SpectreRF, with the passive components designed using Sonnet or equivalent modeling tool. The circuits will be laid out using Cadence Virtuoso and the parasitic parameters will be extracted using Assura.

EEN 627 Capstone Course 4 (3)
Prerequisites: EEN 511 or EEN 515

IC Design to Silicon: The course will provide students with hands-on practice in chip design. Students will complete a full-custom design, from circuit to silicon. With given technology and design specifications, students will start their own designs on a transistor-level schematic, check design accuracy, complete layout and layout verification, and run LPE and whole chip post-layout verification. The designs will be taped out for manufacture, and chips will be packaged and tested.

EEN 629 System on Chip (SOC) (3)
Prerequisites: EEN 500

The course introduces method, consideration and analysis of System on Chip design fundamentals. VLSI architectures, systolic arrays, self-timed systems, system verification, design flow and implementation will be covered. System C and/or System Verilog will be applied for practice.

EEN 630 Quantum Devices (3)
Prerequisites: None
Recommended: EEN 501

The course introduces the knowledge of principles and operational characteristics of modern semiconductor devices, especially nanometer scale structured semiconductor devices. Topics include quantum transport, quantum interference, quantum noise, transport and optical properties of low dimensional semiconductor devices, quantum optical devices, high electron mobility transistors, single electron transistors, super conducting devices, and quantum transport in mesoscopic structures.

EEN 635 Introduction to MEMS Design (3)
Prerequisites: None

The course introduces MEMS design fundamentals, microfabrication techniques and analysis of a variety of MEMS structures including switches, accelerometers and microcavities. The focus will be on hands-on design using COMSOL and Matlab and modeling the resulting structures' electromechanical properties. The class will have a design project.

EEN 637 Bioelectronics and Bioengineering (3)
Prerequisites: None

This course introduces key concepts in biology, bioelectronics and biosensing, while expanding your knowledge of MEMs, analog electronics and digital signal analysis. This is a fundamental course to give you the basic knowledge for understanding bioelectronics field. The course will cover topics like

biological interfaces, critical human body systems.

EEN 646 Capstone Course 1 (3)
Prerequisites: None

Embedded System Design: This course teaches the design of embedded systems with an emphasis on the Internet of Things (IoT). Students will learn the principles of embedded systems design by working with the Linux operating system, ARM microprocessor cores, peripherals such as GPIO, UART, I2C, SPI, and USB, and application programming in Python and JavaScript (Node.js). Students will be introduced to system design through series of labs and work on an IoT project using Raspberry Pi boards. These labs are designed to give students hands-on experience in embedded system design and web services.

EEN 671 Introduction to Wireless Communication Systems (3)
Prerequisites: None

The course provides an overview of wireless communication systems (e.g., 2G, 3G, 4G, WIFI etc.) in use today as well as the emerging systems such as 5G. The course focuses on the analysis, principle, and application of the communication systems, both digital and analog. Students will learn Fourier techniques and their usages in communication systems, brief review of probability theories, concept of information theory, different modulation and demodulation techniques. The students will learn mathematical details; the applications of different matrices and their limitations. The course discusses details of Wireless Sensor Networks (WSNs), Near Field Communication (NFC) and RFID. Focusing on the technology aspects such as its standardization, architecture, operation modes, physical layer and security element.

EEN 688 Special Topics (1-3)
Prerequisites: None

The course offers a relatively new subject that is not currently available in the catalog, but will be of great relevance to electrical engineering. It consists of lectures, readings, homework, presentations and projects determined by the instructor.

EEN 689 Independent Study (1-3)
Prerequisites: Approval by Department Chair
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

EEN 691 Research Project (1)
Prerequisites: Approval by Department Chair
Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in electrical or computer engineering, prepare a technical report, and defend it in front of a faculty advisor.

EEN 692 Research Project (2)
Prerequisites: Approval by Department Chair
Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in electrical or computer engineering, prepare a technical report, and defend it in front of a faculty advisor.

EEN 693 Research Project (3)
Prerequisites: Approval by Department Chair
Research Project is arranged with project advisor. Student will conduct independent research of an approved topic in electrical or computer engineering, prepare a technical report, and defend it in front of a faculty advisor.

EEN 698 Master Thesis I (3)

Prerequisites: Approval by Department Chair

Thesis research is arranged with thesis advisor upon an approval by chair of the department. Students will conduct independent research in computer engineering, prepare a thesis, and defend it in front of a committee consists of a number of faculty designated by department chair.

EEN 699 Master Thesis II (3)

Prerequisites: Approval by Department Chair

Master Thesis II is a continuance of Master Thesis I. It is upon recommendation of student's thesis advisor and approval of chair of the department. Paper submitting for publication is required.

EEN 714 Advanced Microprocessor Design (3)

Prerequisites: EEN 513

The course provides a comprehensive guide for system designers and computer engineers. It covers broad and in-depth topics from computer architecture and operating system designs to system implementations. It is a fast paced course intended for graduate students in Electrical and Computer Engineering, as well as Embedded System professional. Design flow will be covered and EDA tools will be used in practice. Microprocessor architectures from MIPS, Intel, and ARM will be discussed and evaluated, as well as Operating Systems such as uClinux. Low-power and high performance microprocessors, parallel processing architectures, AI chips, and computer interface will also be discussed in detail.

EEN 717 Advanced Analog IC Design (3)

Prerequisites: EEN 515

The course provides an understanding of analog circuit and systems design and complex CMOS IC issues. Topics include high-frequency amplifiers, high-Q oscillators, low-noise circuits, selecting passive components for minimum mismatch, non-linear systems, active filters, A/D and D/A converters, grounding and shielding, layout and system design. Students will design a medium-complexity analog circuit starting from performance and parametric specifications. The course will require heavy use of HSPICE and some electromagnetic modeling.

EEN 719 Advanced RF IC Design (3)

Prerequisites: EEN 515 or EEN 618

This advanced course introduces designs of local oscillators and baluns, supporting mixed signal circuits like A/D converters and baseband filter-amplifier blocks. The course will include a significant design project that is typically a subsystem like a power amplifier or low-noise amplifier. The design will be done using SpectreRF, the circuits will be laid out using Cadence Virtuoso, and the parasitic parameters will be extracted using Assura.

EEN 732 Advanced Nanotechnology (3)

Prerequisites: None

The course is further study on quantum behaviors which mechanic, electronic, magnetic, optical and chemical properties open the door to a new domain of engineered nanostructures and nanodevices, with enormous applications in many aspect of life. Students learn small-scale quantum phenomena, device fabrication, analysis and synthesis processes, instrumentation for characterization and integration of Nano devices and systems.

EEN 736 Advanced Sensor/Bio Design (3)

Prerequisites: EEN 635

The course applies parametric design and optimal design to micro-electro-mechanical systems with an emphasis on design and micro-mechanical simulation. The primary

thrust of the course will be experimental, with an actual design and fabrication project to be built in a local MEMs fabrication facility. The design will be analyzed for electromechanical properties and compared to the simulations.

EEN 739 Advanced Bioelectronics and Bioengineering (3)

Prerequisites: EEN 637

This advanced course will emphasize on microfabrication, instrumentation, biomedical imaging and lab on chip technologies. The course draws upon the knowledge of experts in the field who will take part in delivering the course and supervising the laboratory experiments.

EEN 749 Advanced Digital Signal Processing (3)
Prerequisites: EEN 541

The course focuses on advanced techniques in signal processing. Stochastic signal processing, parametric statistical signal models, and adaptive filtering will be discussed. Application to spectral estimation, speech and audio coding, adaptive equalization, noise cancellation, echo cancellation, and linear prediction will be covered.

EEN 753 Advanced Machine Learning Engineering (3)

Prerequisites: CEN 510 or CSC 580

The course introduces artificial intelligent theories, algorithms, and applications. The course covers detection and analysis, self-learning system; Bayesian network, sensor data analysis, pattern recognition, observation-based self-localization, map learning, environment reconstruction, motion planning and motion control. Project of robot system design will be applied as practice.

EEN 758 Advanced Embedded System Design (3)
Prerequisites: EEN 646

The course intends to expose students to the state-of-the-art design and analysis techniques for embedded systems. Fueled by advances in semiconductor technology and consumer demands, many embedded systems have become so complex that the design capability simply prevents such systems to be realized. In the last decades, new research areas targeting at advanced embedded system design have emerged. In this course, major results in this field will be discussed. The main topics include system modeling, performance and power/energy analysis and estimation, system-level partitioning, synthesis and interfacing, co-simulation and emulation, and reconfigurable computing platforms. Research papers with significant impacts on the above topics are studied in detail. Class discussions and research project participation are integral parts of the course.

EEN 766 Advanced Communication Systems (3)
Prerequisites: None

The course focuses on up-to-date digital communication systems and technologies. It covers introductory information and coding theory, baseband transmission systems, optimum receiver structures, intersymbol interference, equalization, various modulation and corresponding demodulation schemes and application of digital systems.

EEN 774 Advanced Wireless Communications (3)
Prerequisites: EEN 671

This course is an advanced course of EEN 671. The topics include: capacity of wireless channels, multi-user capacity and multi-user diversity, MIMO channel capacity and spatial

channel modeling, MIMO receiver design. The concepts are illustrated using examples from the WiMax and LTE systems.

EEN 891 Independent Study (1-6)

Prerequisites: Approval by PhD Advisor

Independent Study is designed for PhD students. The study topic could be special interest in electrical engineering under the direction of an instructor who is knowledgeable in the field. It may consist of readings, homework, tests, presentations and project reports assigned by the instructor.

EEN 907 Doctoral Dissertation Thesis (3)

Prerequisites: Approval by PhD Advisor

Doctoral Dissertation Thesis consists of a series of research studies and arranged with thesis advisor for PhD candidates upon his/her thesis topic approved. Students will conduct independent research in electrical or computer engineering, prepare for publication, prepare a thesis and defend it in front of a committee consists of a number of faculty designated by Department Chair.

CFL 591 Integrating Academic & Internship Learning (2)

Prerequisites: None

This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591 in order to be eligible to enroll in INT 593.

INT 593 Internship (1-3)

Prerequisites: CFL 591

This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A student may take a maximum of 10 credit hours of INT 593.

COURSE DESCRIPTIONS OF MATHEMATICS

AMS 510 Linear Algebra (3)

Prerequisites: None

This course covers algebraic basic concepts of matrices and matrix operations, determinants, systems of linear equations, Gauss elimination, LU decomposition, vector spaces with inner product, change of bases, transformations, and Gram-Schmidt orthonormalization. Meaning and purpose of eigenvalues and eigenvectors and algorithms for computing them are also introduced.

AMS 512 Applied Mathematics Methods (3)

Prerequisites: None

Recommended: AMS 510

The course emphasize on applying mathematical methods to analyze and solve engineering problems. The course starts with a review of Linear Algebra and its applications, and goes to introduction of some numerical methods including eigenvalue problems, ordinary differential equations (ODE's), and partial differential equations (PDE's), etc. Optimization and minimization methods are important consideration in applied math. Examples of equations and methods of Minimum Degree and Nested Dissection, Convection-Diffusion Equation, Conservation Laws, Multigrid Method, Investigations into Direct Methods for Solving Large Sparse Systems of Linear Equations, Thermal Analysis of the Heating of a Fiber Optic via Concentrated Solar Energy, Numerical Methods for Initial-value Problems, Comparison of Multigrid Methods for the One-Dimensional Convection-Diffusion Equation, Finite Difference Acoustics Modeling for Waveguide Loudspeaker Design, Poisson-Boltzmann Equation, Efficiently Solving the Two-way Wave Equation, etc. will be introduced. Students are encouraged to use applied math on engineering applications through group projects.

AMS 514 Fast Fourier Transformation & Applications (3)

Prerequisites: None

The course provides electrical/computer engineering and applied mathematics graduate students with the background knowledge of Fourier Transformations (FT), Discrete Fourier Transformations (DFT) and Fast Fourier Transformations (FFT). The applications of FFT in Filter Design, Signal Processing and Image Processing are also included in this course.

AMS 520 Optimization Techniques   (3)

Prerequisites: None

The course covers basic concepts of unconstrained optimization, linear programming, simplex method, degeneracy, multidimensional optimization problems involving equality or inequality constraints by gradient and non-gradient methods.

AMS 530 Numerical Analysis (3)

Prerequisites: None

The course covers numerical solution of linear system of equations by direct method and iterative method, numerical least square problem, eigenvalue problem, numerical solution of non-linear systems of equations and optimization problem.

AMS 540 Discrete Mathematics (3)

Prerequisites: None

The course covers topics that are important in the development of computer algorithms and data structures, such as mathematical induction, asymptotic notations, recurrences, infinite series summations, graphs, digraphs, trees and counting combinatory and discrete probabilities analysis and statistical quality control.

AMS 552 Probability, Statistics and Reliability for Engineers (3)

Prerequisites: None

This course provides an introduction to the field of statistics and how engineers use statistical methodology as part of the engineering problem-solving process. It covers the basic concepts of probability, discrete, probability distributions, random sampling and data description techniques. The course also addresses the hypothesis tests, ANOVA, linear regression, and factorial design of experiment to build a solid foundation of statistical analytics skills. Furthermore, the course will, through statistical analysis, cover the engineering applications including measurement system analysis, process capability analysis, robust design verification, statistical process control, and statistical data mining. Reliability concept, block diagram, and reliability modeling are also introduced to predict and ensure the reliability performance.

AMS 722 Advanced Applied Mathematics Methods (3)

Prerequisites: AMS 512

The course will emphasize on the connection between mathematics and applied and natural science and technologies. Applied mathematics and computational methods encompass some of the most diverse and interdisciplinary research in the physical, engineering, and biological sciences, and are broadly used for the design and optimization of products and processes.

AMS 750 Abstract Algebra (3)

Prerequisites: AMS 510

This course provides the abstract algebraic knowledge necessary for coding theory and cryptography. The general notion of algebraic structures, groups, rings, fields. Ring of

polynomials over fields. Remainder classes of polynomials. Field extensions and Galois Fields. General field extensions, fields of rational, real and complex numbers. Some complex arithmetic. Vector spaces over various fields including GF(2). Euclidean algorithm in finite fields. Linear algebra in $GF(2^n)$. The algebra used in AES. Square roots of elements in $GF(2^n)$.

AMS 760 Advanced Optimization Techniques (3)

Prerequisites: AMS 520

Combinatorial optimization, Hopfield neural network model, Simulated Annealing and Stochastic machines, mean field annealing, genetic algorithms, Applications to: Tabu search, traveling salesman problems, telecommunications problems, quadratic 0-1 & quadratic assignment problems, graph partition and graph bipartition problems, point pattern matching problems, multiprocessor scheduling problems.

FACULTY

- Dr. May Huang, PhD, International Technological University. Served as Principal Engineer and Project Manager at Virtual Silicon, Hitachi, VLSI Tech Inc. etc., guest professor at Peking University, Tsinghua University, Beijing University of Post and Telecommunication, China. Department Chair.
- Dr. Neeli R. Prasad, PhD, University of Rome "Tor Vergata", Italy. CEO and Founder of SPA Solutions LLC, senior member of IEEE, committee member IEEE Communication Society (ComSoc) Globecom/ICC Management and Strategy (GIMS) and chair of the Marketing, Strategy, and Staff Liaison Group.
- Dr. Karl Wang, PhD, Massachusetts Institute of Technology. Served as Director of Advanced Product Development at ARM,

Inc., Director of Microprocessor Development at Hitachi, VP of Design Services and IP Business Division at UMC, VP of Research and Development at Silicon Motion, Inc. Advisor of Embedded Research Lab., and VP of Research and Technology.

CORE FACULTY

- Dr. Eric Chen, PhD, Waterloo University. Tech Lead at Uber, Google and GE Healthcare. Advisor, AI Research Lab.
- Dr. Dominik Schmidt, PhD, Stanford University. Technology Analyst at QVT Financial LP and former Senior Director of Technology Development at Intel. Advisor, Bioelectronics Research Lab.
- Dr. John Kim, PhD, New Mexico State University. Served as Senior Engineer at Broadcom, District Manager at Panasonic, and a consultant at Electronics, Telecommunications Research Institute (ETRI), Sybersay Communications, and Bell Labs in Lucent Tech.
- Dr. Ted Sun, PhD Santa Clara University. Served as Engineer at Cadence, Integrated Device Technology, etc.

ADJUNCT FACULTY

- Dr. Raminder Bajwa, PhD, Pennsylvania State University. Director of ASIC design at Google.
- Dr. Fred Cheng, PhD, ITU. COO of Tend Insight Inc., and former CTO of TChips Technology and VP of Marketing at Winbond.
- Dr. John Ladasky, PhD, Stanford University. Founder of Blind Watchmaker LLC. Research Scientist, Bioelectronics Research Lab.
- Dr. Qingning Li, PhD, University of Utah. System Consultant at Engineering Information and former designer at IBM. Advisor, Green Energy Research Lab.
- Dr. Bhaskar L. Mantha, PhD, University of

Cincinnati. Served as Engineer at Intel, VLSI Technology, Hynix, and Zilog.
- Dr. Xiaoshu Qian, PhD, University of Rhode Island. Designer at Intel.
- Dr. Jagadeesh Vasudevamurthy, PhD, McGill University, Canada. Senior Engineer at Xilinx, Mentor Graphics and Synplicity.
- Weihan Wang, PhD Candidate, University of Toronto. Cofounder and CTO of AeroFS. Research Scientist, Embedded Research Lab.
- Dr. John Ye, PhD, University of Southern California. Engineering Director at Camel Microelectronics, Inc. Advisor, SoC Research Lab.
- Dr. Henry Zhang, PhD, University of Texas at Austin. Director of ASIC design at Sundisk.
- Dr. Qing Zhu, PhD, UC Santa Cruz. Engineering Manager at eveRAM Technology Inc, Intel and SanDisk.

DEPARTMENT OF ENGINEERING MANAGEMENT

MISSION

The mission of the Engineering Management Department at ITU is to train graduate students to become both competent managers of projects in technology-oriented businesses and entrepreneurial leaders.

INSTITUTIONAL LEARNING OUTCOMES (ILOS)

ILO #1: Problem Solving

ILO #2: Critical Thinking

ILO #3: Communication literacy

ILO #4: Collaboration and Teamwork

ILO #5: Technical literacy

ILO #6: Research Skills and Information Literacy

ILO #7: Individual Responsibility

MASTER OF SCIENCE IN ENGINEERING MANAGEMENT

The Master of Science in Engineering Management degree program provides practical training in the essential elements of running a technology-focused business including instruction in project management, business strategy, teamwork, collaboration, and communication, product management and marketing, accounting, finance, legal aspects of technology businesses, operations and supply chain management.

For some, engineering management is described as a "technical MBA." However, it is distinguishable from an MBA in its focus on training graduate students to manage the development of new technology and learning how to create competitive advantage from the strategic use of information technology.

Currently, companies are showing a preference for technical graduate students who have both a deep understanding of technology and who also show cross-training in business management knowledge and skills. It is with this emphasis that the Engineering Management Department focuses its training.

Moreover, given the effects of globalization on technology-based businesses, the ITU masters in engineering management degree emphasizes the need for candidates to develop a strong appreciation and awareness of emerging technologies and to be able to adapt to the constant impact of change in the business environment.

The standards to which the Engineering Management program aligns itself include models provided from universities who are members of the Masters in Engineering Management Program Curriculum (MEMPC). This is a prestigious group of nine top-tier universities in America including Cornell

University, Dartmouth, Duke, Johns Hopkins, MIT, Northwestern University, Purdue, Tufts University, and the University of Southern California.

The ITU department also studies guidance put out by the American Society of Engineering Management (ASEM) and participates in the Technology and Engineering Management special interest group of the IEEE.

PROGRAM LEARNING OUTCOMES (PLOS)

Upon completion of this program, graduates will:

PLO #1: Be prepared to lead engineering and technical project teams delivering new products and services whether in the United States or internationally. (Mapped to: ILO#4, Collaboration and Teamwork) and ILO#7, Individual Responsibility)

PLO #2: Be able to take a systems-approach to analyzing problems and managing projects. (Mapped to: ILO#1, Problem Solving and ILO#5, Technical Literacy)

PLO #3: Understand the process of aligning project goals and objectives with corporate strategy. (Mapped to ILO#1, Problem Solving and ILO#5, Technical Literacy)

PLO #4: Have a strong grasp of principles of project management and be able to apply them in the work setting. (Mapped to ILO#1, Problem Solving and ILO#5, Technical Literacy)

PLO #5: Be able to demonstrate good communication skills, both written and oral, as an engineering manager. (Mapped to ILO#3, Communication Literacy)

PLO #6: Demonstrate competence and knowledge in at least one area of technical emphasis, such as software engineering, electrical engineering, etc. (Mapped to ILO#5,

Technical Literacy and ILO#6, Research Skills and Information Literacy)

PLO #7: Show evidence of an entrepreneurial mindset that allows the engineering manager to identify new business opportunities and an ability to develop an action plan to capitalize on new venture ideas. (Mapped to ILO#1, Problem Solving)

CAREER OPPORTUNITIES

Upon completion of the Engineering Management master's program at ITU, students, depending on their elective course choices, can prepare themselves for positions in engineering management, as lead project engineers, technology analysts, R&D managers, business analysts, data analysts, product managers, systems analysts, program managers, patent engineers or analysts, IT consultants, market research analysts, operations managers, management consultants, and more.

MASTER OF SCIENCE ENGINEERING MANAGEMENT PROGRAM REQUIREMENTS

Required Courses:

4 Core Courses: 12 credit hours

1 Capstone course: Project or Thesis: 3 credit hours

1 Internship: 1 credit hour

Elective courses: 11-20 credit hours

Internship: 1-9 credit hours

Cross Disciplinary course: Up to 3 credit hours

Transfer Credits: Up to 9 credit hours from a graduate program of a regionally accredited school

36 total credit hours

REQUIRED CORE COURSES

EMG 500 Principles of Engineering Management

EMG 501 Engineering Practicum

EMG 502 Organizational Behavior

EMG 503 Product Management

CAPSTONE COURSE

EMG 690 Capstone Project

OR

EMG 697 Thesis

ELECTIVE COURSES

Electives from the MSEM curriculum must be chosen so that the total number of credit hours completed is at least 36.

EMG 510 Mobile Applications and IoT Development for Entrepreneurs

EMG 511 Technology Management and Entrepreneurship

EMG 522 Fundamentals of Business Analysis for Software Development

EMG 540 Writing and Presentation Skill-Building for Engineering Managers

EMG 541 Project Management for Engineers and Engineering Managers

EMG 542 Engineering Manager's Toolkit

EMG 545 Introduction to Medical Devices and Digital Health Products

EMG 549 Introduction to Software Development & Business Architecture for Engineering Managers

EMG 550 Software QA & Testing for Business Analysts

EMG 551 Agile Methodologies

EMG 552 DevOps and Microservices Architecture

EMG 553 Business Technology Strategy

EMG 554 Management Consulting

EMG 557 Internet of Things (IoT) Management Issues

EMG 559 Introduction to Sensor Technology for Engineering Managers

EMG 560 Cybersecurity Management

EMG 563 Introduction to Intellectual Property Management

EMG 564 Quantitative Analysis for Engineering Managers

EMG 565 Healthcare Product Economics and Outcomes

EMG 568 Technology Management

EMG 570 Cloud Computing Management Issues

EMG 574 Physics for Engineering Managers

EMG 579 Business Process Management

EMG 588 Special Topics

EMG 689 Independent Study

COURSE DESCRIPTIONS

EMG 500 PRINCIPLES OF ENGINEERING MANAGEMENT (3)

Prerequisites: None

This course will provide an overview of the essential skills relevant to managing engineering and science-based teams in a variety of industries. Such teams are typically responsible for new product development, getting innovations to market, developing new technologies, implementing product improvements, establishing or improving technical processes, and setting up organizational infrastructure. Students will focus on the fundamental skills and applications of engineering and science management and will be introduced to business and engineering topics needed to be successful in the field. Major topics include the areas of leadership and ethics, general management principles, teamwork, collaboration, project management, risk management, systems engineering, organizational structure and behavior, customer service, business communication, marketing, trends in science and technology, innovation management, entrepreneurship, and more.

EMG 501 ENGINEERING PRACTICUM (3)

Prerequisites: None

This course is an exercise in applying the principles of project management to an engineering or other technical objective. Project management training features will include team formation, leadership skills development, collaboration, market research and assessment, project planning, generating a

project charter with business case justification, work breakdown structure, risk assessment, task assignments, scheduling, on-going project-reporting, conflict resolution, a final project report and presentation.

EMG 502 ORGANIZATIONAL BEHAVIOR (3)

Prerequisites: None

The purpose of this course is to provide students with a technical background to become effective managers and leaders. It covers a wide range of management and leadership issues that industries face today – from individual, to team, to entire organization. It includes: individual differences, personnel diversity, motivation in the workplace, managing individual stress, interpersonal communication, managing interpersonal conflicts and negotiation, team building, leadership models and styles, decision making in organizations, organizational culture and managing change.

EMG 503 PRODUCT MANAGEMENT (3)

Prerequisites: None

The product manager is responsible for the strategy roadmap, and feature definition of a product or product line. In this course, students will learn about the general role of the product manager in technology-oriented businesses.

EMG 510 MOBILE APPLICATIONS AND IOT DEVELOPMENT FOR ENTREPRENEURS (3)

Prerequisites: None

This course teaches how to develop applications for mobile computing devices such as iPhones, Android smartphones, iPads, etc. Topics to be covered will include client hardware (desktop and mobile), Android development with Java, iOS development with Swift, web services and RESTful API, creating and incorporating web and cloud services, IoT and its business applications, security and trust management, usability and accessibility.

EMG 511 TECHNOLOGY MANAGEMENT AND ENTREPRENEURSHIP (3)

Prerequisites: None

This course focuses on the connection between entrepreneurship and the creation of new technologies which drive economic development and the creation of wealth. A second area of study focuses on the existence or establishment of an "innovation ecosystem" to create and sustain economic development.

EMG 522 FUNDAMENTALS OF BUSINESS ANALYSIS FOR SOFTWARE DEVELOPMENT (3)

Prerequisites: None

In this course, students will learn about the basic duties of business analysts in the field of software development. Overall, business analysts help companies solve problems by developing a process or technical solution. A business analyst's work is done at many levels within a company, but at its core necessitates an understanding of the Software Development Life Cycle (SDLC) which involves: a) planning a software project, b) identifying the project scope, c) eliciting, analyzing, and communicating requirements, d) designing a solution, e) building or buying the solution, f) testing the solution, g) implementing the solution, and h) conducting a post-project review.

EMG 540 WRITING AND PRESENTATION SKILL-BUILDING FOR ENGINEERING MANAGERS (3)

Prerequisites: None

The key emphasis of this course is on writing. The students will begin by receiving training on producing technical engineering reports, summarizing engineering management academic literature and journal articles, writing engineering research reports, writing a thesis in the engineering management discipline, and more.

EMG 541 PROJECT MANAGEMENT FOR ENGINEERS AND ENGINEERING MANAGERS (3)

Prerequisites: None

Project management knowledge and techniques are critical to *getting complex technical projects completed on time and on budget.* A project engineer's responsibilities include schedule preparation, pre-planning and *resource forecasting for engineering and other technical activities related to the project.* They may also be in charge of performance management of vendors. The role of an engineering manager is usually permanent and different from that of a project manager who works on specific projects. In this course, engineering management students will delve deeply into learning about the role and responsibilities of engineering project managers in Silicon Valley and other high-tech environments.

EMG 542 ENGINEERING MANAGER'S TOOLKIT (3)

Prerequisites: None

Recommended: College Algebra, minimum background necessary. Training up to Calculus preferred.

This course provides an overview of essential quality management topics important for engineering managers to know. More specifically, the course content includes discussion and the study of Failure Mode and Effects Analysis (FMEA), statistical process control (SPC), the design of experiments (DOE), supplier management assessment, process capability analysis, and systematic problem solving (including topics such as TRIZ and root cause analysis).

EMG 545 INTRODUCTION TO MEDICAL DEVICES AND DIGITAL HEALTH PRODUCTS (3)

Prerequisites: None

This course provides an introduction to the special regulatory requirements associated with developing medical devices (i.e., medical treatment and diagnostic products), as well as other new technologies in the emerging digital health industry.

EMG 549 INTRODUCTION TO SOFTWARE DEVELOPMENT AND BUSINESS ARCHITECTURE FOR ENGINEERING MANAGERS (3)

Prerequisites: None

This course provides a comprehensive introduction to computer programming and software development. The instruction will benefit individuals pursuing management careers in programming and software development, as well as anyone in the information technology field who works with programmers and systems analysts. General topics covered will include: 1) Problem-solving approaches to software development 2) Specifications and requirements 3) User-interface design 4) Structured program design.

As to programming concepts, the course will provide basic instruction in Python, C, C#, Java, Visual Basic and shell scripting. The course includes working with different operating systems, such as Linux. As exercises, students will develop small web applications and mobile apps. The full software development life cycle (SDLC) will be taught, including unit test and integration, alpha / beta testing, and software defect tracking and classification.

EMG 550 SOFTWARE QA & TESTING FOR BUSINESS ANALYSTS (3)

Prerequisites: None

This course will cover the typical software testing methods found in industry and will prepare business analysts and others with a need to know about the fundamentals of

software testing procedures and practices found in Silicon Valley.

EMG 551 AGILE METHODOLOGIES (3)

Prerequisites: None

Agile software development is an umbrella term for a set of methods and practices based on the values expressed in the 2001 Agile Manifesto which documented the views of leading software developers in the field at that time. This course instructs students on these industry best practices.

EMG 552 DEVOPS AND MICROSERVICES ARCHITECTURE (3)

Prerequisites: None

In general, DevOps represents a change in information technology (IT) culture focusing on rapid IT service delivery through the adoption of agile, lean practices in the context of a system-oriented approach. DevOps emphasizes people and culture and seeks to improve collaboration between operations and software development teams. In this course, you will learn the key ideas and techniques to bring development and operations together to produce higher-quality software and deliver it more quickly. You will also develop the ability to integrate communication, collaboration, integration and automation in order to improve the flow of work between software developers and IT operations professionals for faster development and deployment.

EMG 553 BUSINESS TECHNOLOGY STRATEGY (3)

Prerequisites: None

This course is aimed at engineers and managers who want to be leaders in a technical environment and advance into executive roles. Students will learn the basic skills and techniques that a majority of executive teams apply to address strategic and operational problems in an integrated way across multiple business and technology domains. In the first half of the course you will learn the fundamentals: what strategy is, and what are the most common techniques and tools for strategy assessment and formulation. In the second half we move from fundamentals to organizational and personal implications for technical leaders, such as chief information officers, chief technology officers, enterprise architects and program managers. Two fundamental questions dealt with in the course are: How to make better use of IT to increase the productivity of the business? How to leverage IT innovations to help the business win in an increasingly digitized world?

EMG 554 MANAGEMENT CONSULTING (3)

Prerequisites: None

This course is aimed at those specifically interested in consulting careers and/or whose future jobs involve working with consultants. Students will learn the basics of the consulting profession with subsequent emphasis on business technology (BT) – the ever increasing reliance on information technology by business of all types to digitize and optimize their business models. In the first part of the course you will learn the basic principles that apply to any consulting-based approach and explore a range of topics that define consulting knowledge. These topics cover the consulting process from preparation for and delivery of client engagements to management of engagement-related obstacles and the development of advising skills.

In the second part of the course, students will explore a range of topics that consultants and their consulting clients need to know when engaging on BT change initiatives. These topics cover the essential building blocks of any digital transformation blueprint: lean thinking and innovation, process automation, organization and change management, technology insights, and data and analytics.

EMG 557 INTERNET OF THINGS (IOT) MANAGEMENT ISSUES (3)

Prerequisites: None

The Internet of Things is a proposed development of the Internet in which everyday objects will have networked connectivity, allowing them to send and receive data. This course is focused on studying the management problems that will arise in connection with this rapidly emerging technology.

EMG 559 INTRODUCTION TO SENSOR TECHNOLOGY FOR ENGINEERING MANAGERS (3)

Prerequisites: None

Sensor technology is an important aspect of the Internet of Things which is forecasted to have huge impacts on business and society in the near future. This course is designed to give students a hands-on introduction to the kind of devices changing our world with the Internet of Things and will provide them with a basic understanding of the core technology allowing them to engage in product development and prototyping.

EMG 560 CYBERSECURITY MANAGEMENT (3)

Prerequisites: None

This course is an introduction to cybersecurity principles, processes and technologies. It presents students with a detailed overview of best practices in the management, governance, and policy development of cybersecurity measures for businesses and organizations.

EMG 563 INTRODUCTION TO INTELLECTUAL PROPERTY MANAGEMENT (3)

Prerequisites: None

In this course students will learn about the connection between knowledge, innovation and intellectual property asset creation. Moreover, they will also learn about the value and importance of the proper management of IP assets including: 1) Identifying existing intellectual property assets and the need for developing new ones. 2) Documenting existing and new intellectual property. 3) Deciding on the proper form of intellectual property protection needed in any particular instance. 4) Deciding how the intellectual property asset will be used. 5) Periodically reassessing the value and use of the intellectual property portfolio.

EMG 564 QUANTITATIVE ANALYSIS FOR ENGINEERING MANAGERS (3)

Prerequisites: College Algebra, minimum requirement. Pre-Calculus or Introduction to Calculus is the preferred background.

The content of the course will be on applied mathematics in such areas as technology forecasting, linear programming, transportation network flows, practical applications of determinants and matrices, calculus-based optimization, inventory control models, queuing theory, as well as other math topics in operations research and supply chain management.

EMG 565 HEALTHCARE PRODUCT ECONOMICS AND OUTCOMES (3)

Prerequisites: None

This course explores the various synergistic dynamics of healthcare product economics and outcomes. Topics will include reimbursement overview, insurance coverage, product design, comparative effectiveness review, and the Affordable Care Act. Emphasis will be placed on how creative innovations and synergism can impact the healthcare industry and economics.

EMG 568 TECHNOLOGY MANAGEMENT (3)

Prerequisites: None

In this course, students will develop a broad understanding of technology management and its importance in establishing competitive advantage in a globalized world. Content will include studies of leadership, technology trends, market analysis, innovation management, product development, business model analysis, effective organizational structure, team building and collaboration, project management, and effective business communications.

EMG 570 CLOUD COMPUTING MANAGEMENT ISSUES (3)

Prerequisites: None

Cloud computing is the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer. In this class students will study the issues associated with managing cloud services and the business considerations needed before switching to the cloud.

EMG 574 PHYSICS FOR ENGINEERING MANAGERS (3)

Prerequisites: None

This course has been designed for graduate engineering management students who are not degreed engineers. It provides non-engineers with a good grounding in physics principles and applications and gives students a means to transition into the role of technical management.

EMG 579 BUSINESS PROCESS MANAGEMENT (3)

Prerequisites: None

Business process management is a discipline that uses various methods to discover, analyze, measure, improve and optimize business processes in an organization. In this course, students will learn about the basic methods used to analyze business processes and will develop skill in conducting business process analysis.

EMG 688 SPECIAL TOPICS (1-3)

Prerequisites: None
Special topics courses cover subjects not currently contained in the curriculum, but are designed to address especially relevant trends or developments related to the discipline.

EMG 689 INDEPENDENT STUDY (1-3)

Prerequisites: None
Independent Study allows students to explore academic areas of special interest not provided in the existing curriculum. It is carried out under the guidance of a member of the faculty.

EMG 690 CAPSTONE PROJECT (3)

Prerequisites: None

Required: Department Chair approval and completion of 18 credit hours of the MSEM program.

During the last two trimesters of their training, students in the ITU Engineering Management Department must complete a capstone project or write a master's thesis. If the capstone project option is chosen, engineering management students are required to demonstrate their competence in the skills and knowledge associated with their degree program. It is designed to show the in-depth learning and higher-order thinking of the students. With this option, students must choose a project in the field of engineering management. Then they will plan, organize, implement, and work towards the completion of the project in a controlled manner, so as to meet the goals and objectives of their project. The capstone project is usually carried out by an individual student. Before beginning work, each capstone project must first be approved by an Engineering Management Faculty

Advisor assigned by the Engineering Management Department Chair. At the end of the project, the student will prepare a Final Project Report and defend this work product before the Faculty Advisor and a panel of other assigned faculty members.

EMG 697 THESIS (3)

Prerequisites: None

Required: Department Chair approval and completion of 18 credit hours of the MSEM program.

During the last two semesters of their training, students in the ITU Engineering Management Department must complete a capstone project or write a master's thesis. For the master thesis, the research must result in some new insights into the academic or practical concepts of the Engineering Management discipline. These must be fully analyzed, explained and documented in the thesis. If the Thesis Option is chosen, students must seek the assignment of an Engineering Management Faculty Advisor to guide their research on a topic in the field of engineering management. Additionally, the selection of a faculty advisor and the intended plan of study must be approved by the Engineering Management Department Chair. At the conclusion of the student's writing, the student will be required to orally defend the thesis before a committee assigned by the Engineering Management Department.

CFL 591 INTEGRATING ACADEMIC & INTERNSHIP LEARNING (2)

Prerequisites: None

This course provides an overview of expectations and requirements for INT 593 Internship, teaches students how to integrate their academic and internship learning, and enhances career skills development. A student must pass CFL 591(can be taken concurrently) in order to be eligible to enroll in INT 593.

INT 593 P/F INTERNSHIP (1, 3)

Prerequisites: CFL 591

This course consists of participation in a full-time or part-time internship experience, related to the student's field of study under the supervision of both an approved internship provider and a faculty advisor. This course provides practical, hands-on training in a relevant industry to enhance classroom learning. A maximum of 10 credit hours earned in INT 593 may be applied toward the Master's Degree graduation requirements.

FACULTY

Tom Tafolla, J.D. Law, University of San Francisco, Interim Department Chair

CORE FACULTY

- Girish Harshe, Ph.D. Solid State Electronics, Penn State University; MBA University of Chicago Booth School of Business; Core Faculty
- Bhairav Mehta, M.S. Industrial and Systems Engineering, Rochester Institute of Technology; M.S. Applied Statistics/Operations Research and MBA, Cornell University; MBA, Queen's University, Ontario, Canada; Core Faculty
- Mamoun Samaha, M.S. Electronics and Computer Engineering, Eindhoven University of Technology; Core Faculty
- Michelle Liang, Ph.D. Computer Science, Fudan University, Shanghai, People's Republic of China; M.S. Computer Engineering, University of Minnesota, Minneapolis, Minnesota; Core Faculty

FACULTY ADJUNCT

- Alex Peters, Post-Doctorate Fellowship, Princeton University; Ph.D. Engineering, RWTH Aachen University, Aachen, Germany; Adjunct Faculty
- Jeremy Tzeng, M.S. / Ph.D. Electrical Engineering, University of California Berkeley, Adjunct Faculty

- Robert Payne, L.LM. International Law, University College, University of London; J.D. University of California Davis, B.A. Stanford University; Adjunct Faculty
- Azadeh Adibi, Ph.D. Industrial Engineering, Arizona State University, Tempe, Arizona; M.S. Industrial Engineering, Wichita State University, Wichita, Kansas; Adjunct Faculty
- Yousef Al-Shehabi, Ph.D. Theology; M.S. Computer Science and Electrical Engineering, Santa Clara University; M.A. International Relations, San Francisco State University; Adjunct Faculty
- Claudia Sloan, MBA W.P. Carey School of Business, Arizona State University; B.S. Computer Science, University of Texas Dallas; Adjunct Faculty
- Kim-Yo Hsieh, Doctor of Chiropractic (D.C.), Palmer College of Chiropractic, San Jose, California; B.A. Biological Sciences, University of California Davis; Adjunct Faculty.

INTERNSHIP POLICY

PURPOSE

Hands-on experience and skill development is a key component of ITU's pedagogy. We recognize how important internships are in transferring course theory, concepts, and skills from a graduate program to a career in the student's field of study. For this reason, we are committed to linking the classroom with relevant industry experience. As affirmed by the university's Academic Leadership Council (ALC), ITU requires students to participate in an internship (one credit hour for part-time, three credit hours for full-time, up to a maximum of 10 credit hours per degree) as a core part of the curriculum for all of ITU's master degree programs.

Internships are managed through enrollment in INT 593, a course that may be taken for a maximum of ten credit hours over the course of an academic program. ITU reviews each internship request on an individual basis to ensure that it is consistent with the student's coursework and academic policies. For ITU students in F-1 international student status, the internship request must also meet the standards found in the U.S. Code of Federal Regulations – 8 CFR § 214.2(f)(10) (i).

ITU's internship eligibility requirements, academic components and expectations, procedures and due dates, and conditions are presented below.

ELIGIBILITY REQUIREMENTS

The following requirements apply to students who wish to participate in ITU's internship program:

- Admission/Enrollment – Students must be admitted to one of ITU's graduate programs. *F1 students need to enroll in a full course load of a minimum of nine credit hours per trimester. (Note: See exception below for Annual Vacation or Last Term of Study).
- INT 593 series enrollment – Students must enroll in INT 593 in order to have an internship. This course may be part of the student's 9 credit hour full time course load. Internships will not be approved as any other course at ITU, including independent study or special study courses. To continue an existing internship, students must enroll in INT 593 and follow the procedures listed here for each new trimester.

- Tuition/Fees – Students will not be allowed to apply for or begin an internship until all past tuition and fees have been paid in full.
- GPA – Students must maintain a minimum cumulative GPA of 3.0 and passing grades in INT 593.

- Internship relevance – Students must show that the requested internship is relevant to their field of study and that the internship provider has extended a formal offer that is consistent with the procedure below.
- Internship providers – Students may not have more than one internship provider at a time. Internships cannot be at the with the same company of employment. *All international students need to check with their immigration lawyer for eligibility to take part on internship.

ACADEMIC COMPONENTS AND EXPECTATIONS

All internships at ITU require enrollment in INT 593, Internship. This academic class is taken for one credit hour with part-time internships (up to 20 hours per week) or three credit hours with full-time internships (21 to 40 hours per week). In order to earn a passing grade, students must directly submit assignments listed below to their faculty member, and include: clear identification of their name, university ID number, the graduate program, the internship title, the internship provider's name, and the internship supervisor's name. Assignments may include:

- Description of internship – A presentation of the unique duties and responsibilities the student will perform during the internship. (Note: The internship cannot be a substitution for a paid staff position or a vacant position at the internship provider's organization).

  Mid-term internship report – An initial report by the student on his/her performance and progress in the internship, as well as specific information about the skills and knowledge being acquired relevant to the student's field of study. (Note: Such reports must first be cleared by the internship provider to observe

appropriate confidentiality and intellectual property constraints).
- Final internship report – A comprehensive report on topics covered in the mid-term report and supplemented by the student's evaluation of relevance of the internship to the student's academic program, career goals, and potential areas for future study and research beyond the internship.
- Final evaluation form – Submitted directly to the faculty member by the internship provider during the last two weeks of the trimester with the signatures of the internship supervisor and an HR representative of the organization providing the internship.

CONDITIONS FOR ALL STUDENTS

To ensure compliance with ITU's policies, the following conditions apply to all students attending ITU:

- First time internships – Internships for the first time with ITU will be limited to a part-time internship. An exception will be allowed for students who can demonstrate a prior successful internship or training experience related to a degree they earned in the U.S. Evidence of such an experience may include an academic transcript showing a passing grade in an internship course, a report from the institution's internship program showing satisfactory performance, and/or a letter of recommendation from an employer or other evidence that the student was authorized to work for during a period of Optional Practical Training.
- Integrating Academic & Internship

Learning (CFL 591) – Students must enroll in the Integrating Academic & Internship Learning (CFL 591) course before beginning their first internship. However, students who apply and are approved for internship their first trimester may take CFL 591 concurrently during that same first trimester.

- Continuous enrollment/attendance – If the internship provider ends the agreement, the student will not be permitted to continue with the internship. Or if an *F1student drops below full-time enrollment (Note: See exception below for Annual Vacation) will not be permitted to continue with the internship.

- Start/End dates – As mentioned above, internships are approved only in conjunction with enrollment in INT 593. For this reason, internships cannot begin sooner than the trimester start date and must end by the trimester end date. No part of the internship may take place during break periods between trimesters.

- Grade Point Average (GPA) requirements – Students must maintain a minimum 3.0 cumulative GPA in their program at ITU to remain eligible for an internship. Once official grades have been posted for the prior trimester, any student who holds a cumulative GPA below 3.0 will lose all internship eligibility (i.e., both full-time and part-time), including eligibility for the trimester in progress.

- Students who maintain a cumulative GPA of 3.0 or higher once final grades have been posted and has earned a term GPA below 3.0 will only be eligible to request a part-time internship.

- Students who have an incomplete grade and wish to apply for an internship must submit all outstanding

work by the deadline to apply for internship. The final grade must be posted prior to the start of the internship. GPA requirements will apply.

- Students who have an incomplete grade and who do not submit completed outstanding coursework by the end of the subsequent academic term, will not be eligible to apply for internship (part-time or full-time), regardless of their cumulative GPA. (Refer to Incomplete grade policy).

- Students whose term GPA for the most recent trimester is 3.0 or higher, but cumulative GPA remains below 3.0, will not be eligible for internship.

Note: coursework taken at another institution will not be considered in determining eligibility for an internship in an ITU program.

- Academic performance requirements (INT 593) – A student who receives a grade of "NP" (no pass) in INT 593 will be reduced to part-time internship. If a second grade of "NP" (no pass) is received in INT 593, the internship will be cancelled and the student will be ineligible for future internships at ITU.

- Academic performance requirements (CFL 591) -- A student must pass CFL 591 by the end of the trimester in which they complete their first internship or that student will lose all internship eligibility for the next term. Internship eligibility will be restored only if a passing grade has been earned in CFL 591 by the end of the following trimester.

- Maximum internship credit hours – Students are limited to ten total credit hours for INT 593. For each part-time internship (up to 20 hours per week),

one credit of INT 593 will be used. For each full-time internship (21 to 40 hours per week), three credits of INT 593 will be used. This limit applies to both new and continuing students. A change in programs or interruption of studies will not reset this limit.

- Change of internship provider – ITU recognizes that unforeseen circumstances may require the change of an internship provider. To allow completion of INT 593, students will be allowed to change their internship provider once per trimester. However, after a second internship request has been submitted in the same trimester, no further changes will be permitted.

A student may not request a change of internship authorization level (i.e. part-time to full-time/full-time to part-time) during the trimester in progress unless the request is the result of an adjustment of eligibility based on GPA and is submitted completely on or before the add/drop deadline.

Students may not change an internship provider after Friday (6:00pm) of the eighth week of the trimester. If an internship ends after the eighth week, the grade in INT 593 will be based on performance up to that point.

INCOMPLETE GRADE POLICY

Incomplete grade must be student initiated.

An Incomplete "I" is a temporary grade which may be given at the instructor's discretion to a student when illness, unanticipated extraordinary circumstances, or other reasons clearly beyond the control of the student prevent completion of course requirements by the end of the term.

Incomplete grades may be given only in the following circumstances:

1. The student's work to date is passing;
2. Attendance has been satisfactory through at least 50% of the term; an illness or other extenuating circumstance legitimately prevents completion of required work by the due date;
3. Required work may be reasonably completed in time frame agreed upon by the instructor and the student;
4. The incomplete is not given as a substitute for a failing grade;
5. The incomplete is not based solely on a student's failure to complete work or as a means of raising his or her grade by doing additional work after the grade report time frame;
6. The student initiates the request for the incomplete grade before the last day of the class,
7. The instructor and the student submit a Petition for Incomplete Grade form before the last day of the class
8. In other circumstances, the appropriate grade must be assigned. A failing grade and last date of attendance should be recorded for students who cease attending class without authorization. Students who are unable to complete a course and who do not meet these circumstances should consider dropping course.
9. The following provisions for Incomplete grades apply:
10. It is in the student's best interest that incomplete grades are made up by the end of the following academic term. Incomplete grades must be made up and final grades submitted no later than the last day of the subsequent term.
11. An Incomplete grade may not be considered passing for purposes of determining academic standing.

12. An Incomplete grade may not be considered for a student in their last term of attendance.
13. Students who have an incomplete grade and who do not submit complete outstanding coursework by the end of the subsequent academic term, will not be eligible for to apply for a part-time or full-time internship, regardless of their cumulative GPA.
14. The Incomplete grade counts toward the student's attempted credit hours, but is ignored in the calculation of the student's GPA.
15. The Incomplete grade is expunged from the academic record and the final permanent letter grade is recorded when the final grade is submitted via a Grade Change form.
16. The Incomplete grade is converted to a F, Failing grade if the student does not submit coursework according to the agreed deadline documented on the Petition for Incomplete form.
17. The Incomplete grade does not apply to courses such as Capstone, Independent Study, Thesis, Internship, CFL, etc.