# 2016 - 2017
## Course Catalog & Student Handbook
*August 1, 2016 - July 31, 2017*

Every effort has been made to ensure the accuracy of the information presented in the Student Handbook. However, standards, tuition and fees, and graduation or completion requirements, may be changed from time to time. This publication is intended for information purposes only and is subject to change without notice. Consult the ITU website at www.itu.edu for the most current information relating to students.

## 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, allow me to welcome you to the start of your academic year! We are proud to be your university of choice and wish you a most successful year ahead.

In this catalog, you will find a wealth of valuable and important information about ITU's academic programs, services, procedures, and important 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 field, they impart relevant and applicable skills that students can use long after graduation. I have no doubt that your time and experience at ITU will set you apart from the crowd. It is our shared goal that when you graduate you will leave, not only educated, but also prepared for the job opportunities ahead.

Please feel free to peruse our catalog and learn more about our University's rich history and ideals. You can read about our academic and research programs led by distinguished industry and academic leaders or learn more about our acclaimed research laboratories. Important information about services to support your personal and professional success are described here, as well as regulations and procedures. This catalog is a microcosm of the bounty of knowledge and experience that awaits you at ITU.

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 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 that 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 2016 | |
|---|---|
| Admissions Application Period | May 15 – August 15 |
| Enrollment  Confirmation Deadline (for new students) | September 2 |
| Regular Registration Period (priority enrollment based on seniority) | August 1 - September 4 |
| Late Registration Period (additional fees apply) | September 5 - September 11 |
| Add/Drop Period for On-Campus Classes | September 12 - September 23 |
| Add/Drop Period for Online Session I Classes | September 12 - September 16 |
| Add/Drop Period for Online Session II Classes | October 31 - November 4 |
| On-Campus Classes | September 12 - December 23 |
| Online Session I Classes | September 12 - October 30 |
| Online Session II Classes | October 31 - December 18 |
| Holidays (campus closed) | November 24 - 25 |
| Holiday Break (no classes) | December 24 - January 1 |

| SPRING 2017 | |
|---|---|
| Admissions Application Period | September 15 – December 15 |
| Enrollment  Confirmation Deadline (for new students) | December 30 |
| Regular Registration Period (priority enrollment based on seniority) | November 28 - January 1 |
| Late Registration Period (additional fees apply) | January 2 - January 8 |
| Add/Drop Period for On-Campus Classes | January 9 - January 20 |
| Add/Drop Period for Online Session I Classes | January 9 - January 13 |
| Add/Drop Period for Online Session II Classes | February 27 - March 3 |
| On-Campus Classes | January 9 - April 23 |
| Online Session I Classes | January 9 - February 26 |
| Online Session II Classes | February 27 - April 16 |
| Holidays (campus closed) | January 16 February 20 |
| Commencement Ceremony | May 13 |

| SUMMER 2017 | |
|---|---|
| Admissions Application Period | January 15 – April 15 |
| Enrollment  Confirmation Deadline (for new students) | April 28th 2017 |
| Regular Registration Period (priority enrollment based on seniority) | March 27 - April 30 |
| Late Registration Period (additional fees apply) | May 1 - May 7 |
| Add/Drop Period for On-Campus Classes | May 8 - May 19 |
| Add/Drop Period for Online Session I Classes | May 8 - May 12 |
| Add/Drop Period for Online Session II Classes | June 26 - June 30 |
| On-Campus Classes | May 8 - August 20 |
| Online Session I Classes | May 8 - June 25 |
| Online Session II Classes | June 26 -  August 13 |
| Holidays (campus closed) | May 29 July 4 |

## 2017-2019 AT A GLANCE

| | |
|---|---|
| Fall 2017 | September 5 - December 17 |
| Spring 2018 | January 8 - April 22 |
| Summer 2018 | May 7 - August 19 |
| Fall 2018 | September 4 - December 16 |
| Spring 2019 | January 7 - April 21 |
| Summer 2019 | May 6 - August 18 |

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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 required 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 PhD 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 PhD 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 22nd 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 PhD 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 2010

## 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 Software Engineering
- Doctor of Business Administration
- Doctor of Philosophy in Electrical Engineering
- Doctor of Philosophy in Interdisciplinary Sciences

## 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 below.

## ADMISSION CYCLES

Applicants should aim to apply for their targeted term within the application cycles below:

| TERM | CLASSES START | APPLICATIONS DUE |
|---|---|---|
| Fall | September | May 15 - August 15 |
| Spring | January | September 15 - December 15 |
| Summer | May | January 15 - 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 read, write, and speak the language fluently – is vital to the student's success as a university student. ITU graduate applicants are therefore expected to demonstrate English-language 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 as a guide to accurately and efficiently measure the potential academic success in the graduate program of interest.

A reasonable level of English proficiency in reading, writing, listening, speaking and understanding is important for an international student's success in a graduate educational environment. It is the responsibility of the Office of Admissions to evaluate the potential success of each applicant by utilizing standardized test scores, which are backed up by reliable research, in the admissions process.

Applicants are required to demonstrate English proficiency by either submitting a TOEFL internet-based test (ibt) or IELTS academic score.

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

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

- 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.

- Students whose TOEFL or IELTS scores do not meet this benchmark will be required to partake in additional language training prior to arrival at ITU.

If the only requirement the applicant needs to meet in order to be admitted is the English proficiency requirement, the applicant may be admitted providing the English proficiency requirement is met prior to enrollment through test scores or exemption as described below.

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

1) **The Student has earned an undergraduate degree from a regionally accredited institution in the U.S.**

Should be a regular four-year undergraduate degree with the majority of its credit earned in the U.S. from a regionally accredited institution (see list below). Waivers will not be considered for credits earned at a branch campus in a non-English speaking country or degrees granted through distance learning programs. Credential evaluation may be required for transfer credits from foreign institution(s).

Degrees earned at institutions accredited by the following agencies are accepted:

- Middle States Association of Colleges and Schools (MSA)

- New England Association of Schools and Colleges (NEASC)

- North Central Association of Colleges and Schools (NCA)

- Northwest Commission of Colleges and Universities (NWCCU)

- Southern Association of Colleges and Schools (SACS)

- Western Association of Schools and Colleges (WASC)

- Accrediting Council for Independent Colleges and Schools (ACICS)

## 2) Accredited graduate degree was earned in the U.S.

The institution should be a regular graduate degree with the majority of its credit earned in the U.S. from an accredited institution (see list below). Waivers will not be considered for credits earned at a branch campus in a non-English speaking country or degrees granted through distance learning programs. Credential evaluation may be required for transfer credits from foreign institutions.

Degrees earned at institutions accredited by the following agencies are accepted:

- Middle States Association of Colleges and Schools (MSA)

- New England Association of Schools and Colleges (NEASC)

- North Central Association of Colleges and Schools (NCA)

- Northwest Commission of Colleges and Universities (NWCCU)

- Southern Association of Colleges and Schools (SACS)

- Western Association of Schools and Colleges (WASC)

- Accrediting Council for Independent Colleges and Schools (ACICS)

## 3) An accredited undergraduate or graduate degree was earned in a non-U.S., Anglophone country.

Official transcripts are required. Credential evaluation of foreign degree is required. The majority of the credits must be earned from the Anglophone institution. Waivers will not be considered for credits 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, United Kingdom (England, Scotland, Northern Ireland & Wales), and the United States.

## 4) The applicant's native language is English.

Applicants can demonstrate evidence their first language is English by means of providing documentation they have been schooled in their native country where English is the official language and the language of instruction.

*Being a U.S. Citizen, U.S. Permanent Resident, or citizen of a country listed below does not automatically waive you from an English proficiency exam, if your first language is not English.*

Examples of 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, United Kingdom (England, Scotland, Northern Ireland & Wales), and the United States.

## 5) Applicant has completed an accredited ESL program in the U.S., or in a non-US Anglophone country as 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 a copy of their certificate of completion to the Office of Admission. Transcripts from an accredited English language program in the US or other Anglophone countries showing 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 the approved Anglophone country.

## MASTER'S LEVEL ADMISSIONS APPLICATION REQUIREMENTS

All ITU applications must include:

- **Online Application** and non-refundable application fee.

- **Sealed official transcripts from all**

**universities attended.** Transcripts, listing courses taken and grades received, must be mailed directly from the institution or through a verified e-Transcript provider. ITU has partnered with Parchment for e-Transcript submissions.

- **Additional transcripts must be submitted for transfer credits from all post-secondary institutions.** Foreign transferred credits are subject to credential evaluation (please see additional international admissions requirements). Transcripts must be issued directly from the institution, listing courses taken and grades received.

- **Statement of Purpose** essay (500-750 words). Topic: "Please describe why you are interested in the intended program of study, and how you hope to use this education to achieve your future goals."

- **Resume** demonstrating relevant work or volunteer experience. 2 pages maximum.

- GRE or GMAT scores recommended. Scores must be sent directly from the testing center.

- Two Letters of Recommendation recommended (required if undergraduate cumulative GPA is lower than 2.75). Letters should speak to the student's professional and academic experience and potential to succeed in graduate school.

- All applicants must submit identification documentation to the Office of Admissions in the form of: a valid government issued identification card or unexpired passport.

## 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 credits 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:
   - Test of English as a Foreign Language (TOEFL) examination. ITU looks for a score of 72 or better for the internet-based test (ibt).
   - International English Language Testing System (IELTS) examination. ITU looks for a band score of 6.0 or better for the academic module.
   - Accredited bachelor's or master's degree from a regionally accredited US institution or from a native English-speaking country.
   - 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.
   - 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).

*\* 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 a department chair and the Admissions 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 ASAP. 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 Enrollment). 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 an Admissions Deferment. 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 | October 27 |
| Spring | January 20th |
| Summer | May 19 |

» **International Students** may not be eligible for deferment. Please speak with an International Student Advisor at ITU if you plan to defer your admission. If you are approved, please note you must maintain status during your deferment period.

# FINANCIAL INFORMATION

## FEES AND EXPENSES

The following sample tuition and fees schedule is for all students (international and domestic):

| | FALL TRIMESTER | SPRING TRIMESTER | SUMMER TRIMESTER | ACADEMIC YEAR |
|---|---|---|---|---|
| TUITION [1] | $4,950 | $4,950 | $4,950 | $14,850 |
| 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] | $514.81 | $514.81 | $514.81 | $1,544.43 |
| VTA FEE | $24 | $24 | $24 | $72 |
| TOTAL | 5,753.81 | 5,753.81 | 5,753.81 | 17,261.43 |

[1] _Based on full-time registration of nine (9) credit hours. Note: Tuition per credit hour is $550._
[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 Insurance Premium refund. Please refer to http://itu.edu/financial-info/ for other applicable fees._

## 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 | TOTAL CHARGES DUE FOR THE ENTIRE EDUCATIONAL PROGRAM |
|---|---|---|---|
| TUITION | $4,950 | 36 credit hours / 4 Trimesters | $19,800 |
| REGISTRATION FEE [5] | $50 | 4 Trimesters | $200 |
| STUDENT GOVERNMENT ASSOCIATION FEE | $15 | 4 Trimesters | $60 |
| TECHNOLOGY FEE [5] | $200 | 4 Trimesters | $800 |
| APPLICATION FEE [6] (ONE TIME FEE) | | | $100 |
| ORIENTATION FEE [6] (ONE TIME FEE) | | | $250 |
| INSURANCE PREMIUM [7,8] | $514.81 | 4 Trimesters | $2,059.24 |
| VTA PASS [9] | $24 | 4 Trimesters | $96 |
| PETITION TO GRADUATE [6] (ONE TIME FEE) | | | $200 |

| TOTAL | 5,753.81 | | 23,565.24 |
|---|---|---|---|

[5] _Fees are non-refundable once students register for classes._
[6] _Fees are non-refundable. Note: The Orientation fee covers the New Student Orientation event, as well as pre-arrival assistance and services._
[7] _Fees may be refundable if all of the requirements are met. Refer to the ITU website for specific requirements regarding Insurance Premium refund._
[8] _Based on insurance carrier quotation for Academic Year 2016-2017 (FA16, SP17, SU17). Rate subject to change per insurance notice._
[9] _Based on $72 annual cost of each VTA pass. ITU is required by the City of San Jose to issue VTA passes to all enrolled students._

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 |
| INSTALLMENT PLAN ADMINISTRATION FEE (PER TRIMESTER) | $100 |
| INTERNATIONAL POSTAGE FEE | Additional Charges Will Apply |
| LAB SUPPLIES/KIT (DEPENDS ON CLASS) | $50 - $200 |
| LATE PAYMENT FEE [10] | $100 |
| OVERNIGHT POSTAGE FEE | $50 |
| PAYMENT SWITCH/CHECK HOLDING FEE | $50 |
| STUDENT ID REPLACEMENT FEE | $25 first time, $50 second time, $100 third and after |
| TRANSCRIPT FEE (PER COPY) | $15 for first copy $10 each for copies 2 - 5 $5 each for copies 6 - 10 |
| EMPLOYER TUITION REIMBURSEMENT DEFERRED PAYMENT PLAN (ETR) FEE | $50 per trimester |

[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.

Tuition and fees for each trimester are due and payable at the beginning of each trimester, unless special approval has been obtained in writing from ITU's Department of Accounting Services. ITU reserves the right to deny enrollment or cancel enrollment for students whose fees are not paid one month after the first date of class of each trimester, unless special arrangements have been made with ITU's Department of Accounting Services.

## 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 DEADLINES AND REGISTRATION PAYMENT POLICY

Students have a 24 hour window from the time they register for courses to pay the entire student account balance by completing one of the following:

A) Pay Online at MyITU:

- Credit/Debit Card

- eCheck

B) Pay in person at Accounting Services with:

- Cash

- Credit/Debit Card

- Cashier's Check, Money Order, Traveler's Check

- Personal Check

C) Pay by wire transfer:

- For international payments:

  » Flywire

- For other wire transfer instructions, please contact the Department of Accounting Services in-person, or submit a request to the ticketing system.

- Wire transfer information will be sent to you by Accounting Services once student status is verified.

- After you have sent your wire transfer, please send a copy of the wire transfer confirmation from your bank to the Department of Accounting Services via the ticketing system.

- Your payment will be applied to your student account once payment is received by the University.

*Note: 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.*

D) Pay by Installment Plan:

- Regular Installment Plan

  » Please visit http://itu.edu/financial-info/installment-plan-policy/ for more information.

- Employer Tuition Reimbursement Deferred Payment Plan

  » Please visit http://itu.edu/financial-info/ETR/ for more information

Students who fail to pay within the 24 hours after their registration, will be subjected to a financial hold which disable the student's account to the ability of adding or dropping courses or requests for official transcripts. If within

2 weeks of placing the financial hold, no payment has been made, then ITU reserves the right to drop courses due to no payment.

## WITHDRAWAL AND REFUND POLICY

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

2) Students have until 11:59PM (PST) of the first day of the class session to drop classes and receive a full refund.

3) Students have the right to cancel the enrollment agreement and obtain a refund of charges paid (not including non-refundable fees) through attendance at the first class session, or the seventh day after enrollment, whichever is later.

4) If students drop their class(es) or withdraw from the University after the first class session, amounts refunded are calculated based upon the time students drop their class(es) or withdraw from the University.

5) To withdraw from a class:

   » Log into MyITU and drop the class.

6) To withdraw from the University:

   » Notify the Office of the Registrar through support.itu.edu.

   » Log into MyITU and drop all classes.

   - To request a refund:

   » Submit the Student Refund Request Form to Accounting Services through support.itu.edu.

7) 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. If students have received federal student financial aid funds, students are entitled to refund of moneys not paid from federal student financial aid program funds.

ITU's refund schedule is as follows:

| ON CAMPUS CLASSES | |
|---|---|
| DATE OF WITHDRAWAL | REFUND PERCENTAGE |
| On/Before the Day of the 1st Class Session (Ending at 11:59PM (PST) on the Day of the 1st Class Session) | 100% |
| On/Before the Day of the 2nd Class Session (Ending at 11:59PM (PST) on the Day of the 2nd Class Session) | 85% |
| After the Day of the 2nd Class Session (Starting at 12:00AM (PST) on the Day of the 2nd Class Session) | No Refund |

| ONLINE CLASSES | SESSION I | SESSION II |
|---|---|---|
| DATE OF WITHDRAWAL | REFUND PERCENTAGE | REFUND PERCENTAGE |
| On/Before the 1st Day of the Session (Ending at 11:59PM (PST) on the 1st Day of the Session) | 100% | 100% |
| During the 1st Week of the Session (Ending at 11:59PM (PST) on the 1st Friday of the Session) | 85% | 85% |

| | | |
|---|---|---|
| After the first Friday of Session (Starting at 12:00AM (PST) on the 1st Saturday of the Session) | No Refund | No Refund |

*Note: 1st class for internships will be the 1st day of the trimester. 2nd class will be one week after the 1st class.*
*For example, 1st day of the trimester is Monday (5/18). If date of withdrawal is on/before 5/18 11:59PM (PST/PDT), then refund percentage is 100%. If date of withdrawal is on/before 5/25 11:59PM (PST/PDT), then refund percentage is 85%. After 5/25 11:59PM (PST/PDT), there will be no refund.*

*After 11:59PM (PST/PDT) on Saturday during the first week of add/ drop, refund will be calculated for each class as a stand-alone. Swapping will no longer be allowed.*

## FINANCIAL ASSISTANCE AND STUDENT LOANS

International Technological University does not participate in any federal and state financial aid programs. In order to ease the burden of a single lump sum tuition payment, the University offers the following payment option:

## INSTALLMENT PAYMENT PLAN

Employer Tuition Reimbursement Deferred Payment Plan (ETR) For further information please refer to the previous page, under the "Payment Deadlines and Registration Payment Policy" in letter D.

## SCHOLARSHIPS

International Technological University offers merit-based scholarships to a select number of students every trimester. To find out more, please visit the ITU website.

## STUDENT TUITION RECOVERY FUND

The State of California created the Student Tuition Recovery Fund ("STRF") to relieve or mitigate economic losses suffered by students who are California residents, or are enrolled in a residency program attending certain schools regulated by the Bureau for Private Postsecondary and Vocational Education.

Students must pay the state-imposed assessment for the STRF if all of the following applies:

1) Students who are California residents, or are enrolled in a residency program, and prepay all or part of the tuition either by cash, guaranteed student loans, or personal loans, and

2) Total charges are not paid by any third party, such as an employer, government program or other payer, unless students have a separate agreement to repay the third party.

Students are not eligible for protection from the STRF and not required to pay the STRF assessment, if either of the following applies:

1) Students who are not California residents, or are not enrolled in a residency program, or

2) Total charges are paid by a third party, such as an employer, government program or other payer, and students have no separate agreement to repay the third party.

Students may be eligible for STRF if students are California residents or are enrolled in a residency program, prepaid tuition, paid the STRF assessment, and suffered an economic loss as a result of any of the following:

1) The school closed before the course of instruction was completed.

2) The school's failure to pay refunds or charges on behalf of a student to a third party for license fees or any other purpose, or to provide equipment or materials for which a charge was collected within 180 days before the closure of the school.

3) The school's failure to pay or reimburse loan proceeds under a federally guaranteed student loan program as required by law or to pay for reimburse proceeds received by the school prior to closure in excess of tuition and other costs.

4) There was a material failure to comply with the Act or this Division within 30 days before the school closed or, if the material failure began earlier than 30 days prior to closure, the period determined by the Bureau.

5) An inability after diligent efforts to prosecute, prove, and collect on a judgment against the institution for a violation of the Act.

*NOTE: ITU currently does not collect STRF fees from students, as the Student Tuition Recovery Fund has reached its upper limit of $25 million dollars. Once the Fund has depleted below its lower limit of $20 million dollar, the Bureau for Private Postsecondary Education will once again require educational institutions in California to collect STRF fees from their students.*

## NOTICE OF NO PENDING PETITIONS

ITU does not have a pending petition in bankruptcy. ITU is not operating as a debtor in possession. ITU has not filed a petition within the preceding five years, nor has any petition in bankruptcy filed against it within the preceding five years that resulted in reorganization under Chapter 11 of the United States Bankruptcy Code (11 U.S.C. Sec. 1101 et seq.)

# CAMPUS RESOURCES

## ACADEMIC ADVISING

Each student is assigned an Academic Advisor, who on a regular basis provides academic guidance regarding course planning and the student's degree progress.

If a student needs a requirement waived or any other type of variance, they should contact their Academic Advisor or department chair.

## LIBRARY

The ITU library is a customer-service center that is fully staffed by a professional librarian and skilled student library interns. Books, e-books, conference proceedings, electronic databases, student research projects, and other materials are accessible within ITU or at the neighboring Martin Luther King Jr. joint public and State University libraries in downtown San Jose.

An online inquiry form allows you to receive help to locate resources, acquire logins for subscription services, learn how to use reference tools such as the APA citation method, as well as receive assistance with other learning and research tasks.

The library service consists of the following:

1) ITU Library Website

2) ITU Online Library Catalog

3) Books, conference proceedings, journals

4) Copies of previous ITU student research projects

5) Access to electronic databases (ACM, EBSCO, IEEE, other)

6) Course reserve study materials collection

7) Information Literacy skills development program

8) Research and reference workshops

9) Research Guides and Reference Tools

10) Five private study and meeting rooms

For information about how to access resources and other library and research services, please drop in to the center or email: library@itu.edu.

## 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. Student Life events give you the opportunity to forge friendships, and join clubs while preparing for your career. Student Life has four signature events each year: The Cultural Fair, where ITU's diversity is celebrated, ITU's Got Talent, students get to perform in a talent show and display their work in our Student Gallery, and Family Fun Day, a family friendly event for students, faculty, and staff.

As an ITU student, you can learn leadership skills as a Student Government Association member, 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, as well as a gym 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 core group of representatives. 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

Santa Clara Valley Transportation Authority is the local, Silicon Valley public transportation service. Through ITU's partnership with the Santa Clara Valley Transportation Authority (VTA), ITU provides a discounted year-round ECO pass that allows registered students unlimited rides on all VTA bus and light rail lines (maps available on campus). There is no need for students to sign up. Cards will automatically be ordered when students meet eligibility requirements:

- Register and maintain status in current trimester classes

- Pay all trimester and tuition fees

- Obtain your student ID card

For new students registered two weeks prior to the first day

of classes and have paid tuition and fees, a VTA card will be available for pick-up on Orientation Day. Students registering outside of the initial two weeks may see a delay of up to four weeks prior to receiving their VTA card. You can access schedules to the VTA system through the Santa Clara Valley Transportation Authority website.

Other notable modes of transportation that are NOT covered under your VTA pass include:

- **Bay Area Rapid Transit (BART)** is a train that provides clean, scenic service from Fremont to 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 areas 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.

ITU is a non-residential institution and has no responsibility to find or assist a student in finding housing.

## 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 career planning, including self-assessment, resume writing, interviewing skills, and job search strategies. Career Services staff also work one-on-one with students, internship providers, and employers to place students into quality positions in industry, both before and after graduation.

## 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.

## REGISTRATION

The registration period for each trimester begins six weeks before the first day of trimester and concludes on Friday, one week before the start of the trimester. Students enroll in classes through MyITU, which is accessed at my.itu.edu. Students can also use MyITU for other enrollment-related tasks, such as adding or dropping classes.

## LATE REGISTRATION

Late registration occurs after Registration, from one week before the start of the trimester until the Friday before classes begin. Students should register for at least one course by the end of late registration in order to be enrolled for the trimester. Additional Late Registration fee applies.

## ADD/DROP PERIOD

The add/drop period runs from the first day of the trimester until Friday of the second week. These two weeks are meant to allow students to refine their course schedule and make changes without leaving a notation on their academic record. Registration after the deadline is allowed only if action or inaction on the part of the university delays registration.

## ADDING AND DROPPING COURSES

Students may not add a course after the second week of instruction in the trimester scheduling system unless otherwise determined by the Academic Committee. The deadline for dropping a course is no later than the second week of the trimester. Dropping a course after the second week of instruction will result in a grade of W (W=Withdraw). Dropping a course after the halfway point of the term (after the 4th week of an Online Session or after the 8th week of an on-campus course) will result in a grade of F (F=Fail).

|  | Will not appear on Transcript | Receive a Withdrawn (W) Grade | Receive a Fail (F) Grade |
| --- | --- | --- | --- |
| Weekend On-Campus Course* | Withdraw on or before 11:59PM on Sunday of the first weekend of class | Withdraw on or before 11:59PM on Sunday of the second weekend of class | Withdraw after 11:59PM on Sunday of the second weekend of class |
| Weekday On-Campus Course** | Withdraw on or before 11:59PM on Friday of the second week of term | Withdraw on or before 11:59PM on Friday of the eighth week of term | Withdraw after 11:59PM on Friday of the eighth week of term |
| Online Session II | Withdraw on or before 11:59PM on Friday of the first week of Online Session 2 classes. | Withdraw on or before 11:59PM on the Friday of the fourth week after Online Session 2 classes start | Withdraw after 11:59PM on the Friday of the fourth week after Online Session 2 classes start |
| Online Session I | Withdraw on or before 11:59PM on Friday of the first week of term. | Withdraw on or before 11:59PM on Friday of the fourth week of term. | Withdraw after 11:59PM on Friday of the fourth week of term. |

*Weekend on-campus course is taken to mean an ITU course that meets face-to-face six times per trimester on campus. Weekend on-campus courses are intensive and span the majority of both Saturday and Sunday for three given weekends.

**Weekday on-campus course is taken to mean an ITU course that meets face-to-face once each week of the trimester (15 weeks total) on campus. This may include classes that meet on Saturdays or Sundays, for a total of 15 meetings.

Tuition refund will be issued for a dropped course according to the fee schedule stated in the Withdrawal and Refund Policy section.

## CANCELLATION

Classes with fewer than seven students enrolled by late registration are subject to cancellation.

## AUDITING COURSES

A student may audit almost any course offered by ITU. Auditing a class means that the student registers for a class as an "Auditor". The student is not required to complete course assignments, though he or she may do so with the permission of the instructor. The student does not receive a letter grade for the course. Instead a grade of "AUD" is entered in the student's record.

Classes taken for "Audit" do not apply toward any academic degree, and do not count as part of a student's full- or part-time course-load. The tuition for an audited course is the same as that for a credit course. A student may register to audit a course up to one week after the last day of late registration.

**Auditing limitations**

Registration is limited to:

- Classes with space available
- Professor's permission

Tuition and fees are the same as for credit.

## 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 special registration procedures, as prescribed by the Office of the Registrar.

## DECLARING OR CHANGING A CONCENTRATION (FOR MBA PROGRAM ONLY)

MBA 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 General MBA program.

Students may add or change their MBA 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.

If a student has declared a concentration and does not complete the required concentration courses by graduation, the student will graduate with a General MBA degree, with no specialization. Please note that concentrations will only appear on the transcript, and not on the diploma.

## CREDIT MEASUREMENTS

Academic credits are measured in terms of credit hours. This is a listing of how Academic Credits 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 should enroll in 9 credit hours to be considered full time.

## 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 | Withdrew prior to halfway through the course. 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 (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

After a grade has been assigned by the instructor, any change of the grade has to follow the Grade Change Policy below:

A) The application for a grade change must be received by the instructor not later than the end of the trimester following the one in which the course was taken.

B) The assignment of the contested grade is due to a clerical error of the instructor, or a technical error. Example of a clerical error: wrong summation of points, or clerical oversight of any student work that is used in the grade computation.

Grade change requests that contest the instructor's judgment of the academic quality of the student's work or achievement are disallowed. Grade change requests that are based on makeup work of any type performed after the trimester in which the course was taken are disallowed. Grade change requests that are based solely on the student's desire to have a better grade are disallowed.

If the above conditions A) and B) are met and the instructor decides to change the grade, the request must be submitted to the department chair for final approval. After this approval the Office of the Registrar will effect the grade change in the student's records.

*Addendum: If a student decides to take the same course again and achieves a better grade, the better grade will be entered in addition to the former grade in the student's record, but will not count as additional credit units toward the student's degree.*

## REPEATING COURSES

A graduate student may repeat a course for which s/he has earned a grade of B-, C+, C, C-, D+, D, D-, F, and NP. 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.

A graduate student is only allowed to attempt the same class for a maximum of three (3) times. 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 career (cumulative) GPA calculation.

Under certain circumstances, the Office of the Registrar, in consultation with the appropriate Department Chair, may allow a fourth attempt on a course. For example, certain classes required for graduation, such as internship and capstone, may be repeated multiple times to achieve the required number of credits for the student to graduate. Internship classes have a separate limitation on number of attempts.

## MID-TERM GRADE STANDING

Students wishing to know their grade at the mid-trimester

should ask the instructor. Those who have deficient grades (D+, D, D-, F, or NP) are urged to confer with their Academic Advisors.

## FINAL GRADES

Grades are generally available about two weeks after the trimester has ended. Students can check grades through MyITU.

## TRANSCRIPTS

A record of each student's academic work at ITU is retained permanently by the Office of the Registrar. Copies of official transcripts may be obtained from the Office of the University Registrar. For more information on how to request a transcript and applicable transcript fees, visit http://itu.edu/registrars-office/.

## TIME LIMITS

All candidates for master's degrees must complete all the matriculation requirements within six calendar years after initial registration at ITU.

## GRADUATION

Each candidate for a master's degree at ITU should submit their Petition to Graduate along with a Preliminary Checklist signed by their academic advisor to the Office of the Registrar before registration begins for their last term. International students should also submit a Reduced Course Load-Final Session, if applicable.

Graduating students who wish to participate in the Commencement Ceremony must request to do so prior to the deadline. A communication will be sent to eligible students who must then RSVP in order to participate in the ceremony. The Commencement Ceremony is held once a year, in the spring (May). Please note that to graduate, a student must file a Petition to Graduate with the Office of the Registrar by the stated deadline. To participate in the Commencement Ceremony, a student must RSVP by the stated deadline. These are separate actions.

## EXPERIENTIAL LEARNING

International Technological University does not award credit for prior experiential learning.

## ARTICULATION AGREEMENTS

International Technological University has not entered into any articulation agreement with any other colleges or universities that provide for the transfer of credits earned in the program of instruction.

## TRANSFERABILITY OF CREDITS AND CREDENTIALS EARNED AT OUR INSTITUTION

The transferability of credits you earn at International Technological University is at the complete discretion of an institution to which you may seek to transfer. Acceptance of the degree you earn in PhDEE, PhDIS, DBA, MBA, MSSE, MSEE, MSCE, MSDA, and MSEM is also at the complete discretion of the institution to which you may seek to transfer. If the course credits and degree that you earn at this institution are not accepted at the institution to which you seek to transfer, you may be required to repeat some or all of your coursework at that institution. For this reason you should make certain that your attendance at ITU will meet your educational goals. This may include contacting an institution to which you may seek to transfer after attending International Technological University to determine if your credits, degree, or certificate will transfer.

## CLASS SIZE LIMIT

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

## STUDENT RECORDS AND PRIVACY

Students have the right to review records that relate to themselves in their capacity as students and to request corrections of records believed to be inaccurate. Most disclosures from student records to outside parties require prior consent from the student. Under the Family Educational Rights and Privacy Act of 1974, transcripts cannot be disclosed to a third party without written consent from the student.

# ACADEMIC POLICIES

**(For additional information for international students, see 'International Student Policies')**

## ACADEMIC PROBATION AND EXPULSION POLICY

Probation I will be placed based on Summer 2014 grades. 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.

## CLASS ATTENDANCE AND PARTICIPATION POLICY

All on-campus classes are held at ITU, 2711 N. First Street, San Jose, CA 95134. Class attendance is mandatory for all on-campus courses at ITU. Showing up for each class session is the minimum requirement for students to learn and be successful in their studies. As a graduate institution, ITU requires all of its students to attend, fully participate, and be engaged in all of the classes for which they are enrolled each term.
It is the responsibility of the individual faculty member to monitor and record student engagement and participation for their class(es), both on campus and online. This can be done in a number of ways, such as in-class quizzes, participation points during inclass discussions, roll call, etc. How attendance is measured may vary from class to class. To encourage student engagement, faculty are encouraged to use classroom participation as a part of their grading.

## 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 in 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.

Besides:

3) One credit hour is assigned to a part time Internship in which the student needs to get between 10 to 20 hours training a week for at least 15 weeks; three credit hours are assigned to a full time Internship in which the student takes 21 to 40 hours training per week for at least 15 weeks. In addition, given the nature of our school, many of our engineering classes meet in a laboratory of the subject matter these classes meet in accordance with the time requirements of the above policy. In addition to the class 26 meeting time, which is largely lecture/didactic and discussion classes, students are required to complete additional lab work/assignments outside of their class hours.

With regard to ITU's online course offerings, ITU has adopted the United States Department of Education requirements for "courses offered entirely online and without any required face-to-face class meetings." A week of instructional time is any given seven-day period in which at least one session of regularly scheduled instruction or examination occurs. Students are expected to be academically engaged through means which could include, but are not limited to, submitting an academic assignment; taking an exam, an interactive tutorial, or computerassisted instruction; attending a virtual study group assigned by the instructor; contributing to an academic online discussion; and engaging in contact with the faculty member and class peers related to the academic subject of the course. Departments must document through scheduling of classes or syllabi that they are meeting the minimum semester credit hour requirement for the credit awarded. (U.S. DOE, CH-A5, 2.22.2013)
The course syllabus communicates an expectation to students that the student will be required to participate as a part of the course and indicates the expected minimum time that

students will need to devote to the course. The total expected time should be a minimum of 45 credit hours per trimester for each unit of class. The credit hour requirement for a course may be achieved through working online, attending online discussions, watching video presentations, taking quizzes, participating in group activities, etc. A student's participation may be randomly monitored for quality control by the instructor for that course, faculty mentors assigned to courses, or the program chair.

## FINAL EXAMINATIONS POLICY

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

## INCOMPLETE GRADE POLICY

Incomplete grade is student initiated.

1) The purpose of an 'incomplete' (I) grade is to give a student the chance of receiving at a later time a letter grade for a course for which the student has not finished all necessary work during the course time, or was prevented by special and unforeseeable circumstances from making proper progress.

2) A student who fulfills the conditions of 1) is entitled to ask the instructor for a grade of 'incomplete' for the course. If the student so requests, the instructor can, but is not required to issue an I grade. Without such a request the instructor must not issue an I grade. (An I grade cannot be issued for Independent Study and for any class that has not been sufficiently attended by the student).

3) The student makes the request by filling out the Incomplete Grade Request (Petition) form and submitting it to the instructor before the date when the grades for the course are due. The form must contain the names of student and instructor, the number and name of the course for which the I grade is requested, and the description of the work, that must be completed to receive a letter grade. The form must be dated and signed by student and instructor and is filed with the Office of the Registrar.

4) A student who receives an I grade for a course must complete and submit the missing work within the following trimester to the instructor of the course or the instructor's TA.

5) If the missing work is submitted in time, the instructor's TA will check the submitted work for completeness and, if complete, will forward it to the instructor. The instructor will review the submitted work and will make the decision which letter grade the student should receive. This letter grade must not be higher than B+. This letter grade is considered the final course grade and cannot be contested by the student.

6) If the student does not submit the missing work in time, the I grade changes to F.

7) Whatever the I grade changes to will replace the I in the student's record.

8) As long as a course grade is in the student's record as an I, it counts toward the student's credit hours, but is ignored in the calculation of the student's GPA.

9) A student must not have more than 2 I grades on his/her record at any time. Students should be aware that the change of an I grade to an F can impact the student's status with respect to their visa.

*Important Note for International Students:* *International students on F or J status must be enrolled full-time during each trimester. Such international students should be aware that the change of an I grade to an F can impact the student's visa status. For immigration purposes, incomplete grades are not allowed during final trimester.*

## INDEPENDENT STUDY POLICY

Independent Study (IS) is a form of educational activity involving an individual instructor and an individual student in which the student conducts research on a mutually agreed upon topic under loose guidance from the supervising instructor. Usually an instructor will make it known to the University in which fields s/he is willing to guide independent study in a particular trimester.

A student who intends to register for and conduct independent study (IS) has to follow the rules described below.

1) The student applies for independent study with the Office of the Registrar. The Office of the Registrar approves or denies the application dependent on condition a) listed below. If approved, the Office of the Registrar issues to the student the 'Outline of Independent Study' form.

2) With this form the student seeks approval for IS from the Department Chair of the student's major and suggests a supervising instructor. The Department Chair approves or denies the application dependent on condition b) listed below which is subject to the Department Chair's judgment.

3) If approved the Department Chair assigns the suggested or a different instructor as supervising instructor at his/her discretion.

4) The instructor and the student fill out the 'Outline of Independent Study' form, which contains the student's and instructor's names, the trimester in which the IS is to be conducted, the credit units to be awarded, the topic of the IS, and the desired outcome. The maximum credit units for IS is 3. It can be reduced to 2 or 1 credit units by the supervising instructor at the preparation of the Outline form. The completed form is submitted to the Department Chair for approval.

5) Upon approval and signature of the Outline form by the Department Chair the form is sent to the Office of the Registrar, who files it and makes the entry in the student's record, and EMS, as registered for IS.

6) IS must be conducted and completed in the trimester specified in the Outline form. Upon completion of the IS the instructor assigns a letter grade in compliance with the general grading policy. Assignment of Incomplete grade (I) is not allowed for IS.

Approval of Independent Study at ITU is subject to the following conditions:

A) No course is available in the schedule for the given trimester that counts for the student's degree as listed in the curriculum.

B) There is some hardship for the requesting student that makes the earning of additional credit units through IS a necessity (typically visa requirements, preceding loss of credits through disease etc.) If the situation of the requesting student is not deemed a hardship by the Department Chair, the application is denied. The wish to gain more credit units than possible with the current course schedule, does not constitute a hardship.

## 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 credits 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 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 withdrawal by ITU. The Office of the 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.

## OPEN CAMPUS POLICY

An Open Campus student is a non-matriculating 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, capstone, and thesis courses. An Open Campus student may not enroll in a doctoral level course without special approval from the Department Chair.

There is no credit hour maximum per trimester. However, the student may only apply nine (9) credit hours earned under Open Campus towards a degree program. Should a student later apply and be admitted into an ITU program, the student will have a choice of which nine (9) credit hours to apply towards the degree. The student must apply through regular admissions process prior to enrolling in the 10th credit hour, if all credit hours are to count towards graduation. Cumulative GPA earned under Open Campus will carry over to the degree program, regardless of whether the credit hours count towards graduation requirements.

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 run for or be in a student leadership role at ITU.

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

## TRANSFER CREDIT POLICY

Students who have taken graduate-level courses at other US universities may petition to transfer course credit to count towards completing their ITU degree program. The Department Chair grants final approval, as subject to the following criteria:

1) A grade of B or better in the course is required for any credit to be transferred.

2) No more than 9 credit hours may be transferred from other US graduate institutions recognized by the following regional and national accrediting agencies:

» Accrediting Council for Independent Colleges and Schools (ACICS)

» Middle States Association of Colleges and Schools (MSA)

» New England Association of Schools and Colleges (NEASC)

» North Central Association of Colleges and Schools (NCA)

» Northwest Commission on Colleges and Universities (NWCCU)

» Western Association of Schools and Colleges (WASC)

» Southern Association of Colleges and Schools (SACS)

3) Courses transferred must be equivalent in level and content to specific courses offered in your ITU degree program.

4) The courses to be transferred may substitute for electives but not for core courses in the ITU degree program.

5) No course(s) will be approved for transfer prior to a student's admission to and enrollment at ITU.

6) Grades from previous institutions will not be transferred and will not affect GPA.

At the time of admission, the Admissions Office will provide an overview of the transfer credit policy and process to give applicants a general sense of what course credit the student can expect to transfer upon enrollment at ITU. However, preliminary transfer credit evaluations will not be provided prior to enrollment. Decisions on the awarding of actual credit are ultimately at the sole discretion of each Department Chair.

Transfer credit requests must be received by the Office of the Registrar before the end of the student's first trimester at ITU in order to be considered. Credits cannot be transferred from a conferred program.

## 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 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.

## 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 unit for part-time, three units for full-time, up to a maximum of nine units per degree) from the first semester 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 (Formerly named GRN 900), a course that may be taken for a maximum of ten credits over the course of a 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 students attending who attend ITU on an F-1 student visa, 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 credits per trimester. (Note: See exception below for Trimester Break 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 course load mentioned above. Internships will not be approved with 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

As stated above, all internships at ITU require enrollment in INT 593. This academic class is taken for one credit with part-time internships (up to 20 hours per week) or three credits with full-time internships (21 to 40 hours per week). In order to earn a passing grade, students will submit specific assignments to a faculty member. All assignments will be submitted by the student with 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 term 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 in cases where academic credit was not involved, 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. (New students starting their program at ITU in Fall 2015 will be allowed to pursue a full-time internship.)

- Integrating Academic & Internship Learning (CFL 591) – Students must enroll in an Integrating Academic & Internship Learning (CFL 591) class before beginning their first internship. The Integrating Academic & Internship Learning (CFL 591) will last for part of the trimester. Students enrolled in CFL 591may also request an internship in their first trimester. Once approved, the student may begin that part-time internship concurrently with the CFL 591. (Note: This condition applies to any student, new or continuing, who has not had an internship before at ITU.

- Continuous enrollment/attendance – If a student drops below full-time enrollment (Note: See exception below for Trimester Break) 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.

- Academic performance requirements (program) – As noted above, students must maintain an appropriate 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 2.0 will lose all internship eligibility (i.e., both full-time and part-time), including eligibility for the trimester in progress. A student who holds a cumulative GPA between 2.0 and 3.0 will be limited to a part-time internship for the trimester in progress (note: this may require the student to enroll in other courses to maintain full-time status). These limits will remain until grades for the next term have been posted. At that time, if that student's cumulative GPA increases to 3.0 or higher, the student will be eligible to request a full-time internship within posted deadlines. If that student's GPA for the most recent term is 3.0 or higher and the cumulative GPA remains below 3.0, the student will remain eligible for a part-time internship. If that student's GPA for the most recent term 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 (other) – Effective Fall 2016 – A student must pass CFL 591 by the end of the term in which they complete their first internship or that student will lose all internship eligibility for the next term. After that next term, internship eligibility will be restored only if a passing grade has been earned in CFL 591 by that time. Also, students who are required to take the university's Student Success Program must satisfactorily complete that program within their first two trimesters to retain internship eligibility.

- Maximum internship credits – Students are limited to ten total credits 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. (Note: Students who began their studies before Fall 2015 and have already reached this limit will be allowed to take an additional three credits of INT 593 to be used for either a full-time internship for one trimester or a part-time internship for three trimesters. These additional three credits may not be used towards graduation requirements.)

- 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. Also, 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 on an F-1 student visa:

- 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 will not affect the student's eligibility for post-graduate OPT.

- Trimester Break – F-1 students are allowed one vacation term, also known as a "trimester break", after completing a full academic year of study. At ITU, this is satisfied when a student has completed 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 or take no classes during that trimester. However, if the student wishes to begin or renew an internship during that term, they must enroll in INT 593.

- Last Term of Study – An F-1 student who is completing a degree program in the same term that an internship is requested is only required to take the number of classes needed to complete the degree. However, all other classes taken in that term must be on-campus, as required by F-1 student visa regulations.

- 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 credits, 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 "illegal employment".

# 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 who cannot attend orientation should contact the International Student Office through ITU's support system, explain their situation, and arrange a time to check in.

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 on-going process. Students need to be in continuous communication with 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 nine steps:

1) Check in with the International Student Office.

2) Keep her/his passport and immigration documents valid:

   • I-20 must be valid at all times. A student holding an expired I-20 is out of status in the U.S.

   • 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 unless otherwise noted on the U.S. Department of State website.

   • A valid F-1 visa stamp is needed to enter the U.S. from abroad. It will not put an F-1 student out of status if it expires during the time the student is studying in the U.S. while maintaining legal status.

3) Maintain full-time enrollment.

   • For Master's students at ITU: Full time registration is minimum 9 credit hours (unless formally approved by the International Student Office and the Office of the Registrar).

4) Extend her/his I-20 as needed, which must be done before the program end date listed in the program study section on page 1 of the I-20.

5) Keep her/his passport and I-94 record safe and copies ready to present when requested.

6) When the student is nearing the end of her/his program, s/he should make arrangements for her/his departure from the U.S. within the grace period allowed under her/his visa status or apply for a new status.

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

8) Report a change of program or degree level.

9) Report a legal name change.

   • Provide the International Student Office with a copy of the legal document that shows the name change.

## MAINTAINING PERSONAL IMMIGRATION AND STUDENT RECORDS

All international students are responsible for maintaining their own personal records of all documents related to their immigration status. 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.

The following is a suggested list of documents that students should keep in their records:

   • A copy of the current passport

   • A copy of the admissions letter and any documents showing a change of concentration, major, or program

   • A sealed official transcript for each school attended

   • A copy of the diploma for each completed degree

   • A copy of any U.S. visas received

   • A copy of any I-20 or DS-2019 received

   • A copy of the most recent I-94

   • A copy of any I-797 received

   • All receipts showing payment of the I-901 SEVIS fee

   • Copies of any travel documents supporting class attendance

   • Copies of the syllabus for any courses taken

   • Copies of any documents related to any internship courses, such as offer letters, internship cooperative agreements, and internship class assignments

   • Copies of any exams or other major assignments graded and returned

   • A record of all U.S. addresses with documents proving residence at each address

## COURSE LOAD INFORMATION FOR INTERNATIONAL STUDENTS

In order to maintain legal status in the United States, F-1 students must be registered for a full course load (9 credit hours) each trimester unless students have been approved for a reduced course load or trimester break. If F-1 students fail to enroll in a full course load without an approved reduced course load or trimester break, their SEVIS record will be terminated or cancelled.

Students may be approved 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. A student may request a trimester break after they have completed three consecutive trimesters with a full course load at ITU.  All Reduced Course Load and Trimester Break requests must be approved by the appropriate parties in order for students to maintain legal F-1 status. 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 Registrar on these matters.

## ONLINE COURSE POLICY FOR F-1 STUDENTS

F-1 students can only 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

1) 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.

2) 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.

3) 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.

4) 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 semester, 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

An academic grievance procedure defines an administrative process through which students or employees may seek

resolution of complaints or grievances arising from a decision made about them.

**Informal Procedures**

A student or employee who has a complaint or request is expected to first resolve it informally. The effort must include discussions with the specific faculty member, teaching assistant or staff member involved. A demonstrated lack of good faith 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.

**Formal Procedures**

If all reasonable informal efforts to resolve a complaint fail, a student or employee may formalize it as a grievance. A formal grievance must be filed within 45 days from the time the student believes, or reasonably should have known, that an occurrence has effected his/her status. This period of 45 days includes all informal efforts to resolve the grievance. The student must submit the grievance in writing to the Administration Office. A proper administrator will conduct an investigation of the grievance and may interview the student for further clarification. After the investigation, the administrator may either grant or deny the redress sought or provide remedies. The decision will be issued no later than 14 days following receipt of the written grievance. If the administrator does not grant redress satisfactory to the student, the student has 14 days to appeal the decision to the University President upon written receipt of the appeal. The President has 14 days to notify the student of his decision, either grant or deny the redress sought or provide other remedies. The President's decision is final. To launch a complaint via the Bureau of Private Postsecondary Education (BPPE) please go to the BPPE website.

## 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 event being sponsored or hosted by a campus individual, university-recognized group, department, or office that get approval by the University President or an Executive Vice President. 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 Office of Campus 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 NonAlcoholic 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 Office of Campus Operations and call 911. In order to obtain approval to serve alcoholic beverages on campus, please fill out the "Request to Serve Alcoholic Beverages on Campus" form and submit it to the Director of Campus Operations.*

## UNIVERSITY LOST & FOUND POLICY

International Technological University's Lost & Found box is located at 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 food/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.

## PARKING POLICY

International Technological University at the 2711 North First Street Campus has a very limited private parking lot. We of-

fer 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 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 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.

## 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 partici-
pate 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 oppor-
tunities 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.

ITU

**2016 - 2017**
Course Catalog
*August 1, 2016 - July 31, 2017*

# DEGREE PROGRAMS AND REQUIREMENTS

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

For the most current course offerings by term, see the online Class Schedule.

## PREREQUISITES

Prerequisites for courses should be noted carefully; the responsibility for meeting these requirements rests on the student. A student may petition to waive a prerequisite requirement for a course. Petitions will be evaluated by the Department Chair on a case-by-case basis.

## 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 difficulty level of the course is designated by the course number:

| Course Type | Number | Description |
|---|---|---|
| Basic Skill Courses | 001-099 | Courses that do not count toward degree requirements. Primarily used for skill development. |
| Freshman-Level Courses | 100-199 | Entry-level courses that have only skill development courses for prerequisites. Considered lower-division. |
| Sophomore-Level Courses | 200-299 | Intended primarily for second-year students who have the essential pre-requisites or background. Considered lower-division. |
| Junior/Senior-level Courses | 300-499 | Intended primarily for third and fourth-year students who have the essential prerequisites or background. Considered upper division. |
| Beginning Graduate Courses | 500-599 | Graduate-level courses intended primarily for beginning and mid-level graduate students. |
| Graduate Internships | 590-599 | Graduate-level internships and internship-related courses. |
| Mid-Level 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. |
| Upper-Level Graduate Courses | 700-899 | Doctoral-level courses intended primarily for mid and upper-level graduate students. |
| Doctoral Thesis & Research | 900-999 | Thesis and Dissertation Research. |

# BUSINESS ADMINISTRATION

## MASTER OF BUSINESS ADMINISTRATION

### MISSION

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, building on a global perspective and leading edge practices and technologies.

### FACULTY

- Amal Mougharbel, *PhD, Université de Corse Pascal Paoli, Business Administration, Department Chair*
- Ramesh Konda, *PhD, Nova Southeastern University, Computer Information, Core Faculty*
- Patty Wiggin, *DBA Candidate, International Technological University, Core Faculty*
- Magdy Hussein, *PhD, Capella University, Organization and Management, Core Faculty*
- Venkatesh Gopal, *PhD, Anna University, BioTechnology, Adjunct Faculty*
- Pierre Humbert, *PhD, Université Louis Pasteur, Quality and Statistics, Adjunct Faculty*
- John Flaig, *PhD, California Southern University, Engineering and Technology Management, Adjunct Faculty*
- Stephen Hyatt, *PhD, Northwestern Polytechnic University, Engineering and Quality, Adjunct Faculty*
- Felino Anthony Amistad, *JD, California Southern University, Law, Adjunct Faculty*
- Barbara Arnoldussen, *RN, PHN, San Jose State University, Nursing, Project/Program Management, Adjunct Faculty*
- Carmelita Omran, *DBA candidate, Walden University, Finance and Management, Adjunct Faculty*
- Girish Harshe, *PhD, The Pennsylvania State University, Finance and Engineering, Adjunct Faculty*
- George Guim, *EdD, University of San Francisco, Economics and Organization & Leadership, Adjunct Faculty*
- Soly Paterson, *MBA, San Jose State University, Engineering and Quality, Adjunct Faculty*
- Bhairav Mehta, *MBA, Cornell University, Strategy/Marketing/Finance, Adjunct Faculty*
- Duane Brooks, *EdD Candidate, University of Nebraska, Marketing, Adjunct Faculty*
- Karen Haley Allen, *MBA, University of San Francisco, Human Resources and Organization Development, Adjunct Faculty*
- Leila Halawi, *DBA, Nova Southeastern University, Information Technology Management, Adjunct Faculty*
- Prasad V., *MS, Engineering, University Of New Orleans, SAP, Adjunct Faculty*

The MBA is designed as a balanced preparation for managerial careers in business. Its purpose is to prepare students for responsible positions in a rapidly changing world; to develop an attitude of intellectual curiosity to foster a program of continuous learning throughout life; and to study management as a unique function applicable to all types of endeavors which involve the coordination of people and material resources toward given objectives.

The program provides the students a solid foundation in Accounting, Economics, Finance, International Business, Management, and Marketing 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 MBA 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.

**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, or Master Thesis, or BUA 690 Simulation and Optimization for Business Analytics. 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

Upon completion of this program, graduates will:

- (ILO 1 Problem Solving) Apply core business theories to study, assess, and execute problem solutions in the business environment.

- (ILO 2 Critical Thinking) Employ critical thinking models to make effective business decisions.

- (ILO 3 Communication literacy)

  I. Write business documents clearly, concisely, and analytically.

  II. Demonstrate effective speaking skills in groups and in public.

- (ILO 4 Collaboration and Teamwork) Demonstrate teamwork in business projects using effective group dynamics.

- (ILO 5 Technical literacy) Exhibit in depth knowledge of key technical functions for business to work efficiently.

- (ILO 6 Research skills and Information literacy) Identify and apply research methods to understand current business practices.

- (ILO 7 Individual Responsibility) Develop sound ethical social responsibility.

## 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: 12-20 Credit Hours

  » Cross Disciplinary course: Up to 3 Credit Hours (counts as Elective)

  » Transfer Credits: Up to 9 Credit Hours (counts as Elective)

  » Internship: 1 - 9 Credit Hours

- 36 Total Credit Hours

## BUSINESS CONCENTRATIONS

If students complete with a passing grade in at least 4 courses in a program concentration, such as: Accounting, Bio-management, Business Analytics, Digital Media Management, ERP/ SAP, Finance, Human Resource Management, Information Systems Management, International Business, Management, Marketing, or Project Management, then they will be eligible to graduate with an MBA in their selected concentration, (e.g. MBA in International Business, etc.). The thesis topic should be on the selected concentration. However, if students do not complete 4 courses in any program concentration, they will graduate with an MBA degree.

ITU offers the following business concentrations:

- Accounting
- Bio-Management
- Business Analytics
- Digital Media Management
- ERP/SAP
- Finance
- Healthcare Management
- Human Resources Management
- Information Systems Management
- International Business
- Management
- Marketing
- Project Management

## CHANGE IN BUSINESS CONCENTRATION

**Beginning Fall 2016,** the MBA program will offer a new concentration of Business Analytics.

**Beginning Spring 2017,** the follow concentrations will be discontinued:
Accounting
Bio-management
Digital Media Management
ERP/SAP
Finance
Human Resources Management
Information Systems Management
International Business
Management
Marketing
Project Management

**Healthcare Management concentration changes**
Students admitted starting Spring 2017 will be subject to new program requirements. Students admitted prior to Spring 2017 are subject to follow the requirements as outlined in their earlier catalog.

## 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*

## 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 COURSES

- » MGT 690 Pitching a Business Plan to Venture Capitalists
- » MBN 697 MBA Thesis
- » BUA 690 Simulation and Optimization for Business Analytics

## BUSINESS ELECTIVE COURSES

- • ACCOUNTING CONCENTRATION
  - » ACT 500 Financial Accounting
  - » ACT 501 Forensic Accounting
  - » ACT 502 International Accounting
  - » ACT 504 Tax Accounting Principles
  - » ACT 505 CPA Exam: Auditing and Attestation
  - » ACT 506 CPA Exam: Business Environment and Concepts
  - » ACT 507 CPA Exam: Financial Accounting and Reporting
  - » ACT 508 CPA Exam: Regulation
  - » ACT 600 Managerial Accounting
  - » ACT 601 Cost Accounting
  - » ACT 602 Intermediate Accounting
  - » ACT 603 Accounting Information Systems/ ERP - *ITU/SAP University Alliance*

- • BIO MANAGEMENT CONCENTRATION
  - » BIO 500 Concepts of Clinical Research Management
  - » BIO 501 Concepts of Modern Medicine and Biology
  - » BIO 502 Business and Scientific Writing
  - » BIO 503 Human Ecology
  - » BIO 504 Biological Management
  - » BIO 505 Bioethics and Policy
  - » BIO 506 Biotech Industry Fundamentals
  - » BIO 507 Bio Market Study
  - » BIO 508 Innovation and R&D Bio Management
  - » BIO 509 Regulatory Management in Biopharma

- • BUSINESS ANALYTICS CONCENTRATION
  - » BUA 500 Principles of Business Analytics [required concentration]
  - » BUA 501 Quantitative Analysis [required concentration]
  - » 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
- » BUS 518 Applied Statistics
- » DGA 504 Global Storytelling
- » ERP 509 Introduction to ERP Systems using SAP  - ITU/SAP University Alliance
- » ERP 515 BI1 & BI2: SAP NetWeaver Business Warehouse
- » ERP 516 Business Analytics using SAP Lumira Cloud
- » FIN 525 Econometrics
- » MGT 567 Quality Control Management
- » MKT 582 Marketing Management
- » MKT 586 Marketing Research
- » MKT 589 E-commerce
- » MKT 590 Marketing with Social Media
- » MKT 591 Advertising Strategy
- » MIS 537 Management Information Systems
- » MIS 540 Information Resource Management
- » MIS 542 Information Systems Innovation
- » MIS 543 Human-Computer Interaction
- » MIS 545 Data Mining and Business Intelligence
- » MIS 546 Data Science for Business
- » MIS 547 Software Development Process Management
- » MIS 548 Knowledge Management

• DIGITAL MEDIA MANAGEMENT CONCENTRATION

- » Any MBA class can be used as an elective, except Healthcare Management and Bio-Management courses.
- » In addition, any Digital Art (DGA) class can be used as an elective for Digital Media Management concentration.

• ERP/SAP CONCENTRATION

- » 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*
- » ERP 514 Software as a Service (SaaS)

• FINANCE CONCENTRATION

- » 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 524 Microeconomics for Business Decisions
- » FIN 525 Econometrics
- » FIN 526 International Economics
- » FIN 604 Securities Analysis
- » FIN 605 Financial Derivatives and Risk Management
- » FIN 606 Corporate Finance
- » FIN 607 Mergers and Acquisitions

• HEALTHCARE MANAGEMENT

- » HCM 509 Healthcare Writing and Research (required concentration)
- » HCM 510 A Regulatory Overview for New Drug Development
- » HCM 511 Concepts of Healthcare Management
- » HCM 512 Health Service Delivery
- » HCM 513 Translating Biomedical Innovation from the Laboratory to the Marketplace
- » HCM 514 Health Sector Innovation

- » HCM 515 Health Information Technology
- » HCM 516 Healthcare Sector Marketing Tools and Techniques
- » HCM 517 Global Entrepreneurship in the Health Sector
- » HCM 518 Good Clinical Practice (GCP)
- » HCM 519 Healthcare Ethics
- » HCM 520 Healthcare Leadership, Patient Safety and Quality Improvement
- » HCM 521 Healthcare Strategic Management
- » HCM 522 Healthcare Environment: Cultural and Behavioral Theories
- » HCM 523 Principles of Global Healthcare
- » HCM 524 Aging in America
- » HCM 525 Principles of Managed Care
- » HCM 526 Ambulatory Care Administration
- » HCM 527 Organizational Development in Healthcare
- » HCM 528 Principles of Health Promotion and Education (3 credit unit)s
- » HCM 529 Mental Health and Wellbeing
- » HCM 530 Healthcare Risk Management
- » HCM 531 Complementary and Alternative Medicine
- » HCM 532 Health Information and Communications Systems

- HUMAN RESOURCE MANAGEMENT CONCENTRATION
  - » HRM 528 Human Resource Management
  - » HRM 529 Employee Training and Development
  - » HRM 530 Employment Law for Business
  - » HRM 531 International Human Resource
  - » HRM 532 Managing Human Capital
  - » HRM 533 Strategic Compensation: Issues and Opportunities
  - » HRM 535 Human Resources and Information Technology
  - » HRM 536 Managing Global Diversity

- INFORMATION SYSTEMS MANAGEMENT CONCENTRATION
  - » 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
  - » MIS 549 Public Information Management
  - » MIS 550 Strategic Management of Information Technology
  - » MIS 552 Business Information Systems & Technologies

- INTERNATIONAL BUSINESS CONCENTRATION
  - » INB 553 Fundamentals of International Business
  - » INB 554 International Financial Markets
  - » INB 555 International Law
  - » INB 556 Global Strategic Management
  - » INB 557 International Monetary Economics
  - » INB 558 Global Marketing and Strategy
  - » INB 559 International Business Management

- MANAGEMENT CONCENTRATION
  - » MGT 560 Principles of Management
  - » MGT 561 Coaching – Changing Lives, Changing Organizations
  - » MGT 562 The Art of Transformational Coaching
  - » MGT 563 Organizational Teamwork
  - » MGT 564 Principles of Public Relations
  - » MGT 565 Non-Linear Strategies for Business Success

- » MGT 566 Production and Operations Management
- » MGT 567 Quality Control Management
- » MGT 568 Impact of Intellectual Property in a Global Economy
- » 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 574 High Performance Leadership
- » 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 584 Supply Chain Management
- » MGT 593 Intrapreneurship – Innovation from Within
- » MGT 608 Business Statistics
- » MGT 609 The Business of Coaching
- » MGT 610 Influencing the Brain for Success
- » MGT 611 Lean Six Sigma
- » MGT 612 Advanced Project Management

- MARKETING CONCENTRATION
  - » MKT 582 Marketing Management
  - » MKT 583 Entrepreneurial Marketing
  - » MKT 585 International Marketing
  - » MKT 586 Marketing Research
  - » MKT 587 Comparative Studies of MNC, FDI, and International Trade
  - » 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

- PROJECT MANAGEMENT CONCENTRATION
  - » BUS 500 Project Management Frameworks
  - » BUS 501 Strategic Planning & Portfolio Management
  - » BUS 502 Project Management & Leadership
  - » BUS 503 Project Management - Agile Approach
  - » BUS 504 Contract Management & Financial Planning
  - » BUS 505 Management of Organizational Changes
  - » BUS 506 Process Mapping & Control
  - » BUS 507 Project Procurement Management
  - » MGT 575 Project Management
  - » MGT 577 Project Risk Management

- OTHER ELECTIVE COURSES:
  - » BUS 508 Executive Leadership
  - » BUS 509 Leading and Managing Change
  - » BUS 510 Regulation, Governance Ethical and Social Responsibility
  - » BUS 511 Finance for Senior Executives
  - » BUS 512 Computer Applications in Education
  - » BUS 513 Verbal Communications and Conversations
  - » BUS 514 Writing and Speaking for Persuasion and Effectiveness
  - » BUS 515 Writing and Composition
  - » BUS 516 Principles of Quality Management
  - » BUS 517 Organization Culture and Diversity
  - » BUS 519 Organizational and Leadership Change
  - » BUS 600 Research Methods

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 Doctorate 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 Doctorate 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:

- Identify research design and methods necessary to undertake a doctorallevel research project.

- Design, implement, and evaluate a major research project dealing with business and managerial issues in the context of effectively managing technology, innovation and change in a business environment.

- Determine the capacity to conduct original research.

- Relate, test, and/or examine ideas, whether their own or those of others.

- Explain the relationship between own research theme, associated literature and business knowledge.

- Perform an academic research, leading to publication of work in refereed journals.

- Explain the methodology of research and data gathering process.

- Identify the writing research skills with highlevel of responsibility in the academic and business environments.

## 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, totalling 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.

## 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 803 Special Topics in Research Techniques

» BUS 804 Management and Organizational Theory

» BUS 805 Management as a Behavioral Science

» BUS 806 Emerging Issues in Marketing Management and Research

» BUS 807 Emerging Issues in Strategic Decision Making

» BUS 808 Creativity: A Process-Oriented Approach

» BUS 809 Innovation and Creativity: Culture of Group Dynamics

» BUS 810 Conflict Resolutions

» BUS 811 Creativity as a Linguistic Process

» BUS 812 Emerging Issues in Financial Decision Making

» BUS 813 Seminar in Organizational Behavior Research with Emphasis on Leadership

» BUS 814 Seminar in Special Topics in International Business

» BUS 815 Seminar in Administrative Policy and Administration

» BUS 816 Operations and Information Technology Management

## 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 701 Advanced Managerial Economics

» BUS 702 Seminar in the Sociological and Psychological Principles of Management

» BUS 703 Leadership Behavior and Motivation

» BUS 704 Seminar in Special Topics in Marketing

» BUS 705 Leadership and Ethics

» BUS 706 Seminar in Strategic Planning in Human Resource Management

» BUS 707 Philosophies and Concepts of Total Quality Management

» BUS 708 Seminar in Accounting Information Systems

» BUS 709 Seminar in Auditing

» BUS 710 Current Issues in Accounting Research

» BUS 711 Seminar in Corporate Finance

» BUS 712 Seminar in Investments

» BUS 713 Multinational Business Finance

» BUS 714 Management Practice for the International Institution

» BUS 715 Seminar in International Business

» BUS 716 Seminar in International Marketing

» BUS 717 Seminar in International Finance

» BUS 718 International Macroeconomics Analysis

» BUS 719 International Human Resource Management

» BUS 720 International Information Technology Management

» BUS 721 Emerging Issues in Organizational Behavior and Human Resources Management

» BUS 722 Economics and Public Policy

» BUS 723 Organization Design

» BUS 724 Corporate Planning and Environment

» BUS 725 Legal Issues for the Modern Institution

» BUS 726 Seminar in Organizational Behavior Research

» BUS 727 Seminar in Special Topics in Operations Management

» BUS 728 Seminar in Strategy and Innovation

» BUS 729 Leadership Behavior and Conflict Resolution

» BUS 730 Technology, Innovation, and Entrepreneurship

» BUS 731 Managerial Applications of Information Technology

» BUS 732 Networking Concepts and Applications

» BUS 733 Managing Software Development Projects

## DISSERTATION RESEARCH PROJECTS

• Dissertation Research: 18 credit hours

» BUS 901 Doctoral Dissertation

You may register for BUS 901 Dissertation Research 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,

## DBA MAJOR CONCENTRATIONS

Doctorate in Business Administration combines a broad knowledge of business with a concentration in one of the below-mentioned areas. ITU offers the DBA in 10 distinct topic areas including:

• Accounting and Financial Management

• Applied Computer Science

• Business Administration

• Global Business Sustainability

• Management

• Management Information Systems

• Marketing

• Organizational Behavior

- Public Administration

- Strategy and Innovation

*Note: 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.*

# COMPUTER SCIENCE AND SOFTWARE ENGINEERING

## MISSION

The Department of Computer Science and Software Engineering 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.

## FACULTY

- Cornel Pokorny, *PhD Engineering Sciences, Technical University Vienna, Department Chair*

- Alex Wu, *PhD Mechanical Engineering, UC San Diego, Adjunct Faculty*

- Arijit Das, *MS Computer Science, Oregon State University, Adjunct Faculty*

- Bhairav Mehta, *MS Industrial Engineering, MBA, Cornell University, Adjunct Faculty*

- Donna Dulo,  JD, MS Computer Science, Naval Postgraduate School

- Da-Qi Ren, *PhD Computer Engineering, Concordia University Montreal, Adjunct Faculty*

- Dongming Liang, *PhD Computer Science, York University, Adjunct Faculty*

- Fang Yuan, *PhD Applied Statistics, University of Alabama, Adjunct Faculty*

- Hann So, *MS Engineering Management, Santa Clara University, Adjunct Faculty*

- Kevin Xu, *PhD Computer Science, Dartmouth College, Adjunct Faculty*

- *Leandro Loss,  PhD Computer Science, University of Nevada, Adjunct Faculty*

- Mamoun Samaha, *MS Electrical Engineering, Eindhoven University, Adjunct Faculty*

- Matt Zhang, *PhD Computer Science, North Carolina State University, Adjunct Faculty*

- Ming Hwa Wang, *PhD Computer Science, Illinois Institute of Technology, Core Faculty*

- Miriam Leon, *MS Multimedia Communications, TU Darmstadt, Adjunct Faculty*

- *Patricia Hoffman,  PhD Applied Mathematics, UC Santa Cruz, Adjunct Faculty*

- Qamar Asghar, *MS Mechanical Engineering, University of Tennessee, Adjunct Faculty*

- Richard Riehle, *PhD Software Engineering, Naval Postgraduate School, Adjunct Faculty*

- Richard Sun, *PhD Computer Science, University of Illinois, Core Faculty*

- Roxana Rhode, *BS Mathematics & Computer Science, Alexandru University, Adjunct Faculty*

- Soly Paterson, *MBA San Jose State University, Adjunct Faculty*

- Srinivasan Mandyam, *PhD Computer Science, Indian Institute of Science, Adjunct Faculty*

- Tony Nguyen, *MS Computer Science, Santa Clara University, Adjunct Faculty*

- Tushar Chandra, *MSCS & Engineering, Arizona State University, Adjunct Faculty*

- Xiaoshu Qian, *PhD Electrical Engineering, University of Rhode Island, Core Faculty*

## 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 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 MSCS 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, to name some. 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

Upon completion of this program, graduates will be able to:

- Lead and organize Information Technology (IT) implementations at companies and institutions

- Invent and improve algorithms for storing, accessing, processing, and analyzing collected data

- Invent real time computation methods for analysis and processing of data in robotics (optical, sound, and other real time data from digital sensors)

- Create innovative and useful features to modern operating systems (multiprocessor, multiprocessing, distributed)

- Contribute to research and development of algorithms in all areas that are now and in the future subject to computerization

- Clearly explain Computer Science concepts in research, development, and educational institutions

- Show proficiency and skills in the most important areas of state of the art computer science

## JOB POSSIBILITIES

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
    - » Capstone Project (3 credit hours) or Thesis (6 credit hours)
    - » Internship: 1 credit hour
- Elective Courses:
    - » Cross Disciplinary Elective(s): Up to 3 credit hours
    - » Transfer Credits: Up to 9 credit hours (counts as electives)
    - » Electives: up to 20 credit hours (a maximum of 3 credit hours of mathematics courses will be counted as electives)

- » Internship: 1 - 9 Credit Hours

- 36 Total Credit Hours

## REQUIRED CORE COURSES

- » CSC 501 Discrete Structures
- » CSC 502 Principles of OS & Distributed Systems
- » CSC 620 Programming Language Theory
- » CSC 680 Advanced Computer Algorithms

## CAPSTONE PROJECT

- » CSC 690 Capstone Project
- » 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
- » CEN 566 Routing in Computer Networks
- » CSC 511 OO Programming with C++
- » CSC 513 C# Programming)
- » CSC 514 OO Programming with Objective-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 540 Computer Graphics
- » CSC 550 Big Data
- » CSC 555 Bio Informatics
- » CSC 560 Introduction to Data Science
- » CSC 570 Web Security Fundamentals
- » CSC 575 Current Topics in CSC
- » CSC 580 Computer Algorithms
- » CSC 605 Principles of Operating Systems
- » CSC 610 Compiler Design
- » CSC 618 GUI Development with Java
- » CSC 625 Advanced HTML5
- » CSC 630 Information Retrieval
- » CSC 631 Data Mining
- » CSC 632 Natural Language Processing
- » CSC 633 Machine Learning
- » CSC 635 Practical Neural Networks Techniques
- » CSC 640 Advanced Computer Graphics
- » CSC 642 Computer Graphics with WebGL
- » CSC 650 Big Data Analytics (CPO) (SAS or SPSS)
- » CSC 682 Graph Algorithms
- » CSC 730 Cryptography & Cryptanalysis
- » CSC 750 Coding Theory
- » CSC 760 Advanced Topics in Data Science
- » SWE 510 Information Security Countermeasures
- » SWE 520 Principles of Ethical Hacking
- » SWE 530 Cloud Computing Security
- » SWE 535 Cloud and Virtualization Security (CPO)

- » SWE 550 Software Project Management (CPO for ACP)
- » SWE 560 Principles of Database Systems
- » SWE 561 Cloud Computing
- » SWE 562 Oracle Database Management/Administration
- » SWE 610 Ruby on Rails
- » SWE 615 Angular JS
- » SWE 618 Software Design using UML
- » SWE 620 Scala Programming
- » SWE 630 Semantic Web
- » SWE 632 Software Risk Management
- » SWE 633 Software Refactoring
- » SWE 640 Artificial Intelligence
- » SWE 645 Performance Critical Design
- » SWE 646 Model Driven Architectures

## 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

Upon completion of this program, graduates will:

- Be able to identify and apply current and emerging software engineering technologies required for the creation of reliable, predictable, well engineered software systems.

- Be able to utilize multiple programming paradigms, including object-oriented, functional, logic, and emerging programming technologies.

- Show understanding of SE principles and practices as described in the SWEBOK, and other emerging software development processes.

- Have sufficient skills in human factors to be able to interact with stakeholders from multiple disciplines on the systems engineering level.

- Have working skills in SE management including team building, leadership, project planning, selection of tools and processes appropriate to a project.

### 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
  » Capstone Project (3 credit hours)
  » or Thesis (6 credit hours)
  » Internship: 1 credit hour

- Elective Courses:
  » Cross Disciplinary Elective: Up to 3 credit hours
  » Transfer Credits: Up to 9 credit hours (counts as electives)
  » MSSE Electives: up to 20 credit hours (a maximum of 3 credit hours of mathematics course will be counted as electives)
  » Internship: 1 - 9 Credit Hours

- 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 PROJECT

  » SWE 690 Capstone Project
  » 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 & Distributed Systems
- » CSC 505 The UNIX/Linux OS
- » CSC 509 C Programming
- » CSC 511 OO Programming with C++
- » CSC 512 Data Structures
- » CSC 513 C# Programming
- » CSC 514 OO Programming with Objective-C
- » 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 540 Computer Graphics
- » 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 605 Principles of Operating Systems
- » CSC 610 Compiler Design
- » CSC 618 GUI Development with Java
- » CSC 620 Programming Language Theory
- » CSC 625 Advanced HTML5
- » CSC 630 Information Retrieval
- » CSC 631 Data Mining
- » CSC 632 Natural Language Processing
- » CSC 633 Machine Learning
- » CSC 635 Practical Neural Networks Techniques
- » CSC 640 Advanced Computer Graphics
- » CSC 642 Computer Graphics with WebGL
- » CSC 650 Big Data Analytics (CPO-SAS/SPSS)
- » CSC 660 Advanced Data Science
- » 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
- » CSC 760 Advanced Topics in Data Science
- » SWE 510 Information Security Countermeasures
- » 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 575 Current Topics in
  Software Engineering

» SWE 610 Ruby on Rails

» SWE 615 Angular JS

» SWE 620 Scala Programming

» SWE 630 Semantic Web

» SWE 632 Software Risk Management

» SWE 633 Software Refactoring

» SWE 640 Artificial Intelligence

» SWE 645 Performance Critical Design

» SWE 646 Model Driven Architectures

# DIGITAL ARTS

## MASTER OF SCIENCE IN 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 insure our program nurtures the world's most creative innovators and leaders in the field of digital arts.

### FACULTY

- Wes F. Takahashi, *Annie Award-winning Director, Head of Animation Department at Lucasfilm's Industrial Light and Magic, Department Chair*

- Dave Lo, *BFA, Academy of Art University, Computer Arts, BS, Georgia Institute of Technology, Computer Science, Core Faculty*

- Jake Wachtel, *MS, USC Annenberg School for Communication and Journalism, Digital Social Media, Writer, Director and Executive Producer for NBC Universal, Full-Time Faculty*

- Jonali Bhattacharyya, *MFA, Academy of Art University,Quadruped Animation and Game Animation, Adjunct Faculty*

- Brian Gee, *BA, University of California at Berkeley, Film, Adjunct Faculty*

- Ravi Sodhi, *MBA, California State University at Los Angeles, International Business, Adjunct Faculty*

- Michael Kimball, *Emmy Award-winning Sound Designer and Sound Engineer, Adjunct Faculty*

- Michael Snyder, *journalist, editor, broadcaster, educator, screenwriter, and animation developer, Adjunct Faculty.*

- Tom Rubalcava, *worked in features, tv, and commercials as a designer, director, animator and storyboard artist, Adjunct Faculty.*

- Allen White, *a filmmaker, screenwriter, and film journalist, Adjunct Faculty.*

- Ryan McDowell, *BA, Cal Poly, Communication Studies, Director of Photography and Video Editor, Adjunct Faculty*

### PROGRAM INTRODUCTION

In a world of smartphones, tablets, wearable computers, 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 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 integrates 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.

The ITU MSDA curriculum is taught by experienced industry professionals who integrate design fundamentals, professional skills and entrepreneurial innovation in order to nurture a generation of artists who can lead, innovate and create the next industry disruption. Students will learn to produce live action, interactive and augmented media. The program prepares students to become leaders in digital art production, advertisement, movie, game, 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.
Program learning outcomes

- Apply core and emerging media production principles to solve media production problems.

- Evaluate evidence, select among options and generate alternatives to make effective decisions.

- Write business documents clearly, concisely, and analytically.

- Verbally present convincing media pitches and presentations that clearly convey production concepts.

- Contribute to team media projects in a way that that promotes effective team dynamics.

- Demonstrate mastery of professional media production skills appropriate for industry careers.

- Identify critical issues, evaluate sources, and use information to successfully engage in media research projects.

- Use appropriate leadership skills to define, plan and execute digital art and media research projects.

### JOB POSSIBILITIES

ITU's Digital Arts program can prepare a student for a career in Film, Video, Audio, Photography, Design, Computer Graphics, UI/UX, Games, 3D Printing, Augmented Reality, and Virtual Reality.

### PROGRAM REQUIREMENTS

- Required Courses

  » 4 Core Courses: 12 Credit Hours

- » Capstone Project: 3 - 6 Credits hours

- » Internship: 1 Credit Hour

- • Elective courses: 9 - 20 Credit Hours

  - » Cross Disciplinary Electives:
    Up to 3 Credit Hours

  - » Transfer Credits: Up to 9 Credit
    Hours (counts as Elective)

  - » Internship: 1 - 9 Credit Hours

- • 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

- » DGA 692 Master's Thesis

## ELECTIVE COURSES

- » DGA 502 Manufacturing Cinematic Space

- » DGA 503 Storyboard Design

- » DGA 504 Global Storytelling

- » DGA 505 Math and Programming For Artists

- » DGA 506 Architectural Tours

- » 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 514 Photographic Principles and
  Advanced Image Manipulation

- » DGA 515 Sound Design

- » DGA 516 Production Sound Recording

- » DGA 517 Post Production Sound Recording

- » DGA 518 UI/UX: User Interface
  and User Experience

- » 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 604 From Hero To Superhero:
  The Persistence, Modernization, and
  Global Dissemination of Classical
  Archetypes in Global Storytelling

- » 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 613 Real-Time Lighting and Compositing

- » DGA 614 Real-Time Lighting and Real-
  Time Compositing and FX Workshop

- » DGA 615 Zbrush

- » DGA 616 Android Wear

- » 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

- » CSC 514 OO Programming with objectiv-C

- » 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 Java Script Programming
- » CSC 540 Computer Graphics
- » CSC 618 GUI Development with Java
- » CSC 640 Advanced Computer Graphics
- » CSC 642 Computer Graphics with WebGl
- » SWE 518 User Interface Design
  And Implementation

# ELECTRICAL ENGINEERING AND COMPUTER ENGINEERING

## MISSION

The Department of Electrical and Computer Engineering concentrates on preparing its graduates for successful careers as scientists, engineers, educators or other professionals in fields of electrical and computer engineering in academic or industry.

## FACULTY

- May Huang, PhD *Electrical Engineering, ITU, Department Chair, Director of Research & Development*
- Karl Wang, *Electrical Engineering, MIT, Vice President of Technology and Research, Advisor of Internet-of-Things (IoT) Research Lab*
- Eric Chen, PhD *Computer Science, University of Waterloo, Canada, Core Faculty, Advisor of Artificial Intelligence Research Lab*
- Dominik Schmidt, PhD *Electrical Engineering, Stanford University, Core Faculty,Advisor of Bioelectronics Research Lab*
- John Ladasky, PhD *Immunology, Stanford University, Research Scientist of Bioelectronics Research Lab*
- John Ye, PhD *Solid-State Physics, University of Southern California, Advisor of System-on- Chip (SoC) Research Lab*
- Qingning Li, PhD *Physics, University of Utah, Core Faculty, Advisor of Green Energy Research Lab*
- John J. Kim, PhD *Electrical Engineering, New Mexico State University, Core Faculty*
- Ted Y. Sun, PhD *Electrical Engineering, Santa Clara University, Core Faculty*
- Avid Farhoodfar, PhD *Computational Physics and Material sciences, Queen's University, Canada, Adjunct Faculty*
- Bhaskar L. Mantha, PhD *Electrical Engineering, University of Cincinnati, Adjunct Faculty*
- Fred Cheng, PhD Electrical Engineering, *ITU, Adjunct Faculty*
- Henry Zhang, PhD Physics, University of Texas at Austin, Adjunct Faculty
- Neeli R. Prasad, PhD Electrical Engineering, University of Rome Tor Vergata, Italy, Adjunct Faculty
- Qing K. Zhu, PhD Electrical Engineering, University of California, Santa Cruz, Adjunct Faculty
- Raminder Bajwa, PhD Computer Science, Pennsylvania State University, Adjunct Faculty
- Xiaoshu Qian, PhD Electrical Engineering, University of Rhode Island, Adjunct Faculty
- Weihan Wang, PhD Candidate Computer Engineering, University of Toronto, Canada, Research Scientist

Department of Electrical Engineering at ITU was founded in 1994, chaired by Dr. Shu-Park Chan, the founder of ITU. From that time the Department has been blessed with extraordinarily strong faculty including four IEEE fellows to provide students up-to-date knowledge and practical skills. Dr. May Huang assumed the role of Department Chair when Dr. Chan retired in 2008. The faculty has changed due to the retirement of professors, but the standard of the quality remains the same dedicated to education, industry competent and academic excellence.

Since Summer 2011, Computer Engineering program was merged into EE department.

Among various established contributions of electrical engineering, IC Chip design is most significant! Located in central Silicon Valley, ITU's MSEE program emphasizes on education in the fields of Integrated Circuit (IC) designs, analysis and development, as well as system design and implementation of Ineternet of Things (IoT).

Degree program of Electrical Engineering currently focuses on the following areas:

- VLSI Design
- Ananlog Sensors & Bio Design
- Signal Processing & Communication
- System Design

leading to the degree of Master of Science in Electrical Engineering (MSEE). Its purpose is to prepare students for a career in industry, research, or education.

## PROGRAM LEARNING OUTCOMES

- **Engineering Ability: (ILO1)** Relate established and emerging engineering techniques to achieve solutions for electrical engineering problems
- **Critical Thinking: (ILO2)** Illustrate evidence based decisions among various engineering paradigms and alternative options for problem solving
- **Communication Skills: (ILO3)** Explain effectively to clarify and present electrical engineering issues
- **Team Work: (ILO4)** Support team projects in a way that promotes effective team dynamics to achieve team goals
- **Fundamentals: (ILO5)** Outline up-to-date technologies in electrical engineering
- **Research Ability: (ILO6)** Construct research skills in electrical engineering
- **Career Responsibility: (ILO7)** Perform appropriate professional skills to define, plan and execute electrical engineering projects

## PROGRAM REQUIREMENTS

- Required Courses
  - » 4 Core Courses: 12 Credit Hours
  - » Capstone Course: 3 Credit Hours

    Or

    Master Thesis: 3 Credit Hours
    (Approval is required)

    Or

    Master Thesis: 6 Credit Hours
    (Publication is required)
  - » Internship: 1 Credit Hour
- Elective Courses: 12 - 20 Credit Hours
  - » Minimum 6 Credit Hours in Electrical Engineering
  - » Cross Disciplinary  (MBA, EM, or DA) Electives: Up to 3 Credit Hours Any course of EE, CE, SE or CS can be chosen as elective.
  - » Transfer Credits: Maximum 9 credit hours can be transferred from a regional accredited graduated school with department chair's approval
  - » Internship: 1 - 9 Credit Hours
- 36 Total Credit Hours

## CORE COURSES

- » CEN 508 Scientific  Computing

  or

  CEN 510 Algorithms and Data Analysis

  or

  CSC 580 Computer Algorithms
- » EEN 500 Electrical Engineering
- » EEN 511 VLSI Design
- » EEN 541 Digital Signal Processing and System Analysis

## CAPSTONE COURSES

- » CEN 643 Advanced Digital Image Processing
- » EEN 627 IC Design to Silicon
- » EEN 646 Embedded System Design
- » EEN 698 Master Thesis I
- » EEN 699 Master Thesis II

## ELECTIVE COURSES

Minimum 6 credit hours of courses in specified field:

- VLSI DESIGN
  - » CEN 500 Computer Engineering
  - » CEN 508 Scientific Computing
  - » CEN 551 Computer Architecture
  - » CEN 556 Distributed Computing Systems
  - » CSC 580 Computer Algorithms
  - » EEN 501 Fundamentals of Semiconductor Physics
  - » EEN 505 Digital Design in HDL
  - » EEN 512 Memory Design
  - » EEN 513 Microprocessor Design
  - » EEN 520 ASIC Design I
  - » EEN 521 FPGA Design
  - » EEN 522 Design Verification
  - » EEN 525 ASIC Design II
  - » EEN 526 Design for Testability
  - » EEN 531 Nanotechnology
  - » EEN 616 Mixed Signal IC Design
  - » EEN 628 Low Power IC Design
  - » EEN 629 System On Chip (SOC) Design
  - » EEN 630 Quantum Devices
  - » EEN 637 Bioelectronics and Bioengineering
  - » EEN 638 Signal Integrity of High-Speed Digital Circuits
  - » EEN 714 Advanced Microprocessor Design
  - » Or other approved courses
- ANALOG SENSORS & BIO DESIGN
  - » CEN 500 Computer Engineering
  - » CEN 508 Scientific Computing
  - » CEN 551 Computer Architecture
  - » CEN 556 Distributed Computing Systems
  - » CSC 580 Computer Algorithms
  - » EEN 501 Fundamentals of Semiconductor Physics
  - » EEN 506 Electromagnetic Fields and Waves
  - » EEN 515 Analog Circuit Design

- » EEN 531 Nanotechnology
- » EEN 551 Circuit Design and PCB Implementation
- » EEN 616 Mixed Signal IC Design
- » EEN 618 RF IC Design
- » EEN 628 Low Power IC Design
- » EEN 629 System on Chip (SOC) Design
- » EEN 630 Quantum Devices
- » EEN 635 Introduction to MEMS 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
- » Or other approved courses

- **DSP & COMMUNICATION**
  - » CEN 500 Computer Engineering
  - » CEN 508 Scientific Computing
  - » CEN 540 Network Security Techniques
  - » CEN 548 Computer Network Systems
  - » CEN 551 Computer Architecture
  - » CEN 556 Distributed Computing Systems
  - » CEN 661 Parallel Computing
  - » CSC 580 Computer Algorithms
  - » EEN 506 Electromagnetic Fields and Waves
  - » EEN 521 FPGA Design
  - » EEN 561 Fundamentals of Communication Systems
  - » EEN 570 Introduction to Microwave Engineering
  - » EEN 671 Introduction to Wireless Communication Systems
  - » EEN 676 Introduction to Near Field Communication
  - » EEN 749 Advanced Digital Signal Processing
  - » EEN 758 Advanced System Design
  - » EEN 766 Advanced Communication Systems
  - » EEN 774 Advanced Wireless Communications

- » Or other approved courses

- **SYSTEM DESIGN**
  - » CEN 500 Computer Engineering
  - » CEN 508 Scientific Computing
  - » CEN 510 Algorithms
  - » CEN 540 Network Security Techniques
  - » CEN 541 Introduction to Computer Vision
  - » CEN 542 Digital Image Processing
  - » CEN 548 Computer Network Systems
  - » CEN 551 Computer Architecture
  - » CEN 556 Distributed Computing Systems
  - » CEN 580 Signal Processing and System Analysis
  - » CEN 581 Principle of Internet of Things
  - » CEN 643 Advanced Digital Image Processing
  - » CEN 661 Parallel Computing
  - » CSC 505 Unix/Linux Operating System
  - » CSC 580 Computer Algorithms
  - » EEN 513 Microprocessor Design
  - » EEN 521 FPGA Design
  - » EEN 551 Circuit Design and PCB Implementation
  - » EEN 577 Green Energy
  - » EEN 629 System on Chip (SOC) Design
  - » EEN 671 Introduction to Wireless Communication Systems
  - » EEN 714 Advanced Microprocessor Design
  - » EEN 749 Advanced Digital Signal Processing
  - » EEN 753 Advanced Machine Learning Engineering
  - » EEN 758 Advanced System Design
  - » SWE 561 Cloud Computing
  - » SWE 640 Artificial Intelligence
  - » Or other approved courses

**Other Elective Courses**

- Any course in MSEE, MSCE, MSSE, or MSCS curriculum can be accepted as elective course
- Any Math course can be accepted as elective course
- One course cross disciplinary (MBA, EM, or DA) can be accepted as elective course

## MASTER OF SCIENCE IN COMPUTER ENGINEERING

The degree program of Computer Engineering embodies the science and technology of design, construction, implementation, and maintenance of software and hardware components of modern computing systems and computer-controlled equipment, leading to the degree of Master of Science in Computer Engineering (MSCE). Its purpose is to prepare students for a career in industry, research, or education.

### PROGRAM LEARNING OUTCOMES

- **Engineering Ability: (ILO1)** Relate established and emerging engineering techniques to achieve solutions for electrical engineering problems

- **Critical Thinking: (ILO2)** Illustrate evidence-based decisions among various engineering paradigms and alternative options for problem solving

- **Communication Skills: (ILO3**) Explain effectively to clarify and present electrical engineering issues

- **Team Work: (ILO4**) Support team projects in a way that promotes effective team dynamics to achieve team goals

- **Fundamentals: (ILO5)** Outline up-to- date technologies in electrical engineering

- **Research Ability: (ILO6)** Construct appropriate professional skills to define, plan and execute projects in electrical engineering

- **Career Responsibility: (ILO7)** Perform appropriate professional skills to define, plan and execute electrical engineering projects

### PROGRAM REQUIREMENTS

- Required Courses
    - » 4 Core Courses: 12 Credit Hours
    - » Capstone Course: 3 Credit Hours

        Or

        Master Thesis: 3 Credit Hours (Approval is required)

        Or

        Master Thesis: 6 Credit hours (Publication is required)
    - » Internship: 1 Credit Hour
- Elective Courses: 12 - 20 Credit Hours
    - » Minimum 6 Credit Hours in Computer Engineering
    - » Cross Disciplinary (MBA, EM, or DA) Electives: Up to 3 Credit Hours

        Any course of CE, EE, SE, or CS can be chosen as elective.

- » Transfer Credits: Maximum 9 credit hours can be transferred from a regional accredited graduated school with department chair's approval
- » Internship: 1 - 9 Credit Hours
- 36 Total Credit Hours

### REQUIRED CORE COURSES

- » CEN 500 Computer Engineering
- » CEN 508 Scientific  Computing

    or

    CEN 510 Algorithms and Data Analysis

    or

    CSC 580 Computer Algorithms
- » CEN 551 Computer Architecture
- » CEN 556 Distributed Computing Systems

### CAPSTONE COURSE OR THESIS

- » CEN 643 Advanced Digital Image Processing
- » CEN 698 Master Thesis I
- » CEN 699 Master Thesis Research II
- » EEN 646 Embedded System Design

### ELECTIVE COURSES

- Minimum 6 credit hours of Computer Engineering Related Courses:
    - » CEN 508 Scientific Computing
    - » CEN 510 Algorithms and Data Analysis
    - » CEN 540 Network Security Techniques
    - » CEN 541 Introduction to Computer Vision
    - » CEN 542 Digital Image Processing
    - » CEN 548 Computer Network Systems
    - » CEN 550 Computer Control Engineering
    - » CEN 551 Computer Architecture
    - » CEN 556 Distributed Computing Systems
    - » CEN 564 Computer Interface and Firmware Engineering
    - » CEN 565 Introduction to Medical Image Systems
    - » CEN 566 Routing in Computer Networks
    - » CEN 567 Local Area Networking
    - » CEN 568 Network Storage Systems

- » CEN 580 System Analysis and Optimization
- » CEN 581 Principle of Internet of Things
- » CEN 643 Advanced Data and Image Processing
- » CEN 653 Challenge of Mobile Device Design
- » CEN 661 Parallel Computing
- » CEN 680 Special Topics in Computer Engineering
- » 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 Design in HDL
- » EEN 520 ASIC Design I
- » EEN 521 FPGA Design
- » EEN 522 Design Verification
- » EEN 525 ASIC Design II
- » EEN 526 Design for Testability
- » EEN 541 Digital Signal Processing and System Analysis
- » EEN 646 Designs of Embedded Systems
- » EEN 753 Advanced Machine Learning Engineering
- » EEN 758 Advanced System Design
- » EEN 758 Advanced System Design
- » SWE 561 Cloud Computing
- » SWE 640 Artificial Intelligence

OTHER ELECTIVE COURSES

- • Any course in MSCE, MSEE, MSCS, or MSSE curriculum can be accepted as elective course
- • Any Math course can be accepted as elective course
- • One cross disciplinary course (MBA, EM, or DA) can be accepted as elective course

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 engineering research, preparation of a thesis based on that research, and a program of advanced studies in engineering, mathematics, and related physical sciences.

## PROGRAM LEARNING OUTCOMES

- **Fundamentals:(ILO1)** Experiment analytical thinking and comprehensive knowledge on solving problems in specialized aspects of electrical engineering

- **Research Ability:(ILO2, ILO6)** Create independent scholarly researches and contribute innovative ideas and concepts to engineering field

- **Communication:(ILO3)** Generate positive communication skills to fulfill professional positions

- **Team Work :(ILO4)** Perform teamwork perspective and leadership

- **Ethics:(ILO5)** Outline professional teaching and research leadership to contribute to academic, industry or society

- **Career Responsibility:(ILO7)** Produce accountable and continuing self-improvement with open-mind and substantial working strategy to achieve career success

## ADMISSION REQUIREMENTS

A related master degree with minimum grade point average of 3.50 or above, GRE score, and three letters of recommendations from professionals are required for admission.

## PROGRAM REQUIREMENTS

- 60 credit units beyond master degree including

  - » 30 units of course work and independent study

  - » 30 units of dissertation

- Maximum 15 credit units with grade B or above may be transferred from PhD level courses of an accredited school with approval of department chair.

- 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 Ph.D. dissertation

- Publication in international academic journals is required to complete PhD dissertation

## PROCEDURES OF PROGRAM COMPLETION

**Thesis Adviser** It is the student's responsibility upon acceptance to the Phd program to obtain consent from a faculty member in the student's primary department, to serve as his/her prospective thesis advisor.

The PhD student and his/her advisor will jointly develop a study plan for courses and research in a particular area, and submit it to chair of the department.

**Study Program and Course Work** PhD students are expected to complete a minimum of 60 credit hours of graduate education beyond their master's degree. Of these, 30 credit hours may be earned through course work and independent study, and 30 through the thesis. A maximum of 15 credit hours may be transferred from other accredited institutions at the discretion of the student's advisor and department chair. All thesis credit hours are graded on a Pass/No Pass basis.

## QUALIFICATION EXAMINATION

PhD students are required to take a qualification exam within two years of admission for full-time students, and three years for part-time students. The qualification exam can be retaken only once.

The qualification examination is a written exam, in the field of Mathematics, and any two of four other technical fields:

- » VLSI Design

- » Analog Sensors & Bio Design

- » Digital Signal Processing and Communication

- » System Design

Each field will cover at least three courses, for example:
- Mathematics:
  - » AMS 512  Applied Mathematics Methods
  - » AMS 552  Probability & Statistics for Engineers
  - » AMS 620  Advanced Optimization Techniques
- VLSI Design:
  - » EEN 714 Advanced Microprocessor Design
  - » EEN 513 Advance Nanotechnology
  - » EEN 758 Advance System Design
- Ananlog Sensors & Bio Design:
  - » EEN 717 Advance Analog IC Design

- » EEN 719 Advanced RF IC Design
- » EEN 736 Advanced Sensor/Bio Design
- Digital Signal Processing and Communication
  - » EEN 749 Advanced Digital Signal Processing
  - » EEN 766 Advanced Communication Systems
  - » EEN 774 Advanced Wireless Communications
- System Design
  - » EEN 739 Advanced Bioelectronics and Bioengineering
  - » EEEN 753 Advanced Machine Learning Engineering
  - » EEN 758 Advanced System Design

# ENGINEERING MANAGEMENT

## MASTER OF SCIENCE IN ENGINEERING MANAGEMENT

### FACULTY

- Tom Tafolla, *JD, University of San Francisco, Law, Interim Department Chair*

- Girish Harshe, *Ph.D., Penn State University, MBA, University of Chicago, Booth School of Business. Adjunct Faculty*

- Avid Farhoodfar, *Ph.D., Engineering Physics, Queen's University, Ontario, Canada; M.Sc., Plasma Physics, Brock University, Ontario, Canada.Adjunct Faculty*

- Symon Chang, *Ph.D., Electrical Engineering, Stanford University; M.S., Physics, Stanford University. Adjunct Faculty*

- Jeremy Tzeng, *M.S. / Ph.D., Electrical Engineering and Computer Science, U.C. Berkeley. Adjunct Faculty*

- Wen Ku, *Ph.D., Industrial Engineering, University of Wisconsin; M.S. Operations Research, Illinois Institute of Technology. Adjunct Faculty*

- Neeli Prasad, *Ph.D., University of Rome Tor Vergata, Rome, Italy; M.Sc., Electrical and Electronics Engineering, Delft University of Technology, Delft, Netherlands. Adjunct Faculty*

- Yousef Al-Shehabi, *Ph.D. Theology; M.A., International Relations, San Francisco State University, M.S., Computer Science and Electrical Engineering, Santa Clara University, Santa Clara, California. Adjunct Faculty*

- Alex Peters, *Post-Doc Fellowship, Princeton University; Ph.D., Engineering, Aachen University of Technology; M.Sc. in engineering, Institute of Civil Engineering, Bucharest, Romania. Adjunct Faculty*

- Barbara Hecker, *Ph.D., Computer Science, Nova Southeastern University, J.D., Northwestern California University School of Law. Adjunct Faculty*

- Mamoun Samaha, *M.S., Electronics and Computer Engineering, Eindhoven University of Technology, Eindhoven, Netherlands. Adjunct 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. Adjunct Faculty*

- Soly Paterson, *MBA, San Jose State University. Adjunct Faculty*

Engineering management involves the application of business methods and management expertise to technology-oriented companies, products and processes. The program here at the International Technological University (ITU) has been designed to prepare engineers, technical specialists and business professionals to lead projects and programs of a technical nature.

The benchmark of ITU's Engineering Management degree is built on the example of the Masters in Engineering Management Programs Consortium (MEMPC) and the elements of the Engineering Management Book of Knowledge of the American Society of Engineering Management (ASEM). (See references below)

- http://www.mempc.org/
- https://www.amazon.com/Guide-Engineering-Management-Body-Knowledge/dp/0983100535
- https://www.asem.org/Graduate-Program-Cert

The Consortium is an association of seven leading engineering programs in the United States (established in 2006), including Cornell University, Dartmouth College, Duke University, MIT, Northwestern University, Stanford University, and the University of Southern California. The ASEM was established in 1976 at the University of Missouri – Rolla (UMR) and describes itself as the national society that speaks for the profession of engineering management.

Training in engineering management at ITU provides a blend of engineering and technology training, along with a foundation in principles of business management. The degree has sometimes been referred to as a "technical MBA" and puts a significant emphasis on the development of leadership skills, team-building, collaboration, technology assessment, innovation and entrepreneurship, financial analysis, quantitative methods, market research, and effective business communication.

Moreover, given our existence in the heart of Silicon Valley, we offer students the opportunity to study and learn about fast-developing emerging markets such as the Internet of Things (IoT), medical devices, digital health technology, cloud computing, and other areas.

Given the predominance of computer science, programming, and software development in Silicon Valley, we also offer courses in engineering management that prepare engineering and business managers to be conversant in these areas.

### JOB POSSIBILITIES

Graduates of the Engineering Management Program, with a proper choice of courses, will have a foundation to pursue careers in the following areas Engineering Manager, Program Manager, Technology Business Development, Systems Analyst, Project Manager, Technology Analyst, Business Strategy Analyst, Product Manager, Management Consulting IT Consulting, Software QA Tester, and support staff for high tech executive management.

## PROGRAM LEARNING OUTCOMES

Upon graduation, students in ITU's Master's in Engineering Management (MSEM) degree program will:

1) Be able to lead engineering and technical project teams delivering new products and services whether the development team is located in the United States, or dispersed in different international locations.

2) Be able to lead multi-cultural teams in inter-disciplinary projects.

3) Be able to take a systems-approach to managing projects.

4) Understand the importance of aligning project goals and objectives with the corporate strategy of their organization.

5) Be able to plan, organize, lead, and control the outcomes of project teams staying mindful of the need to effectively communicate within the team, to motivate and instill a collaborative mindset in the group.

## PROGRAM REQUIREMENTS

- Required Courses
  - » 4 Core Courses: 12 Credit Hours
  - » Capstone or Thesis Project: 3 Credit Hours
  - » Internship: 1 Credit Hour
- Elective Courses: 12 - 20 Credit Hours
  - » Cross Disciplinary Electives: Up to 3 Credit Hours
  - » Transfer Credits: Up to 9 Credit Hours (counts as Elective)
  - » Internship: 1 - 9 Credit Hours
- 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 OR THESIS

- » EMG 690 Capstone Project
- » EMG 697 Thesis

## ELECTIVE COURSES

- » 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 and Architecture for Engineering Managers
- » EMG 550 Software QA and Testing for Business Analysts
- » EMG 551 Agile Methodologies
- » EMG 552 DevOps and Microservices Architecture
- » EMG 553 Business Technology Strategy
- » EMG 554 Business Transformation Consulting
- » EMG 557 The 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 565 Healthcare Product Economics and Outcomes
- » EMG 568 Technology Management
- » EMG 570 Cloud Computing Management
- » EMG 574 Physics for Engineering Managers
- » EMG 575 Introduction to Lasers and Photonics for Engineering Managers
- » EMG 579 Business Process Management
- » EMG 580 Special Topics

### Business Elective Courses

Any MBA class can be used as an elective for the Engineering Management Program.

### Engineering Elective Courses

Any engineering course from the electrical, software, or computer engineering programs can be an elective for the Engineering Management Program.

### Digital Arts

Any DA class can be used as an elective for the Engineering Management Program.

# 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 3.0 or above is 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

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 BE in lawful F-1 status to participate.

### COURSES

» CFL 591 Integrating Academic and Internship Learning

» INT 593 P/F Internship

### COURSE DESCRIPTIONS

#### 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.

## CERTIFICATE PROGRAMS

Upon completing three of the approved courses, the student may be awarded a joint Student Recognition Award from ITU and SAP University Alliance. To collect the certificate, the student should make the request while submitting their Petition to Graduate.

## ESL PROGRAM

The ESL Program provides the opportunity for non-native speakers of English to develop the tools and skills necessary to succeed in academic and professional environments. This program challenges the student to produce accurate and fluent English when speaking and writing. The program uses a student centered approach to learning while integrating the skills of speaking, listening, reading, writing, and grammar. Instructors will also focus on pronunciation and vocabulary expansion to assist the student in producing clear and effective communications.

The main course in the ESL program is the Student Success Program, which is only offered during the day. It has a required lab and materials fee which covers testing, textbooks and some other course expenses. This fee must be paid each term 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 term.

In addition, the ESL program partners with other ITU services to provide English language support through a variety of additional activities.

## 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.

# ENGLISH AS A SECOND LANGUAGE (ESL) PROGRAM

## STUDENT SUCCESS PROGRAM

### FACULTY

- Director, Renée Remy, *M.Ed., Stanford University, Comprehensive, Advanced and Business TESOL Certifications, Transworld Schools*

- Ann Cartier, *M.A., Adult Education, San Francisco State University, Adjunct Faculty*

- Jared Roehrig, *MA, English, San Francisco State University, MFA, Creative Writing, San Francisco State University, CELTA, St. John's University, Adjunct Faculty*

- Jason Barber, *M.Ed. in Higher Education Administration, Northeastern University, Boston, MA, Adjunct Faculty*

### MISSION

Our mission is to help students acquire the English language and cultural skills necessary to succeed in academic, business and social environments.

### PROGRAM DESCRIPTION

The ESL Program assists non-native speakers of English in developing the tools and skills necessary to succeed in academic and professional environments. The program uses a student centered approach to learning so that the skills of speaking, listening, reading, writing, and grammar are fully integrated. Authentic materials are used whenever possible to ensure the coursework is relevant, current, and challenging.

The ESL program partners with other ITU student services to provide English language support through a variety of additional activities.

### WRITING CENTER

The ESL Program runs a virtual Writing Center which is open to all students at no additional cost. The Writing Center assists students in:

- Reviewing written academic assignments

- Reviewing resumes and cover letters for grammar and language clarity

- Practicing presentation and interview skills

- Vocabulary expansion

- Reading comprehension

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 term 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 term.

## 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 505 CPA EXAM: AUDITING AND ATTESTATION (3)
*Prerequisites: None*
This course develops an understanding of the auditing practice and the role of internal and external auditing. The course covers auditing methods and auditing standards generally accepted (GAAS) related to attestation engagements. The auditing and attestation section of the CPA exam tests knowledge in the framework of five general engagement tasks: plan the engagement, assess the prospective client and engagement, decide whether to accept or continue the client and the engagement, and enter into an agreement with the client; consider internal control in both manual and computerized settings; collect and document data to form a basis for conclusions; review the engagement to offer reasonable assurance that objectives are accomplished and assess information obtained to reach and to document engagement conclusions; and arrange communications to satisfy engagement objectives.

ACT 506 CPA EXAM: BUSINESS ENVIRONMENT AND CONCEPTS (3)
*Prerequisites: None*
This section tests understanding of general business environment and business concepts that students need to know in order to know the accounting implications of transactions. Topics include knowledge of business organization; limited liability companies (LLC), limited liability partnerships (LLP), and joint ventures; economic theories needed to obtain knowledge of an entity's business and industry; financial management; and information technology.

ACT 507 CPA EXAM: FINANCIAL ACCOUNTING AND REPORTING (3)
*Prerequisites: None*
This section tests understanding of accounting principles generally accepted (GAAP) for business enterprises. Topics include financial statements theories and standards; distinctive items: recognition, measurement, evaluation, and presentation in financial statements in conformity with GAAP; particular types of transactions and events: recognition, measurement, evaluation, and presentation in financial statements in conformity with GAAP; accounting and reporting for governmental bodies; accounting and reporting for not-for-profit institutions.

ACT 508 CPA EXAM: REGULATION (3)
*Prerequisites: None*
This section tests students' understanding of federal tax procedures and accounting subjects, federal taxation of property transactions, federal taxation—individuals and entities, proficient and legal duties, ethics, and business law.

ACT 600 MANAGERIAL ACCOUNTING (3)
*Prerequisites: ACT 500, or equivalent*
The course develops the understanding of the many ways that firms utilize costs. The students will learn the alternative costing methods, such as the relevant costs for decision making; the break even analysis and the contribution margin

approach; absorption costing vs. direct costing; cost volume profit analysis. In addition, other topics are discussed such as the decision making involving joint costs, decentralization, product costing, job and process costing, and performance evaluation.

### 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 focuses on concepts and principles of designing computer systems to perform accounting functions, and extensive use of applications of different microcomputer accounting software packages. Students will work on SAP central component of financial information system that incorporates sales, audit, cash management, etc. Students will be given a few case studies to work on. The course will also incorporate case studies provided by SAP in the course.

## AMS (APPLIED 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: Recommended AMS 510*
This course emphasizes applying mathematical methods to analyze and solve engineering problems. The course starts with a review of Linear Algebra and its applications, and goes on to introduce some numerical methods including eigenvalue problems, ordinary differential equations (ODEs), partial differential equations (PDEs), etc. Optimization and minimization methods are important considerations 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*
This 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*
This course covers basic concepts of unconstrained optimization, linear programming, simplex method, degeneracy, and multidimensional optimization problems involving equality or inequality constraints by gradient and non-gradient methods.

### AMS 530 NUMERICAL ANALYSIS (3)
*Prerequisites: None*
This 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*
This 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 620 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 and quadratic assignment problems, graph partition and graph bipartition problems, point pattern matc ing problems, multiprocessor scheduling problems.

### AMS 722 ADVANCED APPLIED MATHEMATICS METHODS (3)
*Prerequisites: AMS 512*
This course will emphasize 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 course covers 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; and square roots of elements in $GF(2^n)$.

### AMS 760 ADVANCED OPTIMIZATION TECHNIQUES (3)
*Prerequisites: AMS 520*
This course covers combinatorial optimization, Hopfield neural network model, Simulated Annealing and Stochastic machines, mean field annealing, and genetic algorithms, with 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, and multiprocessor scheduling problems.

## BIO (BIO-MANAGEMENT)
### BIO 500 CONCEPTS OF CLINICAL RESEARCH MANAGEMENT (3)
*Prerequisites: None*
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 CONCEPTS OF 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 502 BUSINESS AND SCIENTIFIC WRITING (3)
*Prerequisites: None*
Scientific, Business, and Technical Writing offers students a platform to learn, practice and develop skills in scientific and technical writing. The course is designed for students to develop, research, and revise an independent project. The purpose of the class is to prepare students for their professional lives in professional, scientific, technical, or public service fields. Upon completion of the course, they gain expertise in organizing their knowledge while exploring ways of applying it, thus developing their professional expertise. Working on the resume and cover letter, both as

a professional document and as an example of writing for a specific audience students explore how communication styles differ for different audience. Each student develops an independent class project through several stages of revision, culminating in a final paper. Students are encouraged to choose a topic of their interest. Students taking the course usually propose experiments, projects, or initiatives based on their chosen topic.

## BIO 503 HUMAN ECOLOGY (3)
*Prerequisites: None*
A study of the interrelationships of man, populations, space, energy, food, mineral resources, and other life on earth. This course is intended to form a primer to those who wish to advance the concept of sustainable ecosystems by changing human behavior and interaction with nature, provide stewardship by providing the ethical and moral framework to just and impartial communication of our public and private actions, pursue sound science to understand how the world works and the effects of human interactions with nature, and lead positive and rational changes for a sustainable future of the world and its ecosystems. The course will explore the dynamics of human population and the pressure it exerts on natural system. Changes in socio-economic conditions, modern diseases and medicines, and lifestyle changes will be examined in the context of changes to the environment and ecosystems. The controversy surrounding genetically modified food, and restoration ecology at work will also be discussed.

## BIO 504 BIOLOGICAL MANAGEMENT (3)
*Prerequisites: None*
In this course, students will experience a huge amalgamation of information drawn from geography, biology, sociology and economics. This information requires skills in these disciplines and to have certain ethical and moral obligations to put this knowledge 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.

## BIO 505 BIOETHICS AND POLICY (3)
*Prerequisites: None*
Students will be exposed to an overview of bio-ethics – past, present, and future. Participants will identify and analyze forces that have influenced the evolution of bio-ethics and policy-making. The course also aims to identify the fundamental ethical questions that underlie contemporary biomedical practice. In the middle of the course, students will be exposed to the relationship of relationship of insurance and ethics. Students will explore bio-ethics in the clinical environment and bio-ethics on a global aspect. The course culminates in students views, opinions, and predictions on the trajectory of bio-ethics and policy-making in the future.

## 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 507 BIO MARKET STUDY (3)
*Prerequisites: None*
Students will learn about the basic principles of market study as it applies to life. The issues of economic principles and human psychological principles will be examined in the context of behavioral responses to economic factors. Students will explore the concepts of supply and demand, human systems, medical technology, business marketing, and how it all relates to the healthcare professionals and healthcare industry.

## BIO 508 INNOVATION AND R&D BIO MANAGEMENT (3)
*Prerequisites: None*
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 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. This course is highly recommended for students who want to explore their own product development for use in medical/biomedical applications. Ideally the class will have expertise in various disciplines – biology, engineering, and finance. Recommended for students from other majors who are inclined to explore entrepreneurship.

## BIO 509 REGULATORY MANAGEMENT IN BIOPHARMA (3)
*Prerequisites: None*
Commercial development of drugs, medical devices, or biologics needs to adhere to strict regulatory guidelines from the FDA in the US and similar agencies in other countries. Compared to product development in other disciplines, lack of understanding the regulatory requirement can lead to serious consequences. This course is designed to provide a basic understanding of the regulatory guidelines related to drug and device development. The course will cover salient features of the FDA mandate for development of drugs and medical devices in the US. It will also explore additional requirements for commercialization of these drugs in other countries as well.

# 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*
This course presents a structured method to problem solving. Important quantitative methods such as Decision Analysis, Forecasting, Linear Regression and Linear Programming will be used to communicate and solve problems to support business decision-making. In addition, students will learn valuable skills to communicate the results of these quantitative analyses to help strategic decision making for businesses. It is recommended that students have some background in statistical approaches such as measures of central tendency (mean, mode and median), measures of variability (standard deviations), correlation, sampling and estimation, basic hypothesis testing and basic regression analysis.

## BUA 503 GAME THEORY, BUSINESS STRATEGY AND THINKING STRATEGICALLY (3)
*Prerequisite: 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)
*Prerequisite: 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)
*Prerequisite: 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)
*Prerequisite: 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)
*Prerequisite: 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)
*Prerequisite: 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)
*Prerequisite: 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 690 SIMULATION AND OPTIMIZATION FOR BUSINESS ANALYTICS (3)
*Prerequisite: Completion of 27 credits 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, NON-SPECIFIC)
### 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 505 MANAGEMENT OF ORGANIZATIONAL CHANGES (3)
*Prerequisites: None*
With increasing global competitiveness, successful organizational leaders involved in project management need an increased customer focus. Total Quality Management is the ideal approach to accomplish such a goal, but its implementation often requires a cultural change within the entire organization. In this course, students will learn the key ingredients of the quality cultural change at all organizational levels and will develop the skills needed to implement and manage that change. They will then be able to apply and integrate their knowledge in their daily functions. This course offers a study of change management modules at the organizational level including Total Quality Management, Customer Focus, Strategic Management, Quality Management Ethics, Partnering and Strategic Alliances, Supply Chain Management, Quality Culture Change, Change Leadership, Team Building and Teamwork, Employee Empowerment, Education and Training, Overcoming Internal Politics, and Implementing TQM.

### BUS 506 PROCESS MAPPING & CONTROL (3)
*Prerequisites: None*
This course puts students in the process of analyzing and designing the structure of operation and implementation. It talks about enterprise architecture and process mapping that is needed in Project Management and Management Engineering and Restructuring. This is to give advanced analytical skills and mechanisms toward designing and drawing the operation scheme based on Computer Assisting Software Engineering (CASE). It also shows the monitoring and control tools needed to maintain, handle, and control

the projects or/and program structure for systematized implementation.

## BUS 507 PROJECT PROCUREMENT MANAGEMENT (3)
*Prerequisites: None*
In this course, students learn about planning the purchases and acquisition process and mechanism, where they plan their supply chain and network for outsourcing or purchasing of certain requisition and respond to seller inquiries. Accordingly, they learn to manage the purchasing and procurement contracts for accurate and efficient implementation procedures. It focuses on showing the procedures and required assignments to outsource vendors and administer the communication with them. Furthermore, it shows the needed skills to follow on executing the required activities that the vendors provide from the service offering stage to the closing of contracts.

## BUS 508 EXECUTIVE LEADERSHIP (3)
*Prerequisites: None*
This course will improve students' interpersonal and team-working skills. It will help the students to understand organizational behavior issues, with a special emphasis on assessing leadership competencies and changing corporate cultures. Topics include analyses of leading companies and direct application of material to individual work settings.

## 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 511 FINANCE FOR SENIOR EXECUTIVES (3)
*Prerequisites: None*
The comprehension of corporate finance entails an understanding of basic finance theory and financial institutions. An understanding of money, its value in relationship to risk, return, and cost of capital is invaluable. Moreover, financing sources from venture capital to IPOs play critical roles to long-term planning, mergers, acquisitions, and international financial management. With the evolution of the information and internet age, this course strives to offer the theory and future predictions of finance and its relation to the history, influence, and diverse forces from such institutions as government and politics, banking, securities, insurance, futures and other derivative markets. Students or learners will draw on their executive experience in the boardrooms and executive offices to compile perspectives and knowledge on financial markets and financial institutions, corporate financial functions, and practices. Students or learners will also review and examine American and International finance research journals internet articles, and the Shiller Text Irrational Exuberance (2009).

## BUS 512 COMPUTER APPLICATIONS IN EDUCATION (3)
*Prerequisites: None*
This course examines how to integrate computers into classroom education. Emphasis will placed on skills in the use of computer technology appropriate to teaching, learning, and managing education. It explores how technology can be used for curriculum, instructional design, and educational standards. In addition, the course also helps students learn, evaluate, and use resources that are essential for classroom management, professional productivity, and dealing with issues of equal access.

## BUS 513 VERBAL COMMUNICATIONS AND CONVERSATIONS (3)
*Prerequisites: None*
This class features two approaches to people interactions and communication: one with behavioral analysis emphasizing positive reinforcement at work, the second focusing on communication differences between men and women. Students will read two different texts and will apply the topics to typical work and personal scenarios, creating presentations and messages that demonstrate competencies in verbal and written interaction, communication, and conversations. There will be lecture and discussion on observing others, setting goals, measuring behaviors, and applying consequences and positive reinforcement to motivate and maximize performance at work. There will be lecture and discussion on the complexities in how men and women view communicating and how people can evaluate miscommunication to change their beliefs and conversation approach.

## BUS 514 WRITING AND SPEAKING FOR PERSUASION AND EFFECTIVENESS (3)
*Prerequisites: None*
This course will identify key elements necessary for good written and oral communication skills used in business settings. Students will explore methods for improving their natural speaking talents, including speech construction, practice, and delivery for prepared and spontaneous public speaking. Students will also read articles about persuasive interpersonal techniques to use in business settings, with recommended formats for persuasive written communication messages.

## BUS 515 WRITING AND COMPOSITION (3)
*Prerequisites: None*
This course provides students with a thorough grounding in writing and composing in English with particular emphasis

on effective professional communications at management, marketing, administrative, and research levels. This class is intended to provide guidelines and practice for different types of business and creative writing. The student gains knowledge and experience in choosing and composing various types of real-world business correspondence. Although the class will be focused on composition, students will be expected to participate in spoken as well as written forms of communication.

## 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)
*Prerequisite: 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)
*Prerequisite: 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: Graduate standing*
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 600 RESEARCH METHODS (3)
*Prerequisite: Some Statistics Knowledge*
Research Methods and Business Analytics (BA) share the practice of using multivariate statistical analysis. The essence of these statistical analyses is to extract meaningful results from multitude of data. Business Analytics is the new frontier of management science and practice whereby the acquired knowledge from data drive decision-making in the business environment. This course introduces students to the tools of business analytics with focus on the foundations of these statistical techniques, and interpretation of the results within the context of the business problem to be addressed. This course provides the student with the foundation to understand and apply the methods of BA via class lectures and hands-on practice on different software packages, like Rapid Miner and SAS. Another outcome of the class is to expose the students to ideas that may be encountered in SAS certifications.

## BUS 700 MANAGEMENT PRACTICE AND ORGANIZATIONAL BEHAVIOR (3)
*Prerequisite: 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 701 ADVANCED MANAGERIAL ECONOMICS (3)
*Prerequisite: None*
This course discusses Managerial Economics and Foundations of Management, and seeks insights from economics with current communications of approach in management. The course will be arranged in four topics: organizational economics and management, competitive approach, joint relationships among firms, and strategy in the current world economy. Topics also include an analysis of the application of economic methods to the decision-making issues of managers in private and public organizations; purposes of business

institutions; capital budgeting; theories of competition; costs and revenues; applying microeconomic practice and study to improve managerial decision-making.

## BUS 702 SEMINAR IN THE SOCIOLOGICAL AND PSYCHOLOGICAL PRINCIPLES OF MANAGEMENT (3)
*Prerequisite: None*
This course discusses various approaches to management as they progress from different topics such as psychology, sociology, and anthropology. Topics consist of entry into the institution (staffing, selection, education, socialization); managerial psychology (incentive, manners, management); and efficiency in the workplace (value of work, performance evaluations, absenteeism, revenue). The study of the sociological and the psychological suppositions and suggestions of different hypotheses of management and leadership is discussed. Discussed subjects include choosing and training workers, varying the behavior of managers, and persuading organizational methods. The class will also discuss Dual Motive Theory in terms of Ego/Empathy and self/other behavior to understand how brain functions can impact human behavior.

## BUS 703 LEADERSHIP BEHAVIOR AND MOTIVATION (3)
*Prerequisite: 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 704 SEMINAR IN SPECIAL TOPICS IN MARKETING (3)
*Prerequisite: None*
This course explain the principles, theories, and practice of the marketing purpose. Students will learn problem-solving methods for useful application through cases and techniques, and will study contemporary developments in marketing from educational and practitioner viewpoints. The course concentrates on the marketing purposes; recognition of consumer and organizational needs; clarification of economic, sociological, psychological, and global problems; and explanation and study of the value of marketing research.

## BUS 705 LEADERSHIP AND ETHICS (3)
*Prerequisite: None*
This course examines theories and applications of leadership and business ethics. The course reviews traditional leadership and ethical theories, discusses organizational leadership-ethics models from individual and systems perspective. The course analyzes specific common ethical problems encountered in business at the individual, manager, and organization levels. In addition, students will be introduced to critical hermeneutic participatory research conversations as a qualitative research approach for problem analysis and decision-making in the leadership-ethics field.

## BUS 706 SEMINAR IN STRATEGIC PLANNING IN HUMAN RESOURCE MANAGEMENT (3)
*Prerequisite: None*
This course addresses in detail current human resource philosophies, guidelines and practices that concentrate on single areas of ability management in a diversity of organizational surroundings.

## BUS 707 PHILOSOPHIES AND CONCEPTS OF TOTAL QUALITY MANAGEMENT (3)
*Prerequisite: None*
This course discusses the historical creation of quality assumption and practice, studies quality planning methods, emphasizes the value of getting organization dedication to quality standards, studies efficient quality control methods, and explains the effect of successful Quality Management on organizations. This course also explains the theory and importance of Total Quality Management and relates quality management standards to current and future operations management philosophies. Topics include quality assurance, strategic quality development, statistical quality control, employee participation, customer fulfillment, supervision and study of quality data, and ongoing improvement.

## BUS 708 SEMINAR IN ACCOUNTING INFORMATION SYSTEMS (3)
*Prerequisite: None*
Students examine financial methods and models. Financial analysis software is an essential part. Students will hone their skills using financial analysis software to finish assignments. The course focuses on resolving realistic issues. Students will know application problems using financial analysis software, write abstracts on financial articles, and do a proficient project studying a company's financial statements. The course focuses on the application of financial and non-financial data to a broad choice of business decisions. A range of financial decision-making devices will be used in the study of these decision-making procedures. Problem recognition, study, and decision are applied to present unsolved useful and specialized business issues.

## BUS 709 SEMINAR IN AUDITING (3)
*Prerequisite: None*
This course introduces auditing. Topics consist of the discussion of auditing purpose, audit standards, the process of auditing, audit planning, the collection of audit data, audit reporting, and current developments in auditing. A study of the topic of auditing is focusing on the audit of financial statements used for external reporting. Topics also include expert ethics, internal and prepared auditing, and assurance services. A study of independent auditing with a concentration on audit planning, risk assessment, internal controls, evidence, audit reports and professional responsibilities is considered.

## BUS 710 CURRENT ISSUES IN ACCOUNTING RESEARCH (3)
*Prerequisite: 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 711 SEMINAR IN CORPORATE FINANCE (3)
*Prerequisite: None*
This course discusses financial decision making in corporations. Topics include credit procedures, financial operation, transaction financing, corporate venture, corporate resources of funding, capital budgeting, capital structure, financial risk management, dividend guidelines and corporate conditional claims, and international finance. Theories are incorporated into the standard concepts of risk and return, evaluation of assets, and market structure. In addition, the course studies financial procedures related to corporate financial decision-making and the forms of short-term and long-term financial decisions made by managers.

## BUS 712 SEMINAR IN INVESTMENTS (3)
*Prerequisite: None*
This course explains the student's knowledge of finance related to investments, asset pricing and the appropriate research methods. The course also discusses the student's endeavor to publish in a refereed journal. The academic research covers the areas of portfolio concept, equilibrium and arbitrage pricing forms consisting of mergers and acquisitions, corporate hedging, capital asset pricing model (CAPM), and efficient market hypotheses (EMH). A summary of securities and their analysis is presented with a focus on basic theoretical models such as risk and return.

## BUS 713 MULTINATIONAL BUSINESS FINANCE (3)
*Prerequisite: 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 714 MANAGEMENT PRACTICE FOR THE INTERNATIONAL INSTITUTION (3)
*Prerequisite: None*
This course observes global institutions arrangements and purposes, parts of strategic planning, proper control, business and government affiliations, strategic agreements, and problems such as global agreements. The course will study legal problems related to increasing body of global institutions that reflect the interdependence of current world business. Such institutions are the United Nations, the World Trade Organization, the International Criminal Court, and many other local entities. The Management focus provides managers with the conditions required to both recognize and work within the emergent global setting of current institutions. It is very important to understand the results of strong global competition in home markets, the chances that existed abroad, the consequences of currency instabilities, and global capital movements with the issues and chances available by the different languages and cultures.

## BUS 715 SEMINAR IN INTERNATIONAL BUSINESS (3)
*Prerequisite: None*
This course shows how global business is different from carrying out business within nation-wide boundaries. The seminar will develop both a historical and contemporary viewpoint of international business management: the development of regulation, determining theory and research, and hypothetical viewpoints that continue to influence global business management performance, and the application's understanding of the hypothetical answers in a business enterprise. In addition, the course reviews the legal systems in many countries, which have impacted the business conducted in those countries.

## BUS 716 SEMINAR IN INTERNATIONAL MARKETING (3)
*Prerequisite: None*
This seminar develops marketing theories and competencies in an international context. The course also discusses marketing instruments and research in a global context. Students will know how companies apply their marketing procedures, while defining the risks and chances of global marketing. Students will study the present economic, political, and social forces in world markets, and how they have negatively changed the surroundings of marketing in such markets. In addition, the course covers the study of the creation of product, promotion, pricing, distribution approaches proper for international markets, sales management, and research in terms of company concerns and opportunities.

## BUS 717 SEMINAR IN INTERNATIONAL FINANCE (3)
*Prerequisite: None*
This seminar studies global monetary economics and finance. The focus is on the learning of worldwide monetary and financial agreements, the financial area, and financial volatility and monetary and fiscal policy problems. Topics consist of problems such as exchange rate instability and its effect on the actual and financial segment, currency runs, overseas liability, capital flows, international portfolio option, World Bank and IMF rules and problems regarding financial market worldwide financial rules, and global financial planning.

## BUS 718 INTERNATIONAL MACROECONOMICS ANALYSIS (3)
*Prerequisite: None*
This course concentrates on the study of the forces that form the U.S. global stability of payments. It will provide an analysis of the effect of U.S. expansion and U.S. inflation on home and overseas interest rates, trades in, sales abroad, the dollar's rate related to foreign currencies, and the net flow of wealth involving U.S. and other countries. The course studies the application of macroeconomics instruments to the decision making practice in the world economy. Topics consist of expenditure and investment theory, government expenses and budget deficits, asset pricing, the propositions of global capital market incorporation, expansion, price increases, guidelines integrity, and actual and nominal exchange rate.

## BUS 719 INTERNATIONAL HUMAN RESOURCE MANAGEMENT (3)
*Prerequisite: None*
This course discusses human resource management areas such as recruitment, education, reward, and labor in terms of doing business on international level. The course explains the goals and roles of personnel programs. Topics such as training and development, job examination, salary administration, performance evaluation, corrective structures, safety, and health are discussed. The course discusses the political, economic, and social reasons that affect global human resource management. Students will identify the human resource challenges and chances that impact international enterprises, and they will assess global human resource management strategies and policies.

## BUS 720 INTERNATIONAL INFORMATION TECHNOLOGY MANAGEMENT (3)
*Prerequisite: 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 721 EMERGING ISSUES IN ORGANIZATIONAL BEHAVIOR AND HUMAN RESOURCES MANAGEMENT (3)
*Prerequisite: None*
An organization consists of a purpose, people, a structure, a vision and objectives. Therefore the science of organizational behavior (OB) came to understanding how individuals and groups behave, react, and communicate in the framework of an organization. Topics of organizational behavior includes topics such the organizational theory, individual behavior, motivation, team and groups dynamics, management and leadership, organization structure, and organizational culture. 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.

## BUS 722 ECONOMICS AND PUBLIC POLICY (3)
*Prerequisite: None*
This course discusses the concepts of prices and markets and studies macroeconomics government rules that affect business decisions. It looks at the hypothetical origins of competing rule options in subjects such as fiscal and monetary policy, international trade, antitrust regulation, and taxation. In addition, it evaluates the implications for business decisions of different government laws as they affect the efficiency and overall work of the private sector. The course studies the difficult boundary between the public and private sectors in the current American society in a comparative context, both historical and international. Real world case studies offer students a realistic understanding of the methods for organizing business-government relations at the local, state, federal, and international level.

## BUS 723 ORGANIZATION DESIGN (3)
*Prerequisite: None*
This course discusses the Management Training Program to enhance managerial decision making. Organization design is a major resource of competitive advantage. Building an efficient organization structure and deliberately supporting organizational structures to sustain business strategy and results in, lower costs, enhanced customer happiness, faster time to market, better capability to adjust to changes in the market, and increased efficiency. The content clarifies how environmental features, strategic options, and technical causes impact the design of organizations. It consists of an explanation of four conventional organization designs- -practical, place, product, and multidivisional, and of four newer designs–environmental, international, network, and virtual.

## BUS 724 CORPORATE PLANNING AND ENVIRONMENT (3)
*Prerequisite: None*
This course discusses corporate responsibility and accountability of companies' environmental impacts. It studies the different drivers for corporate responsibility and the function of corporations related to the environment. The course explains the nature and efficiency of corporate answers to environmental accountability and the function of strategic planning in accomplishing outcomes. This course concentrates on the problems of building a strategic corporate planning form for an organization. Topics consist of distinctions among the function of internal and external databases; modeling, planning and forecasting; and establishing measures of efficiency.

## BUS 725 LEGAL ISSUES FOR THE MODERN INSTITUTION (3)
*Prerequisite: None*
This course concentrates on the study of the legal procedures, trends, and suggestions of rules, laws, and latest court decisions affecting business. It will conduct survey and comparative study of the legal structures of nations contributing into global finance, trade, and commerce. In addition, the course teaches students the political, legal, and regulatory management that describes, supports, and limits business practice chances.There will be an emphasis on basic

interactions of politics, law, ethics, and corporate social accountability. Topics consist of basis of business ethics; business and the legal structure; law of private business behavior; possession and control of business; trade practices and consumer safeguard; and the official environment of global business.

## BUS 726 SEMINAR IN ORGANIZATIONAL BEHAVIOR RESEARCH (3)
*Prerequisite: 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 727 SEMINAR IN SPECIAL TOPICS IN OPERATIONS MANAGEMENT (3)
*Prerequisite: None*
This seminar incorporates the assumption, study, and practice of processes and technology management with a concentration on the use of technology structures into manufacturing and service related procedures. Students will discover the basic problems and current developments of processes management along with theories of technology and data transfer. The theories will be used in the assessment of the study and application of developing operations theories, and methods, efficiency and competitiveness programs, planning, and execution of operations and technology structures in defining the work of the organization.

## BUS 728 SEMINAR IN STRATEGY AND INNOVATION (3)
*Prerequisite: 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)
*Prerequisite: 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)
*Prerequisite: 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 731 MANAGERIAL APPLICATIONS OF INFORMATION TECHNOLOGY (3)
*Prerequisite: None*
This course teaches students file organization, information systems, hardware, software, database concepts, and data communications. In addition, the course will discuss the theory of a database and database management systems to design databases; store and recover data; and show data and create reports in different business information practicing applications. Designing and implementing web pages using HTML and incorporating information in a web page are explained. Assignments examine how technology is altering the way communication is conducted, decisions are made, people are managed, and business procedures are improved. Students access the Internet to collect data and study business decisions using decision support techniques.

## BUS 732 NETWORKING CONCEPTS AND APPLICATIONS (3)
*Prerequisite: None*
This course concentrates on planning, building, and operating a data communications structure and computer network, and highlights data distribution. The course consists of important parts of networks with hardware, software, and interfaces. In addition, the course explains the networking field. Topics incorporate local-area networks, wide-area networks, network terms and protocols, router programming, Ethernet, OSI model, cabling, IP addressing, and network standards. At the end of the course, students will be able to achieve tasks in relation to language, networking mathematics, forms, media, Ethernet, sub-netting, and TCP/IP Protocols.

## BUS 733 MANAGING SOFTWARE DEVELOPMENT PROJECTS (3)
*Prerequisite: None*
This course explains basic software project management methods. Students will learn contemporary and conventional software development methods and policies. The course also

discusses the mathematical and instinctive processes used to establish the most possible plans and designs for difficult and large scale structures and projects. Focus will be on the theory and methods of directing and controlling sources for a fixed term project founded to accomplish particular objectives and goals. Students will learn the newest methods for scheduling, estimating and budgeting, selecting proper work techniques, examining and controlling, and development reporting of real results against founded budgets.

### BUS 800 WRITING AND RESEARCH METHODS (3)
*Prerequisite: 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)
*Prerequisite: 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)
*Prerequisite: 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 803 SPECIAL TOPICS IN RESEARCH TECHNIQUES (3)
*Prerequisite: None*
This course provides knowledge and proficiencies related to development-oriented business research. Students will study advanced research processes, which will teach them statistical methods, and study of qualitative data. In addition, it covers important research project development, including creating topic, problem statement and explained bibliography, review and creation of literature, gathering of information, study of data and understanding. The course help students look in detail at data gathering methods, measurement tools, example processes, and data analysis methods.

### BUS 804 MANAGEMENT AND ORGANIZATIONAL THEORY (3)
*Prerequisite: 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 805 MANAGEMENT AS A BEHAVIORAL SCIENCE (3)
*Prerequisite: None*
This course offers applied methods in behavior management and self-discipline. Students obtain methods for the management of both positive and negative behaviors in behavioral self-control and behavior management. This course introduces students to the dual motive theory and the field of management, focusing on principles and concepts applicable to all types of organizations. The development of practical and behavioral features of management and organizational theory are presented in the framework of political, societal, regulatory, ethical, global, technological, and demographic environmental forces. The course also talks about the analysis and application of group dynamics, motivation theory, leadership theories, and the incorporation of interdisciplinary concepts from the behavioral sciences. It will include a review of Dual Motive Theory, understanding how brain functions of ego and empathy can impact management behavior.

### BUS 806 EMERGING ISSUES IN MARKETING MANAGEMENT AND RESEARCH (3)
*Prerequisite: 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)
*Prerequisite: 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 808 CREATIVITY: A PROCESS-ORIENTED APPROACH (3)
*Prerequisite: None*
This course explores the process of creativity and invention by reviewing the way creative people work and live. The approach is multi-faceted and involves introspective reports, descriptive interpretation, and analytical accounts. During the review phase, the course attempts to cover the wide range of views on creativity and invention. During the later phase, the students will learn how to be more creative. The teaching approach will include lecture, discussion, student journals, group activities, and projects. Students' performance will be evaluated based on their eagerness to learn and apply the concepts and principles to their own fields.

## BUS 809 INNOVATION AND CREATIVITY: CULTURE OF GROUP DYNAMICS (3)
*Prerequisite: None*
The main objective is to explore mechanisms of innovation in the social setting, and especially in working environment. Research overview will cover characteristics of the creative process from various perspectives. Applying principles of group dynamics and Creativity Signposts, the students will fashion appropriate action plans for cultivating innovative situations. 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.

## BUS 810 CONFLICT RESOLUTION (3)
*Prerequisite: None*
This course introduces the student to Conflict Resolution. This course will focus on conflict theories, methods of conflict management, and an examination of case studies along with contemporary and historical perspectives and analysis of conflict. Upon completion of this course students will be able to map out and analyze conflict situation, using theoretical concepts and frameworks. Course assignments will be used to apply the methods learned and complement the theoretical knowledge gained from the textbook, case studies and lectures. 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.

## BUS 811 CREATIVITY AS A LINGUISTIC PROCESS (3)
*Prerequisite: None*
This course examines human creativity from a philosophical and linguistic perspectives, using the metaphor, writing, and action as text, as the heuristic process tied to creativity in the context of business. Starting with Saint Augustin's concept of time, Aristotle's mythos and mimesis, and ending with Ricoeur's dynamic concepts of emplotment and mimeses, the course examines forms of imaginative practices in the human sciences that constitute the intermediary steps in the process of understanding and creativity. Interpretation is discussed as an intermediary between surface meanings and depth meanings (creativity and innovation), and as an ontological act (of appropriation) in which the thinker must go beyond logical knowing and commit to re-understanding existing values and history on a personal, interpersonal, and institutional levels, and to project into the future. Practical applications of how creativity works, through analysis of videos, business plans, financial reports, statistical models, scientific models, and critical hermeneutic participatory research conversations, are used as media through, by, and in which new actions can be delineated and transposed from a fictive to a concrete reality in a variety of business and educational situations.

## BUS 812 EMERGING ISSUES IN FINANCIAL DECISION MAKING (3)
*Prerequisite: 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)
*Prerequisite: 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 814 SEMINAR IN SPECIAL TOPICS IN INTERNATIONAL BUSINESS (3)
*Prerequisite: None*
This course discusses the theory and process of building up and realizing approaches for getting competitive advantage in the international business environment. Students will gain knowledge in the fields of strategic management and global business. In the development of the study of this hypothetical work, students will also consider a diversity of empirical methods used to study the global competitive strategy practice. Students will discover the speeding up globalization of industries, and regionalization of competition, that at the same time make easy and delay the creation and accomplishment of strategies internationally.

## BUS 815 SEMINAR IN ADMINISTRATIVE POLICY AND ADMINISTRATION (3)
*Prerequisite: None*
This course discovers the function of public administration in current society by way of observing its hypothetical basis, ethical problems, and political environment. Topics include theoretical study and analysis of administration; the development of management theory and its following function in the public sector; managerial design, manners and change; decision making forms and active group; public administration and policy practice; the principles of public service; administrative management; and the official basis of public administration.

## BUS 816 OPERATIONS AND INFORMATION TECHNOLOGY MANAGEMENT (3)
*Prerequisite: None*
This course covers the fundamental theories, principles, and issues related to the operations and management of information technology in support of the firm's business processes. Students will explore the role of information technology and systems in contributing to the productivity and competitiveness of business enterprises and in enabling organizational restructuring as needed. Students will explore and critique current body of knowledge, the information technology literature, and research methods.

## BUS 901 DISSERTATION RESEARCH (18)
*Prerequisite: 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.

## CEN (COMPUTER ENGINEERING)
## CEN 500 COMPUTER ENGINEERING (3)
*Prerequisites: None*
This course provides a general review of technical concepts and current developments in computer engineering relevant to computer architecture, computer algorithms, computer networks, and computing techniques that cover Big Data Parallel Processing, Data Mining Computing, and Computing Software. Experts in the fields introduce fundamental and up-to-date knowledge of science and technology in computer engineering.

## CEN 508 SCIENTIFIC COMPUTING (3)
*Prerequisites: Recommended AMS 510*
*(Alternative: CEN 510, or CSC 580 can be a replacement of CEN 508)*
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, and SAS/JMP to help students conduct the scientific project.

## CEN 510 ALGORITHMS AND DATA ANALYSIS (3)
*Prerequisite: None*
*(Alternative: CEN 508 Scientific Computing, or CSC 580 Computer Algorithms can be a replacement for CEN 510)*
*Prerequisites: Knowledge of Data Structures*
This course emphasizes computer algorithms applied in the field of engineering. It covers fundamental techniques for algorithm design, analysis and implementation, including recursion, dynamic programming, randomization, dynamic data structures, fundamental graph algorithms, and NP-completeness. Sample applications in computer engineering will also be discussed. Topics included: Recursion — divide and conquer, backtracking, dynamic programming, greedy algorithms; randomization and amortization — randomized quicksort, hashing, potential functions, disjoint sets; graph algorithms — breadth/depth-first search, topological sorting, minimum spanning trees, shortest paths, maximum flows and minimum cuts, applications; and NP-hardness — the Cook-Levin theorem, polynomial-time reductions, classical NP-hard problems, approximation, applications.
*Formerly known as, "Algorithms" from August 2015 - July 2016.*

## CEN 540 NETWORK SECURITY TECHNIQUES (3)
*Prerequisites: 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 INTRODUCTION TO COMPUTER VISION (3)
*Prerequisites: CEN 508 or CEN 510*
This course will focus advanced techniques in image processing. Challenges of data collection with various sensors and cameras, high-level algorithms and real-time implementation will be discussed. 2D and 3D objectives recognition and reconstruction will be covered with practice.

## CEN 542 DIGITAL IMAGE PROCESSING (3)
*Prerequisites: CEN 508 or CEN 510*
This 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 by 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, ATM/Frame Relay, Network Operating Systems (NOS), voice processing, and VOIP.

## CEN 550 COMPUTER CONTROL ENGINEERING (3)
*Prerequisites: CEN 500*
This course introduces the knowledge of block diagram and signal flow graph, modeling of electromechanical, hydraulic, pneumatic systems, state variable representation and transfer functions, matrix methods in state space, controllability, observability, and canonic form transformations, pole placement with state feedback and integral control, time domain analysis and stability criteria, root locus and method for output feedback design, and control system simulation.

## CEN 551 COMPUTER ARCHITECTURE (3)
*Prerequisites: Knowledge of Digital Logic and Circuits*
This course focuses on principles of computer architecture, offering students an overview of computer systems, CPU design, 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 internal organization of computers and how it affects performance.

## CEN 556 DISTRIBUTED COMPUTING SYSTEMS (3)
*Prerequisites: Recommended CEN 548*
This course covers several main topics in distributed systems, including remote service invocation (RPC), peer-to-peer system (P2P), web services, service registration and discovery, data synchronization, service replication, and fault tolerance.

## CEN 564 COMPUTER INTERFACE AND FIRMWARE ENGINEERING (3)
*Prerequisites: CEN 551*
This course introduces software and hardware interfaces between computer and peripheral devices. It covers the system hardware and device firmware design for computer applications, mainly the microcontroller/microprocessor and peripherals. Firmware is programmable content in electronic hardware devices that provides instructions to those devices. It is developed in either C or assembly.

## 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 566 ROUTING IN COMPUTER NETWORKS (3)
*Prerequisites: CEN 548*
This course introduces different routing protocols (RIP, IGRP, EIGRP, OSPF, IS-IS and BGP) as well as new developments (multicasting and MPLS). Students will learn interior and exterior routing protocols that are currently being used in the Internet. In addition, they will study multicast routing and multi-protocol layer switching (MPLS).

## CEN 567 LOCAL AREA NETWORKING (3)
*Prerequisites: CEN 548*
This course provides an overview of communications networks and introduces the components of local area networks (LANs), wide area networks (WANs) and protocols. Main network technologies such as Sonet, Ethernet, wireless LANs and storage area network will be covered. The class will cover OSI (open system interconnection), TCP/IP, and the networking architecture that is the base technology of the Internet.

## CEN 568 NETWORK STORAGE SYSTEMS (3)
*Prerequisites: 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 SYSTEM ANALYSIS AND OPTIMIZATION (3)
*Prerequisites: Recommended AMS 552*
This course covers 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)
*Prerequisite: 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: CEN 542*
This course introduces techniques and implements 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: CEN 500 or EEN 500*
This course emphasizes on the challenges of mobile device design and technologies. The key topics cover condensed and precise structure design, antenna design, high reliability and quality, security, power issues, etc.

### CEN 661 PARALLEL COMPUTING (3)
*Prerequisites: CEN 510*
This 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 680 SPECIAL TOPICS IN COMPUTER ENGINEERING (3)
*Prerequisites: Approval from a faculty advisor*
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 691 RESEARCH PROJECT (1)
*Prerequisites: Approval from a faculty advisor*
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 from a faculty advisor*
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 from a faculty advisor*
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)
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 RESEARCH II (3)
Master Thesis II is a continuance of Master Thesis I. It is upon recommendation of the student's thesis advisor and approval of chair of the department. Paper submitting for publication is required.

## 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.

## CSC (COMPUTER SCIENCE)
### CSC 501 DISCRETE STRUCTURES (3)
*Prerequisites: None*
This cgourse 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 sysems, 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: 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 513 C# PROGRAMMING (3)
*Prerequisites: None*
This course introduces C# as a programming language and as a platform for web and Win 8 mobile app development. We will talk about C# basics, like data type, variables, functions OOP using C#. Programming in C# for mobile Win 8 app development will be explored. Students will create a variety of programs and apps using C#.

## CSC 514 OO PROGRAMMING WITH OBJECTIVE-C (3)
*Prerequisites: Knowledge of C*
This course focuses first on teaching the Objective C language, its syntax, design, features, and capabilities, then on introducing the Cocoa Library, then on developing GUI applications using Interface Builder. Objective C is the principal language for application development on Apple's Mac OS X and iPhone. On the Mac OS it is used together with Cocoa (the NS class library) and on the iPhone together with the UI class library. The course teaches in detail the syntax and features of the language, supported by many programming examples, drill quizzes, and homework. It will use the Cocoa API and the Interface Builder to develop example applications for the Mac with a graphical interface. It starts with development of OC programs on the command line. Later the Xcode IDE together with the Cocoa library and IB will be used for development.

## CSC 515 IPHONE APPLICATION DEVELOPMENT (3)
*Prerequisites: CSC 514*
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 540 COMPUTER GRAPHICS (3)
*Prerequisites: None*
Historical development of computer graphics, black and white graphiCS programming, color raster graphics, resolution and memory requirements, look-up tables, vector graphiCS and matrices, surfaces, rotation & scaling, graphiCS primitive, and transformation.

### 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: 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: 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 575 TOPICS IN COMPUTER SCIENCE (3)
*Prerequisites: None*
Newly appearing, and often very promising topics in the ever developing field of Computer Science are taught, explained, analyzed, and practiced, chosen by the expert-level instructor.

### 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 605 PRINCIPLES OF OPERATING SYSTEMS (3)
*Prerequisites: CSC 580*
This course covers the basic principles of operating system design and implementation. Topics include concurrent processes, inter-process communication, job and process scheduling, deadlock and various other operating systems concepts. Issues in memory management (virtual memory, segmentation, and paging) and auxiliary storage management (file systems, directory structuring, and protection mechanisms) will also be covered.

### CSC 610 COMPILER DESIGN (3)
*Prerequisites: CSC 512*
This course is an introductory course on the design and implementation of compilers. It covers 4 main topics (1)The front end section includes scanning, parsing and context sensitive analysis of the source program; (2) The infrastructure section provides the background knowledge needed to generate intermediate code in the front end, to optimize that code, and to transform it into code for a target machine; (3) The optimization section introduces optimizer, a compiler's middle section; (4) The code generation section includes instruction selection, instruction scheduling and register allocation.

### CSC 618 GUI DEVELOPMENT WITH JAVA (3)
*Prerequisites: CSC 518*
This course teaches the principles of Graphical User Interfaces (GUI) and develops GUIs using Java's AWT and Swing libraries. Knowledge of and ability to use these libraries is of paramount importance in almost all of today's software development and is not limited to development of Android Phone applications. The learning and programming of GUIs is most effective and rewarding using these Java libraries, considered by many as the best, simplest and most elegant of all GUI development tools and libraries. (Most Java GUI developers don't use any visual development tools, since the design and concept of Java's GUI libraries itself is so natural and easy to understand, that visual development tools become redundant). It teaches the basic principles of graphical user interfaces, the widget hierarchies, event handling mechanisms, event queue management, thread handling etc.

## 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 630 INFORMATION RETRIEVAL (3)
*Prerequisites: None*
This course describes the models for information retrieval, techniques for indexing and searching, and algorithms for classification and clustering. Topics include, but are not limited to: SVM, latent semantic indexing, link analysis and ranking, Map-Reduce architecture and Hadoop.

## 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 632 NATURAL LANGUAGE PROCESSING (3)
*Prerequisites: Knowledge of Java or Python*
Introduction to natural language processing includes formal language theory, statistical methods, probabilistic models, hidden Markov models, computational linguistic, machine translation, speech recognition and synthesis, spoken language understanding, question answering, conversational agents, and human-machine interaction.

## 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 635 PRACTICAL NEURAL NETWORKS TECHNIQUES (3)
*Prerequisites: None*
This course explores the organization of synaptic connectivity as the basis of neural computation and learning. Perceptrons and dynamic theories of recurrent networks including amplifiers, attractors, and hybrid computation are covered. Additional topics include backpropagation and Hebbian learning, as well as models of perception, motor control, memory, and neural development.

## CSC 640 ADVANCED COMPUTER GRAPHICS (3)
*Prerequisites: CSC 540*
This course gives students hands-on experience and thorough understanding of the most important computer graphiCS principles. It uses Java and its built-in graphiCS capabilities to give the student programming experience in 2D and 3D computer graphics, coordinate transformations, linear 2D and 3D transformations, projections, 3D geometry; color computations, RGB and CMYK color systems, simulation of curved surfaces through Gouraud and Phong shading, hidden surface removal through the Zbuffer technique; also, some animation principles. Introduction to the most important Computer GraphiCS hardware.

## CSC 642 COMPUTER GRAPHICS WITH WEBGL (3)
*Prerequisites: CSC 540*
HTML5, released in March 2011, brings with it a variety of enhancements, including enhancements to the JavaScript language and powerful 2D and 3D graphiCS capabilities. They consist of a library of function calls of the canvas element's rendering context that are embedded in JavaScript.

Another feature is the use of shaders that are programmable portions of the rendering pipeline. These must be programmed in the OpenGL shading language.

## 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: 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 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 & 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.

## CSC 760 ADVANCED TOPICS IN DATA SCIENCE (3)
*Prerequisites: CSC 580*
Due to so many areas in the advanced level of data science, the expert-level instructor decides the specific area(s) for the deep dive.

## DGA (DIGITAL ARTS)
## DGA 501 NEW MEDIA PRODUCTION (3)
*Prerequisites: None*
An introduction to digital media production providing 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 502 MANUFACTURING CINEMATIC SPACE (3)
*Prerequisites: None*
As an entry-level design studio course, it uses the familiar language of film to teach volumetric thinking and design principles. The semester is divided into three projects: Analysis (1D), Construction (2D), and Space (3D). (1D) Students begin by analyzing a film through reading, writing, abstracting, and diagramming. (2D) Next, they choose a specific scene within their film to explore in depth through orthographic drawing and traditional architectural representation. (3D) Finally, they use the themes from their film as a catalyst for a design proposal. The final project is modeled physically and digitally, using design software and CAD/CAM/CNC equipment. Students are expected to participate in weekly discussions, presentations, and critiques, and use design software and tools. Some knowledge of the

Adobe Creative Suite, CAD, and Rhinoceros, or equivalent, is not expected, but will be beneficial.

## 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 505 MATH AND PROGRAMMING FOR ARTISTS (3)
*Prerequisites: None*
The purpose of this course is to teach practical mathematics and of programming to Digital Arts students. A comprehensive understanding of the mathematics involved in Computer Graphics gives Digital Artists an edge and advantage in their professional productivity. The same must be said for a moderate level of programming capabilities. The course will proceed with a little math applied to simple level programming – all related to graphics, media and design.

## DGA 506 ARCHITECTURAL TOURS (3)
*Prerequisites: None*
Locus Operandi: methods of urban surveillance. This seminar brings the city to the foreground. Through a series of site visits, the built environment becomes the classroom itself. Students will complete field trips to six locations in San Francisco, and one in San Jose. Each trip will include the following methods of urban surveillance: walking, reading, viewing film, researching, and representing. These activities will be catalogued into a book and a phone application, and will serve as field research for the final project, the design of an urban intervention. Students will be expected to attend all classes, and lead an hour of each visit. Work will be completed using pens, sketchbooks, Adobe Creative Suite, and Rhinoceros, and other related medium.

## 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

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 514 PHOTOGRAPHIC PRINCIPLES AND ADVANCED IMAGE MANIPULATION (3)
*Prerequisites: None*
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 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 pre-dub 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 & 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 & 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 & 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

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 604 FROM HERO TO SUPERHERO: THE PERSISTENCE, MODERNIZATION, AND GLOBAL DISSEMINATION OF CLASSICAL ARCHETYPES IN GLOBAL STORYTELLING (3)
*Prerequisites: None*
This course will investigate a key to successful, meaningful storytelling – the heroic archetype, from its origins in classical

mythology, to its development in literature, to its importance in today's international dramatic or comedic properties (including blockbuster film franchises) and advertising via cross-media and transmedia. The course will illustrate the ways such characters provide audience identification, while inspiring empathy and understanding and evoking the emotional spectrum, whether through cinema, TV or portable devices. Students will be given an opportunity to learn about the heroic archetype in its many forms, and create their own heroes, as well as develop narrative properties and model campaigns for global impact and distribution, generating a skill set to make use of this crucial element of storytelling.

#### 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 CB MODELING (3)
*Prequisties: DGA 508*
Computer Graphic (CG) 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 Aguemented 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 desigining and modeling their own objects, creatures, and enviroments. 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 613 REAL-TIME LIGHTING & COMPOSITING (3)
*Prerequisites: None*
Learn the techniques film professionals use to paint with lights to create Hollywood caliber scenes and shots. Also take a leap beyond traditional time-consuming renders and learn how to apply the latest real-time technology to light virtual cinematic scenes. This course also shows students how to composite rendered elements, live actors and FX all together using the latest real-time technology.

## DGA 614 REAL-TIME LIGHTING & REAL-TIME COMPOSITING & FX WORKSHOP (3)
*Prerequisites: None*
Learn the techniques film professionals use to paint with lights to create Hollywood caliber scenes and shots. Also take a leap beyond traditional time-consuming renders and learn how to apply the latest real-time technology to light virtual cinematic scenes. This course also shows students how to composite rendered elements, live actors and FX all together using the latest real-time technology. Even students with little to no 3D lighting or compositing experience will walk away from this workshop with a complete real-time rendered scene.

## 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 616 ANDROID WEAR (3)
*Prerequisites: CSC 519, DGA 518*
With the natural progression of technology toward wearable devices, Android Wear will only gain in popularity.This class will help the student be prepared and well versed in the design fundamentals, UI/UX flow, how to use notifications, limitations of the platform, and how to help enhance the user with contextual information. Software used: Eclipse.

## 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 621*
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 start-up. 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 & 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 524 & DGA 508*
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 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.

# EEN (ELECTRICAL ENGINEERING)

## EEN 500 ELECTRICAL ENGINEERING (3)
*Prerequisites: None*
This course provides a general review of technical concepts and current developments in electrical engineering, with concentrations relevant to Integrated Circuit (IC) designs in VLSI/ULSI; Analog, MEMS and RF IC designs; Signal Processing and Communication in telecom and wireless; and Intelligent System Designs. Experts in the fields teach the course.

## EEN 501 FUNDAMENTALS OF SEMICONDUCTOR PHYSICS (3)
*Prerequisites: Knowledge of Physics*
This course introduces semiconductor physics and device modeling. It covers the theoretical and processing issues of metal oxide semiconductor (MOS) capacitors, p-n junction diodes and field-effect transistors. It emphasizes on deep submicron and Nano technology MOS devices. CMOS and SOI technologies and 3-D devices such as the FINFET are also covered. Quantum mechanics and other techniques potentially applied on integrated circuit manufacture are discussed.

## 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, and timing/power effective designs.

## EEN 506 ELECTROMAGNETIC FIELDS AND WAVES (3)
*Prerequisites: Knowledge of 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)
*Recommend: Knowledge of Data Structures*
This course covers IC (Integrated Circuits) circuit and physical designs. The course introduces IC process, basic analog and digital circuits, operational principles, schematic and layout techniques, circuit simulation, clock distribution, power distribution, high-speed circuits, and low-power techniques. Course project to provide students hands-on practice is required with circuit design and layout implementation to enable career opportunity as entry-level IC chip designers. EDA tools consistent with industry usage are introduced for design and verification.

## EEN 512 MEMORY DESIGN (3)
*Prerequisites: EEN 511*
This course introduces advanced circuit design consideration and implementation. It focuses on various memory design concepts, techniques, and applications involved DRAM/SDRAM, SRAM/SSRAM, ROM, EPROM, FLASH, etc.

### EEN 513 MICROPROCESSOR DESIGN (3)
*Prerequisites: CEN 551*
This 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 offers students an in-depth understanding of how to encode in multiple languages; particularly C Shell, Bourne Shell, Perl, Python and Tcl, which are very popular in the current semiconductor chip design and computer engineering industry. During this course, students will work on at least 3 real VLSI design projects with practical script examples. By the end of this course, students will have gained to have strong encoding ability on the industry automation project by using multiple scripting languages fluently.

### EEN 515 ANALOG CIRCUIT DESIGN (3)
*Prerequisites: 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: Knowledge of Digital Structure*
This 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 (3)
*Prerequisites: None*
This course introduces the principle of Field Programmable Gate Array, various FPGA architectures, design flow, and application advantages vs. limitations. Practicing with course projects, students will develop solid understanding and hands-on experience in this exciting digital design area.

### EEN 522 DESIGN VERIFICATION (3)
*Prerequisites: EEN 500*
The course introduces logical verification concepts, considerations, and applications. Advanced algorithms applied to coverage, challenges of speed, scalability, verifiability, and skills and trade-offs will be discussed.

### EEN 525 ASIC DESIGN II (3)
*Prerequisites: Knowledge of Digital Structure*
The course emphasizes 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 526 DESIGN FOR TESTABILITY (3)
*Prerequisites: EEN 520*
This course teaches students the fault modeling including single stuck-at fault (SSF) and multiple stuck-at fault, fault equivalence and dominance, fault simulation techniques: serial, parallel and concurrent, testing algorithms for SSF and bridge fault, functional testing, PLA testing, and memory testing. Commercial tools and capabilities are introduced.

### EEN 531 NANOTECHNOLOGY (3)
*Prerequisites: Recommended EEN 501*
Nanotechnology is the field of fabrication, characterization and manipulation of nanometer scale objects. The course analyzes detailed descriptions of equipment, facilities processes, and process flow needed to fabricate small devices and structures. The course covers fabrication challenges and break-through nanotechnology in semiconductor. Students will learn processing and manufacturing considerations including process control, contamination, yield, and processing interaction. Case study of design process flow to build micro- and nano-scale devices and systems.

### EEN 541 DIGITAL SIGNAL PROCESSING AND SYSTEM ANALYSIS (3)
*Prerequisites: Recommended AMS 514*
The course focuses on time and frequency analysis of discrete-time signals in both time and frequency domains, modeling of electrical systems, and the design of finite impulse response (FIR) discrete filters. The sampling theorem, continuous-to-discrete and discrete-to-continuous converter, 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 multirate signal processing, decimation, interpolation and sample rate conversion, and efficient implementation are covered. Principle, analysis and application of communication systems, both digital and analog, are introduced. Students will learn Fourier techniques and applications in communication systems and implementation of software and hardware in analyzing signal processing systems.

### EEN 551 CIRCUIT DESIGN AND PCB IMPLEMENTATION (3)
*Prerequisites: EEN 500*
This course focuses on practical circuit design, spice simulation and printed circuit board (PCB) layout. It covers basic analog circuit design, spice introduction, spice simulation, impedance calculation, high-speed circuit design consideration and basic PCB layout. The software tool is based on Cadence Allegro.

### 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 570 INTRODUCTION TO MICROWAVE ENGINEERING (3)
*Prerequisites: EEN 506*
The course introduces high frequency theory, the basic performance, bandwidth, and manufacturing yield of RF and microwave networks. Students will learn Electromagnetic field theory and mathematical details; the applications of different matrices and their limitations; and the basis and use of Smith chart, and filter designs.

## EEN 577 GREEN ENERGY (3)
*Prerequisites: None*
The course focuses on solar energy, specifically 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)
*Prerequisite: EEN 511 or EEN 515*
The course will provide students on-hand chip design practice. Students will complete a full-custom chip design from circuit to silicon. With given technology and design spec, students will start their own designs from transistor-level schematic design and verification, to the completion of layout and layout verification, and run LPE and whole chip post-layout verification. The designs will be taped out for manufacturing and chips will be packaged and tested.

## EEN 628 LOW POWER IC DESIGN (3)
*Prerequisites: EEN 500*
This course covers design consideration and techniques for low power IC design, power estimation and consumption analysis at different design stages, techniques and tradeoffs in high-performance and low-power critical IC designs.

## EEN 629 SYSTEM ON CHIP (SOC) DESIGN (3)
*Prerequisites: EEN 513*
This 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. System C and/or System Verilog will be applied for practice.

## EEN 630 QUANTUM DEVICES (3)
*Prerequisites: EEN 501*
This 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: EEN 500*
This course introduces MEMS design fundamentals, microfabrication techniques, and analyzes 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: EEN 500*
This course introduces key concepts in biology, bioelectronics, and biosensing, while expanding students' knowledge of advanced MEMs, analog electronics and digital signal analysis. This is a basic course to give you the basic knowledge for understanding bioelectronics field. The course will cover topics like biological interfaces and critical human body systems.

## EEN 638 SIGNAL INTEGRITY OF HIGH-SPEED DIGITAL CIRCUITS (3)
*Prerequisites: EEN 500*
This 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 current design techniques, rules, and procedures.

## EEN 646 EMBEDDED SYSTEM DESIGN (3)
*Prerequisites: None*
This course provides design of embedded systems. The students will learn the principles of embedded systems design by working with Linux operating system, ARM microprocessor

cores, and peripherals e.g. GPIO, UART, I2C, SPI, and USB, and application programming in Python and C. Students will be introduced to system design through series of labs and work on projects web camera, robotics, and IOT (Internet of Things) using Arduino and Raspberry Pi boards. These labs are designed to give students hands-on experience in embedded system designs.

## EEN 671 INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS (3)
*Prerequisites: EEN 561*
This course provides an overview of wireless communication systems in use today as well as some of the emerging systems. It presents wide range of wireless applications, from cell phones to wireless local area networks (WLAN) to satellite communications. It will examine the pros and cons of wireless communication and describe both infrared and radio technologies. Finally it will 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: EEN 561*
This 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 680 SPECIAL TOPICS IN ELECTRICAL ENGINEERING (3)
*Prerequisites: Approval from a faculty advisor*
This 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 691 RESEARCH PROJECT (1)
*Prerequisites: Approval from a faculty advisor*
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 from a faculty advisor*
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 from a faculty advisor*
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 from a faculty advisor*
Thesis research is arranged with thesis advisor upon 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 consisting of a number of faculty designated by department chair.

## EEN 699 MASTER THESIS II (3)
*Prerequisites: Approval from a faculty advisor*
Master Thesis II is a continuance of Master Thesis I. It is upon recommendation of the student's thesis advisor and approval of chair of the department. Submitting a paper for publication is required.

## EEN 714 ADVANCED MICROPROCESSOR DESIGN (3)
*Prerequisites: EEN 513*
This 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 professionals. 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 uC-Linux. Computer interfaces such as UART, I2C, SPI, USB, PCI, and Ethernet will also be discussed in detail.

## EEN 717 ADVANCED ANALOG IC DESIGN (3)
*Prerequisites: EEN 515*
This 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: EEN 531*
This course offers further study on quantum behaviors, in 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 aspects 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 MEMS DESIGN (3)
*Prerequisites: EEN 635*
This 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 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*
This 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*
This course introduces Artificial Intelligence 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. A robot system design project will be applied as practice.

## EEN 758 ADVANCED SYSTEM DESIGN (3)
*Prerequisites: EEN 646*
This 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)
*Prerequisite: EEN 561*
This 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)
*Prerequisites: Approval from a faculty 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 892 INDEPENDENT STUDY (2)
*Prerequisites: Approval from a faculty 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 893 INDEPENDENT STUDY (3)
*Prerequisites: Approval from a faculty 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 from a faculty advisor*
Doctoral Dissertation Thesis consists of a series of research studies and is arranged with the thesis advisor for PhD candidates upon approval of her/his thesis topic. Students will conduct independent research in electrical or computer engineering, prepare for publication, prepare a thesis, and defend it in front of a committee consisting of a number of faculty designated by the department chair.

## EMG (ENGINEERING MANAGEMENT)
### 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

or establishing or improving technical processes or 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 break-down structure, risk assessment, task assignments, scheduling, on-going project-reporting, conflict resolution, a final project report and presentation.
*"Engineering Project Management" August 2015 - July 2016.*

### EMG 502 ORGANIZATIONAL BEHAVIOR (3)
*Prerequisites: None*
The purpose of this course is to prepare the 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, road-map, 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.
*Formerly known, "New Product Management." August 2015 - July 2016.*

### 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.
*Formerly known, "Business Analysis In Engineering" August 2015 - July 2016.*

### 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 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 AND 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 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 BUSINESS TRANSFORMATION 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 we 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 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 (IP) asset creation. Moreover, they will also learn about the value and importance of the proper management of IP assets including:

1) Dentifying existing IP and the need for new IP.

2) Documenting existing and new IP.

3) Deciding on the proper form of IP protection needed in any particular instance.

4) Deciding how the IP asset will be used.

5) Periodically reassessing the value and use of the IP portfolio.

## 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
*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
*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 575 INTRODUCTION TO LASERS & PHOTONICS FOR ENGINEERING MANAGERS
*Prerequisites: None*
This course will teach fundamental principles of optics, electro-optics, lasers, and fiber optics. The technologies covered in this course can be applied in the fields of electronics, instrumentation, telecommunications, and biomedical equipment.

## 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 580 SPECIAL TOPICS (3)
*Prerequisites: Approval of the instructor.*
This course category allows for the introduction of new, experimental or special interest classes having a short-interest lifespan or which are in development.

## EMG 690 CAPSTONE PROJECT (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 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 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.

# 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 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.

### ERP 514 SOFTWARE AS A SERVICE (SAAS) (3)
*Prerequisites: None*
Software as a Service or Software on demand is the software installed on internet. SaaS is a general design adapted by business applications and contains Accounting, Enterprise Resource Planning, and Customer Relationship Management. Students will understand the theory of SaaS and the technology that makes it possible.

### ERP 515 BI1 & BI2: SAP NETWEAVER BUSINESS WAREHOUSING (3)
*Prerequisite: None*
The course explains SAP Business Warehouse (SAP BW), which is part of the general SAP NetWeaver platform. Data warehousing in SAP NetWeaver BW allows the incorporation, change, merging, cleanup, and storage of data. It also includes the extraction of data for analysis and understanding. The data warehousing practice contains data modeling, data extraction, more processing of data, and the management of the data warehouse management procedures. This course discusses the recording, analysis and understanding of business data, which are vital to preserve and improve the competitive advantage of companies by improving procedures and allowing them to respond quickly with market needs. SAP NetWeaver Business Warehouse (SAP NetWeaver BW) offers tools and tasks that allow companies to reach these goals.

In SAP NetWeaver BW, students can incorporate, alter, and consolidate relevant business information from useful SAP applications and external data sources. Knowledge of SAP NetWeaver BW offers students with a high-performance structure that helps assess and understand data.

### ERP 516 BUSINESS ANALYTICS USING SAP LUMIRA CLOUD (3)
*Prerequisite: None*
This course offers students the chance to work with SAP Lumira, a leading tool for BusinessAnalysis. The goal is to study a usual organizational problem and make numerous feasible choices. This course will discuss two data sets used to picture the best potential solution. The first data set presents an ERP simulation game and the second data set is based on the Global Bike Inc. (GBI) case study.

## 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 524 MICROECONOMICS FOR BUSINESS DECISIONS (3)
*Prerequisites: None*
This course examines supply and demand theory for consumers, firms, and industry. It studies consumer utility and demand theories, production, cost and profitability theories, and theories on market structure (perfect competition, monopoly, monopolistic competition and oligopoly) for decision-making as a manager. The course includes using econometric techniques and software package to estimate demand/cost equations and solve practical problems requiring microeconomic analysis.

## 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)
*Prerequisite: 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)
*Prerequisite: 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)
*Prerequisite: 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)
*Prerequisite: 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 - HEALTHCARE WRITING AND RESEARCH (3)
*Prerequisite: 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 FOR NEW DRUG DEVELOPMENT (3)
*Prerequisites: None*
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 512 HEALTH SERVICE DELIVERY (3)
*Prerequisites: None*
This course is intended to provide knowledge and skills needed to develop and implement systems capable of delivering accessible, high quality, and efficient healthcare services. It will draw upon relevant information from disciplinary areas and application areas of study including strategy, operations, marketing, finance, law, human resources, quality improvement, and information technology.

## HCM 513 TRANSLATING BIOMEDICAL INNOVATION FROM THE LABORATORY TO THE MARKETPLACE (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 514 HEALTH SECTOR INNOVATION (3)
*Prerequisites: None*
Technological and biomedical advances, public health challenges, cost concerns, and consumer empowerment are fostering experimentation in the health sector, including new delivery and financing models, policy reform and entrepreneurial ventures. This course will explore the actual everyday process of trying to introduce and sustain such innovation in health delivery organizations and systems for improving quality, safety, access and affordability of patient care. The course content will include: (1) the theoretical underpinnings of understanding system level innovation through a micro-organizational lens; (2) identifying and evaluating the efficacy of micro-level strategies of embedding innovation; (3) cultivating the capacity to see and explore new possibilities for innovating; and (4) negotiating the in-situ cultural and political dynamics central to sustaining innovation over time.

## 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 516 HEALTHCARE SECTOR MARKETING TOOLS AND TECHNIQUES (3)
*Prerequisites: None*
This elective provides an in-depth understanding of health sector marketing in the for-profit and not-for-profit sectors for both products and services. The course explores how the tools of marketing (e.g., consumer behavior, pricing, promotion, channels, branding, segmentation, etc.) can be employed in the rapidly changing health sector with particular attention to changing organizational structures, financing, technologies, market demands, laws, channels of distribution, on-line applications, and regulations which require new approaches to marketing. Topics to be addressed include marketing to physicians, DTC (Direct-to-Consumer) Marketing, new product development particularly for pharmaceuticals and medical devices, adoption of medical and service innovations, typical decision making units in the health sector, and social marketing.

## HCM 517 GLOBAL ENTREPRENEURSHIP IN THE HEALTH SECTOR (3)
*Prerequisites: None*
To successfully start a new international healthcare business, all MBA students with a concentration on healthcare management need to know about global entrepreneurship. The 2009 Institute of Medicine (IOM) Report, The US Commitment to Global Health, defined global health as "improving health for all people by reducing avoidable disease, disabilities, and death." Three United Nations Millennium Development Goals (MDGs) pertain to the health sector: reducing child mortality, improving maternal health, and combating HIV/AIDS, malaria and other diseases. Using the IOM definition, and concentrating on the UN MDGs, this course will cover the basics of building a business plan to meet a global health need. Concepts and techniques of social entrepreneurship will provide the foundation for learning and communicating.

## HCM 518 GOOD CLINICAL PRACTICE (GCP) (3)
*Prerequisites: None*
This course will provide an in depth understanding for guidance, and rules for proper conduct of clinical trials. The course will also provide a historical perspective of the clinical research landscape. The course will discuss guidelines and international quality standards for the regulation of clinical trials. They include standards on how clinical trials should be conducted, provide assurance of safety and efficacy of newly developed drugs and protect human rights. The course will discuss the ethical principles and regulatory requirements that influence the current and future conduct of clinical research, as well as providing essential information on clinical trial design.

## 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 521 HEALTHCARE STRATEGIC MANAGEMENT (3)
*Prerequisites: None*
This course describes the strategic management role in contemporary health services organizations. The focuses are on the organizational strategic planning procedures, including theories and process of strategic measurement, strategy formulation, and realization, as well as the role and purpose of marketing strategy as part of the strategic implementation process. The emphasis is placed upon customer demand, market instability, and constraints from the standpoint of strategic management. The students will earn a well-developed understanding of health care systems, the consumer, and strategic thinking that become the essential forces in the active competitive local, national, and international economy of the healthcare industry. The students will apply entrepreneurial and strategic management applications to health care organizations.

## HCM 522 HEALTHCARE ENVIRONMENT: CULTURAL AND BEHAVIOR THEORIES (3)
*Prerequisites: None*
This course explores the various cultural and behavioral trends that directly impact healthcare. There are multiple theories that have been generated, studied, and implemented to create a positive change in the behavior of people and thereby creating a healthy lifestyle. This course will explore with case studies how to broaden these theories to include various cultural and strata of society and debate solutions to arrive at the modifications needed to change these theories so that they can be more universally acceptable.

## HCM 523 PRINCIPLES OF GLOBAL HEALTHCARE (3)
*Prerequisites: None*
Students learn about the basic principles of global health as they apply to various countries around the world. The issues of health and society and the burden of morbidity and mortality will be discussed. Students wil also explore the concepts of "Glocalization" of healthcare, government regulations, medical technology, and the responsibilities of healthcare professionals.

## HCM 524 AGING IN AMERICA (3)
*Prerequisites: None*
The aim of this course is to provide a comprehensive overview of issues surrounding aging in contemporary America. An interdisciplinary focus will be utilized in examining these issues. Social and developmental perspectives will be explored in order to discover their assumptions about aging and their spheres of influence. These perspectives will be integrated by applying them to specific conditions encountered in later life.

## 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 526 AMBULATORY CARE ADMINSTRATION (3)
*Prerequisites: None*
In this course, the student is familiarized and helped to develop their knowledge in the areas of ambulatory care administration. National and local trends will be identified, as well as practical applications needed to administer outpatient care programs and facilities.

## HCM 527 ORGANIZATIONAL DEVELOPMENT IN HEALTHCARE (3)
*Prerequisites: None*
This course discusses core concepts in the field of Organizational Development (OD) in healthcare organizations. Emphasis is on gaining an understanding of practical implications of various theories and assessment instruments about workers and the workplace environment. Specific topics include leadership, strategic planning, customer focus, measurement, analysis and knowledge management, workforce focus, operations focus, and results.

## HCM 528 PRINCIPLES OF HEALTH PROMOTION AND EDUCATION (3)
*Prerequisites: None*
This course provides an overall introduction to the growing profession of health promotion and education specialists. It covers the roles and responsibilities of health educators, the settings where health educators are employed, and the ethics of the profession. In addition to covering the history of health, health care, and health education, the course provides a preview of future career possibilities.

## 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 530 HEALTHCARE RISK MANAGEMENT (3)
*Prerequisites: None*
Identifying risks as opportunities is a major issue in healthcare. This course helps timely and relevant management with Enterprise Risk Management (ERM), a set of processes and procedures used to evaluate and manage risk. The course covers operational, financial, technical and legal aspects of a healthcare industry. Patient safety, employment law, and other ethical and moral aspects are discussed.

## 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 532 HEALTH INFORMATION AND COMMUNICATIONS SYSTEMS (3)
*Prerequisites: None*
This course invites students to explore at a graduate MBA student level the largest health information and communication system resource in the world: the Internet. The desired outcome will be increased eHealth literacy from both a personal and a professional viewpoint. Digital eHealth literacy has been defined as "the ability of individuals to seek, find, understand, and appraise health information from electronic resources and apply such knowledge to addressing or solving a health problem" (Stellefson et al, 2011). Similarly, the US Department of Health and Human Services defines health literacy as "the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Health.gov, 2013). Participation in this class will improve students' knowledge of this important clinical area, and allow practice of written and oral communication skills. Students must come to class with their computers.

## 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 EMPLOYEE TRAINING AND 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 531 INTERNATIONAL HUMAN RESOURCE (3)
*Prerequisites: None*
This course focuses on how to go about adapting management practices to circumstances abroad. Topics discussed include: differing legal environments; managing global recruitment, selection, retention, and performance management; developing global leaders; and managing expatriates from the parent country.

### HRM 532 MANAGING HUMAN CAPITAL (3)
*Prerequisite: None*
This course focuses on the organizational factors that influence the utilization of human capital. In addition, it will focus on developing, maintaining and improving workforce competence. This course will also explore the challenges of increasing the competitive advantage through effective human capital management. Topics include workforce planning in a dynamic environment, building a positive human capital reputation, dynamics of organizational culture, organizational change and learning, linking corporate strategy and human capital management, and influencing emerging technologies. We 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 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.

### HRM 536 MANAGING GLOBAL DIVERSITY (3)
*Prerequisites: None*
This course discusses the benefits and challenges of managing diversity in the workplace. The students will analyze various ways to develop a positive, nondiscriminatory and productive work environment. In addition, the course focuses on workplace issues related to differences in gender, race, ethnicity, age, and social class. The objective of this course is to give students a clear understanding of the influence of a global workforce and its value in achieving business goals and strategies. Additionally, students will also learn to manage the cultural and racial differences that occur as a result of international global diversity.

## IDS (INTERDISCIPLINARY SCIENCES)
### IDS 711 GENERAL CONSILIENCE (3)
*Prerequisite: None*
Consilience is the bridging of the natural and social sciences. In this course students will learn the history and scope of Consilience. This overview course will briefly explore the bridges and connections between academic disciplines. This course is mandatory for every student in her/his first trimester.

### IDS 712 PHYSICS (3)
*Prerequisite: None*
This course will cover the history and fundamental concepts in physics. The historical perspective will focus on the progression of human understanding of these physical laws. It will look at the laws of thermodynamics in respect to identifying the primary algorithm that all physical matter, to include life, follows.

### IDS 713 COSMOLOGY (3)
*Prerequisite: None*
This course will have a strong connection to the primary algorithm focusing on how the universe has unfolded from the big bang to current day. It will cover all major aspects of the history of the universe including the unknown origins and future.

### IDS 714 CHEMISTRY (3)
*Prerequisite: None*
This course on chemistry will look at how the chemical elements in the universe were created, and how chemical complexity works within the entropic second law of thermodynamics. We will look at the leading theories of the origins of life and how it chemically works within all physical laws.

## IDS 715 GENETICS (3)
*Prerequisite: None*
Although the general argument of which came first – metabolism or replication – is still unanswered, we have learned a vast amount about the nature of both metabolism and replication. This course will analyze life's ability to store and pass-on information through DNA chemical structures.

## IDS 716 EVOLUTION (3)
*Prerequisite: None*
This course will cover the concepts of how life has evolved through genetic mutation and adaptive radiation here on earth. It will look at the primary algorithm as a function of extension–incorporation–extension as life has evolved.

## IDS 717 BIOLOGY/ECOLOGY (3)
*Prerequisite: None*
This course will focus on studying the major kingdoms of life and how they have evolved into the many ecosystems on Earth. This course will explore in depth the bridge between the primary algorithm as applied in physics and in biology.

## IDS 718 EVOLUTIONARY NEUROSCIENCE (3)
*Prerequisite: None*
In this course students will learn the underpinning theories and evidence for the second algorithm, dual-motive theory. It will look at how brains have evolved and the relative behaviors of this evolution. It will then cover what this evolution means for human behavior and experience.

## IDS 719 PSYCHOLOGY (3)
*Prerequisite: None*
This course will take a historical and current view of the various areas in psychology. It will focus on identifying the connections between dual-motive theory and the current views on human behavior and motivation.

## IDS 720 PHILOSOPHY (3)
*Prerequisite: None*
Historically, philosophy and political governance have been deeply connected. This course will review the historical figures in the field and provide a scientific basis to explain the subjective experience that drives both eastern and western philosophy.

## IDS 901 DOCTORAL DISSERTATION (1 TO 9 CREDIT HOURS PER SEMESTER; 30 TOTAL CREDIT HOURS)
*Prerequisites: Approval from a faculty advisor*
Doctoral dissertation. Students may take up to 9 credit hours for their doctoral dissertation in a semester in order to reach a minimum of 30 credit hours.

## 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 555 INTERNATIONAL LAW (3)
*Prerequisites: None*
The objective for this course is to develop a sufficiently sophisticated understanding of law and international politics to enable students to appreciate the significance of international law. A secondary objective is to develop an understanding of how municipal law (the law of nation-states) supports and enhances the international legal regime. Students will understand the background necessary to recognize, understand and manage problems arising in the international legal order, including: international trade, investment, business, environmental problems, and protection of human rights.

## 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 557 INTERNATIONAL MONETARY ECONOMICS (3)
*Prerequisites: None*
The course offers an analysis of the balance of payments and foreign currency markets. Topics include the international payments system, foreign investment, and debt.

## 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 P/F 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, THESIS
### MBN 697 MBA THESIS (3)
*Prerequisites: 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 561 COACHING – CHANGING LIVES, CHANGING ORGANIZATIONS (3)
*Prerequisites: None*
This course is designed to survey the field of coaching from a theoretical, ethical and practical point of view. Students will explore various coaching methodologies and disciplines. The benefits of coaching and how to select a coach for individuals and organizations will be explored. Coaching skills will be taught and practiced, as well as experienced.

### MGT 562 THE ART OF TRANSFORMATIONAL COACHING (3)
*Prerequisites: None*
Through the study of the neuroscience of coaching, students will come to understand the reason and ways in which the brain responds to coaching methodologies. Students will be taught a specific process to bring about transformation in the coachee and encourage the creation of new habits. Students will apply the coaching skills on a weekly basis. Students are required to attend a 30 minute group weekly conference call to review progress and improve coaching skills.

### MGT 563 ORGANIZATIONAL TEAMWORK (3)
*Prerequisites: None*
In this course, students will learn and apply the skills required for effective teamwork that applies in many industries. This course provides the student with the opportunity to apply course concepts to organizations in the private, non-profit, and public sectors. It examines the role of teamwork in organizations including: the rationale for teams, communicating, effective team meetings, resolving team problems, motivating, collaboration and intercultural implications. Students are expected to participate in discussion and teamwork online. 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 565 NON-LINEAR STRATEGIES FOR BUSINESS SUCCESS (3)
*Prerequisites: None*
This course is designed to give students an edge in tomorrow's hyper-competitive business landscape. The course focuses on the themes of entrepreneurship, disruptive innovation, business model performance, and leadership with a view to reducing the high mortality rate of startups. Mastery

of these four themes is a prerequisite for success in today's business environment which is volatile, uncertain, complex, and ambiguous. Students must come to class with computers. Also students are advised to submit their resumes to the ITU EMS (ems.itu.edu) before the first class in order to be familiar with background of class members as well as facilitate the formation of project teams.

## 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 568 IMPACT OF INTELLECTUAL PROPERTY IN A GLOBAL ECONOMY (3)
*Prerequisites: None*
This course provides an overview of intellectual property law, including trade secrets, patents, trademarks, and copyright. Key objectives are to help students develop an appreciation for the importance of intellectual property as a key economic driver in the modern global economy and to assist them in developing competence in IP management, whether they are technology or business professionals.

## 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 574 HIGH PERFORMANCE LEADERSHIP (3)
*Prerequisites: None*
The course covers an overview of high performance leadership with an emphasis on examining how leaders drive and support their organization to reach their goals, maintaining profitability and promoting sustainability. An important aspect of this course covers the responsibility of high performance leaders in the area of human resources and employee engagement. Additionally this course will cover high performance leadership as it fosters and supports continuous learning - keeping pace with new knowledge and the rapidity of change in business. Another aspect of high performance leadership is the impact of culture on organizations especially within the current global market place, as cultures impact teams, divisions and companies across nations. Students will learn how to move from the tactical to strategic as a leader, as well as how to address challenges systemically.

## 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. 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. It 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)
*Prerequisite: None*
Teamwork is an important element of organizational effectiveness. This course builds on the current theories of understanding and managing teams and groups. The course equips students with effective team and groups techniques in the workplace to build and encourage engaging teams. In addition, the course gives students the ability to understand communications among individuals and the procedures that contribute to team and group efficiency.

## 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 Managment" 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)
*Prerequisite: 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 610 INFLUENCING THE BRAIN FOR SUCCESS (3)
*Prerequisites: MGT 561, or equivalent*
This course will survey a variety of theories related to coaching including neuroscience, neurolinguistic programming, dual motive theory, emotional intelligence, and other ways the brain is influenced to create change. Students will develop an understanding of when each theory is best applied and how to integrate these theories into the coaching process.

## MGT 611 LEAN SIX SIGMA (3)
*Prerequisites: Recommended 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 (INFORMATION SYSTEM MANAGEMENT)

### 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.

## MIS 549 PUBLIC INFORMATION MANAGEMENT (3)
*Prerequisites: None*
This course presents an introduction to computers and information management systems in public sector organizations. Topics include data management, data analysis, public systems analysis, algorithm development, data base design concepts, and design support systems. The course focuses on the study of database and network technologies; the influence and relevance of information systems in public agencies; and the review of issues of ethics, and security as related to Information Systems. Emphasis will be on the non-technical manager's role in managing IT in terms of technology planning, applications, IT procurement, data security, and Internet technologies.

## MIS 550 STRATEGIC MANAGEMENT OF INFORMATION TECHNOLOGY (3)
*Prerequisites: None*
This course addresses some contemporary issues faced by general managers — e.g., globalization, and time compression. The course defines the information technology strategies of an organization. It will examine principles and concepts of strategic information technology systems, and systems development as it relates to information technology management strategy.

## MIS 552 BUSINESS INFORMATION SYSTEMS & TECHNOLOGIES (3)
*Prerequisites: None*
This course provides integrative coverage of essential new technologies, information system applications, and their impact on business models and managerial decision making. We will discuss Information Systems and Global E-Business and Collaboration. Part of this, we will cover Information Systems, Organizations, and Strategy. We will also cover key aspects of Information Technology Infrastructure, Emerging Technologies, Foundations of Business Intelligence, Achieving Operational Excellence, and Building and Managing Systems.

## 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.

## 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 587 COMPARATIVE STUDIES OF MNC, FDI, AND INTERNATIONAL TRADE (3)
*Prerequisites: None*
Students will study international business and management environments by covering topics such as the international monetary system, import-export, growing competition and trading relationships in a global community. Case studies are presented relating to ethical issues that arise in international business to develop fundamental knowledge of international research and development, marketing, distribution, finance, and accounting.

### 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 Certificate 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.

## 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 & Footprinting, various attach methods like Trojans, Backdoors, Viruses & Worms, Phishing & its Prevention; System Hacking & Security, Cryptography - the most important methods without going into mathematical details, Google Hacking, Secure Coding Practices, Firewalls, IDS, Evading IDS, Wireless Hacking & Security, Bluetooth Hacking; Introduction to Cyber Crime Investigation & IT ACT 2000, Investigation Methodologies & Case Studies, Cyber Forensics.

### 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: 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: 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 575 CURRENT TOPICS IN SOFTWARE ENGINEERING (3)
*Prerequisites: None*
Newly appearing, and often very promising topics in the ever developing field of Software Engineering are taught, explained, analyzed, and practiced, chosen by the expert-level instructor.

## 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 realtime, 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: 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 618 SOFTWARE DESIGN USING UML (3)
The Unified Modeling Language is an important tool in object oriented software development where it is applied to the requirement specification and eventually leads to OO Program design. It helps visualizing the design of the software by using graphical diagrams. Use case analysis, static and dynamic modeling and finite state machines will be explored and practiced. The students will learn design spoftware in a clear way by visualizing its structures and interactions. Also they will learn to evaluate the quality of software design with respect to modifiability, maintainablility and reusability.

## 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 630 SEMANTIC WEB (3)
*Prerequisites: Knowledge of Java, HTML, database, information systems, or AI principles*
Introduction to semantic web for inclusion of semantic content in web pages or special domain documents to make semantic searching (instead of pure keyword searching) possible. Subjects include XML, RDF, OWL, SPARQL, logical, ontology, linked data, semantic extraction, tagging automation, semantic inference, and search optimization.

## 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: 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 645 PERFORMANCE CRITICAL DESIGN (3)
*Prerequisites: None*
This course provides understanding and insight into how to construct and evaluate timing-critical software systems. Timing-critical software systems are systems where a timely delivery of results and outcomes is as important as the correctness of the outcome itself. Automobile safety systems, avionics systems, medical devices, financial management systems, and building safety systems are everyday examples of this type of system. Hard and soft deadlines, periodic and aperiodic execution, mutual exclusion and protected resources, and resource arbitration will be taught and used in examples. The fundamentals underlying Rate Monotonic Analysis will be taught and discussed. The creation of multithreaded timing models for software systems will be covered by examples, sample analyses and student projects. In addition, decomposing a system for relevant timing performance will be covered.

### SWE 646 MODEL DRIVEN ARCHITECTURES (3)
*Prerequisites: None*
This course provides the student with the ability to conceive, characterize, capture, and evolve a conceptual architecture into more detailed implementations. The relationship of architecture, modeling, and Implementation will be examined. Different types of functional, behavioral, and nonfunctional modeling will be discussed. Both executable and analytical types of models will be covered. Behavioral models will be discussed in depth. State machines will be covered as the basic mechanism of describing sequential behavior. This will be extended and applied to concurrency models using concurrent state machines. Nonfunctional attributes (including execution timing) and their aggregation within layered models will be an important part of the class. Structural models will be covered as well. Other types of models involving constraints such as strongly typed programming languages and contract-based programming, combinations of models and their consistency through the use of inter-model assertions, and ongoing industry work involving ISO 42010 – Standard for Architecture Description will be included. This discussion will formalize the idea of views, viewpoints, stakeholders, and their relationship to models.

### 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 690 CAPSTONE PROJECT (3)
*Prerequisite: Department chair approval and completion of 27 units 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 (SEN 999) MASTER'S THESIS (3-6)
*Prerequisite: Department chair approval and completion of 27*
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. units of the MSSE program.

# CROSSWALK

| New | Old | Course Title | Credit Hours | Prerequisite | Recommended |
|---|---|---|---|---|---|
| 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 505 | ACTN 991 | CPA Exam: Auditing and Attestation | 3 | | |
| ACT 506 | ACTN 992 | CPA Exam: Business Environment and Concepts | 3 | | |
| ACT 507 | ACTN 993 | CPA Exam: Financial Accounting and Reporting | 3 | | |
| ACT 508 | ACTN 994 | CPA Exam: Regulation | 3 | | |
| ACT 600 | ACTN 910 | Managerial Accounting | 3 | ACT 500, or equivalent | |
| ACT 601 | ACTN 920 | Cost Accounting | 3 | ACT 500 or equivalent | |
| ACT 602 | ACTN 921 | Intermediate Accounting | 3 | ACT 500 or equivalent | |
| ACT 603 | ACTN 925 | Accounting Information Systems/ERP | 3 | ACT 500 or equivalent | |
| AMS 510 | AMN 910 | Linear Algebra | 3 | | |
| AMS 512 | AMN 912 | Applied Mathematics Methods | 3 | | AMS 510 |
| 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 | Statistics, Probability and Reliability for Engineers | 3 | | |
| AMS 620 | AMN 921 | Advanced Optimization Techniques | 3 | AMS 520 | |
| AMS 722 | AMN 922 | Advanced Applied Mathematics Methods | 3 | AMS 512 | |
| AMS 750 | AMN 950 | Abstract Algebra | 3 | AMS 510 | |
| AMS 760 | AMN 960 | Advanced Optimization Techniques | 3 | AMS 520 | |
| BIO 500 | BIOM 900 | Concepts of Clinical Research Management | 3 | | |
| BIO 501 | BIOM 901 | Concepts of Modern Medicine and Biology | 3 | | |
| BIO 502 | BIOM 903 | Business and Scientific Writing | 3 | | |
| BIO 503 | BIOM 905 | Human Ecology | 3 | | |
| BIO 504 | BIOM 906 | Biological Management | 3 | | |
| BIO 505 | BIOM 908 | Bioethics and Policy | 3 | | |
| BIO 506 | BIOM 909 | Biotech Industry Fundamentals | 3 | | |
| BIO 507 | BIOM 910 | Bio Market Study | 3 | | |
| BIO 508 | BIOM 914 | Innovation and R&D Bio Management | 3 | | |
| BIO 509 | BIOM 915 | Regulatory Management in Biopharma | 3 | | |
| BUA 500 | | Principles of Business Analytics | 3 | | |
| BUA 501 | | Quantitative Analysis | 3 | | |
| BUA 502 | | Simulation and Optimization for Business Analytics | 3 | | |
| BUA 503 | | Game Theory, Business Strategy and Thinking Strategically | 3 | | |
| 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 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| BUA 690 | | Simulation and Optimization for Business Analytics | 3 | Completion of 27 credit hours in the program | |
| 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 505 | PMGT 912 | Management of Organizational Changes | 3 | | |
| BUS 506 | PMGT 914 | Process Mapping & Control | 3 | | |
| BUS 507 | PMGT 925 | Project Procurement Management | 3 | | |
| BUS 508 | EBUS 910 | Executive Leadership | 3 | | |
| BUS 509 | EBUS 917 | Leading and Managing Change | 3 | | |
| BUS 510 | EBUS 918 | Regulation, Governance, Ethical and Social Responsibility | 3 | | |
| BUS 511 | EBUS 919 | Finance for Senior Executives | 3 | | |
| BUS 512 | EDBS 901 | Computer Applications in Education | 3 | | |
| BUS 513 | GRN 511 | Verbal Communications and Conversations | 3 | | |
| BUS 514 | GRN 516 | Writing and Speaking for Persuasion and Effectiveness | 3 | | |
| BUS 515 | GRN 599 | Writing and Composition | 3 | | |
| BUS 516 | INMG 910 | Principles of Quality Management | 3 | | |
| BUS 517 | | Organization Culture and Diversity | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| BUS 518 | | Applied Statistics | 3 | | |
| BUS 519 | | Organizational and Leadership Change | 3 | | |
| BUS 600 | MBAN 997 | Research Methods | 3 | Some Statistics knowledge | |
| BUS 700 | DBA 810 | Management Practice and Organizational Behavior | 3 | | |
| BUS 701 | DBA 811 | Advanced Managerial Economics | 3 | | |
| BUS 702 | DBA 812 | Seminar in the Sociological and Psychological Principles of Management | 3 | | |
| BUS 703 | DBA 813 | Leadership Behavior and Motivation | 3 | | |
| BUS 704 | DBA 814 | Seminar in Special Topics in Marketing | 3 | | |
| BUS 705 | DBA 815 | Leadership and Ethics | 3 | | |
| BUS 706 | DBA 816 | Seminar in Strategic Planning in Human Resource Management | 3 | | |
| BUS 707 | DBA 817 | Philosophies and Concepts of Total Quality Management | 3 | | |
| BUS 708 | DBA 820 | Seminar in Accounting Information Systems | 3 | | |
| BUS 709 | DBA 821 | Seminar in Auditing | 3 | | |
| BUS 710 | DBA 822 | Current Issues in Accounting Research | 3 | | |
| BUS 711 | DBA 823 | Seminar in Corporate Finance | 3 | | |
| BUS 712 | DBA 824 | Seminar in Investments | 3 | | |
| BUS 713 | DBA 825 | Multinational Business Finance | 3 | | |
| BUS 714 | DBA 830 | Management Practice for the International Institution | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|-----|-----|--------------|--------------|--------------|--------------|
| BUS 715 | DBA 831 | Seminar in International Business | 3 | | |
| BUS 716 | DBA 832 | Seminar in International Marketing | 3 | | |
| BUS 717 | DBA 833 | Seminar in International Finance | 3 | | |
| BUS 718 | DBA 834 | International Macroeconomics Analysis | 3 | | |
| BUS 719 | DBA 835 | International Human Resource Management | 3 | | |
| BUS 720 | DBA 836 | International Information Technology Management | 3 | | |
| BUS 721 | DBA 840 | Emerging Issues in Organizational Behavior and Human Resources Management | 3 | | |
| BUS 722 | DBA 841 | Economics and Public Policy | 3 | | |
| BUS 723 | DBA 842 | Organization Design | 3 | | |
| BUS 724 | DBA 843 | Corporate Planning and Environment | 3 | | |
| BUS 725 | DBA 844 | Legal Issues for the Modern Institution | 3 | | |
| BUS 726 | DBA 845 | Seminar in Organizational Behavior Research | 3 | | |
| BUS 727 | DBA 846 | Seminar in Special Topics in Operations Management | 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 731 | DBA 851 | Managerial Applications of Information Technology | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|-----|-----|--------------|--------------|--------------|--------------|
| BUS 732 | DBA 852 | Networking Concepts and Applications | 3 | | |
| BUS 733 | DBA 853 | Managing Software Development Projects | 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 803 | DBA 910 | Special Topics in Research Techniques | 3 | | |
| BUS 804 | DBA 911 | Management and Organizational Theory | 3 | | |
| BUS 805 | DBA 912 | Management as a Behavioral Science | 3 | | |
| BUS 806 | DBA 913 | Emerging Issues in Marketing Management and Research | 3 | | |
| BUS 807 | DBA 914 | Emerging Issues in Strategic Decision Making | 3 | | |
| BUS 808 | DBA 915 | Creativity: A Process-Oriented Approach | 3 | | |
| BUS 809 | DBA 916 | Innovation and Creativity: Culture of Group Dynamics | 3 | | |
| BUS 810 | DBA 917 | Conflict Resolution | 3 | | |
| BUS 811 | DBA 918 | Creativity as a Linguistic Process | 3 | | |
| BUS 812 | DBA 920 | Emerging Issues in Financial Decision Making | 3 | | |
| BUS 813 | DBA 925 | Seminar in Organizational Behavior Research with emphasis on Leadership | 3 | | |
| BUS 814 | DBA 930 | Seminar in Special Topics in International Business | 3 | | |
| BUS 815 | DBA 940 | Seminar in Administrative Policy and Administration | 3 | | |
| BUS 816 | DBA 950 | Operations and Information Technology Management | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recommended |
|---|---|---|---|---|---|
| BUS 901 | DBA 990 | Dissertation Research | 18 | | |
| CEN 500 | CEN 900 | Computer Engineering | 3 | | |
| CEN 508 | CEN 908 | Scientific Computing | 3 | | AMS 510 |
| CEN 510 | CEN 910 | Algorithms | 3 | Knowledge of Data Structures | |
| CEN 540 | CEN 940 | Network Security Techniques | 3 | | CEN 548 |
| CEN 541 | CEN 941 | Introduction to Computer Vision | 3 | CEN 508 or CEN 510 | |
| CEN 542 | CEN 942 | Digital Image Processing | 3 | CEN 508 or CEN 510 | |
| CEN 548 | CEN 948 | Computer Network Systems | 3 | | |
| CEN 550 | CEN 950 | Computer Control Engineering | 3 | CEN 500 | |
| CEN 551 | CEN 951 | Computer Architecture | 3 | Knowledge of Digital Logic and Circuits | |
| CEN 556 | CEN 956 | Distributed Computing Systems | 3 | | CEN 548 |
| CEN 564 | CEN 964 | Computer Interface and Firmware Engineering | 3 | CEN 551 | |
| CEN 565 | CEN 965 | Introduction to Medical Image Systems | 3 | | |
| CEN 566 | CEN 966 | Routing in Computer Networks | 3 | CEN 548 | |
| CEN 567 | CEN 967 | Local Area Networking | 3 | CEN 548 | |
| CEN 568 | CEN 968 | Network Storage Systems | 3 | CEN 548 | |
| CEN 580 | CEN 980 | Signal Processing and System Analysis | 3 | | AMS 552 |
| CEN 581 | CEN 981 | Principle of Internet of Things | 3 | CEN 500 | |
| CEN 643 | CEN 943 | Advanced Digital Image Processing | 3 | CEN 542 | |
| CEN 653 | CEN 953 | Challenge of Mobile Device Design | 3 | CEN 500 or EEN 500 | |
| CEN 661 | CEN 961 | Parallel Computing | 3 | CEN 510 | |
| CEN 680 | CEN 992 | Special Topics in Computer Engineering | 3 | | |
| CEN 691 | CEN 998 | Research Project | 1 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recommended |
|---|---|---|---|---|---|
| CEN 692 | CEN 998 | Research Project | 2 | | |
| CEN 693 | CEN 998 | Research Project | 3 | | |
| CEN 698 | CEN 999 | Master Thesis Research I | 3 | | |
| CEN 699 | CEN 999 | Master Thesis Research II (Publication Required) | 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 | UNIX/Linux Operating System | 3 | | Knowledge of C |
| CSC 509 | CS 880 | C Programming | 3 | | |
| CSC 511 | SEN 909 | OO Programming with C++ | 3 | Knowledge of C | |
| CSC 512 | SEN 890 | Data Structures | 3 | Knowledge of C++ or Java | |
| CSC 513 | SEN 932 | C# Programming | 3 | | |
| CSC 514 | SEN 970 | OO Programming with Objective-C | 3 | Knowledge of C++ or Java | |
| CSC 515 | SEN 965 | iPhone Application Development | 3 | CSC 514 | |
| CSC 518 | SEN 964 | OO Programming with Java | 3 | | |
| CSC 519 | SEN 958 | Android Phone Application Development | 3 | CSC 518 | |
| 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 | CS 882 | Mobile Web Programming | 3 | CSC 525, CSC 530 | |
| CSC 530 | SEN 949 | JavaScript Programming | 3 | CSC 525 | |
| CSC 532 | SEN 951 | Client Programming with JS/jQuery | 3 | CSC 525, CSC 530 | |
| CSC 535 | SEN 954 | Server Programming with PHP | 3 | CSC 525 | |
| CSC 540 | SEN 991 | Computer Graphics | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| CSC 550 | CS 850 | Big Data | 3 | Know-ledge of Java | |
| CSC 555 | CS 904 | Bio Informatics | 3 | Know-ledge of C++ or Java | |
| CSC 560 | CS 960 | Introduction to Data Science | 3 | | |
| CSC 570 | CS 940 | Web Security Fundamentals | 3 | Know-ledge of HTTP, TCP/IP, SQL, and operating systems | |
| CSC 575 | | Topics in Computer Science | 3 | | |
| CSC 580 | SEN 920 | Computer Algorithms | 3 | | |
| CSC 605 | SEN 959 | Principles of Operating Systems | 3 | CSC 580 | |
| CSC 610 | SEN 953 | Compiler Design | 3 | CSC 512 | |
| CSC 618 | SEN 957 | GUI Development with Java | 3 | CSC 518 | |
| CSC 620 | CS 923 | Programming Language Theory | | Discrete Mathematics for Computer Science | |
| CSC 625 | CS 885 | Advanced HTML5 | 3 | CSC 525, CSC 530 | |
| CSC 630 | CS 870 | Information Retrieval | 3 | | |
| CSC 631 | CS 831 | Data Mining | 3 | | |
| CSC 632 | CS 922 | Natural Language Processing | 3 | Know-ledge of Java or Python | |
| CSC 633 | CS 933 | Machine Learning | 3 | Know-ledge of basic computer science principles and skills, probability theory, and linear algebra. | |
| CSC 635 | CS 932 | Practical Neural Networks Techniques | 3 | | |
| CSC 640 | SEN 992 | Advanced Computer Graphics | 3 | CSC 540 | |
| CSC 642 | SEN 993 | Computer Graphics with WebGL | 3 | CSC 540 | |
| CSC 650 | CS 855 | Big Data Analytics (CPO-SAS/SPSS) | 3 | CSC 550 | |
| CSC 660 | CS 961 | Advanced Data Science | 3 | CSC 560 | Know-ledge of R Lan-guage |
| CSC 670 | CS 901 | Network & Data Security | | Knowledge of Information Assurance Fundamentals and Data Communications | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| CSC 680 | CS 950 | Advanced Computer Algorithms | 3 | | |
| CSC 682 | SEN 921 | Graph Algorithms | 3 | CSC 580 | |
| CSC 690 | SEN 998 | Capstone Project | 3 | Department approval and completion of 27 credit hours | |
| CSC 695 | SEN 999 | Master's Thesis | 3-6 | Department approval and completion of 27 credit hours | |
| CSC 720 | | Formal Methods | 3 | | |
| CSC 730 | CS 979 | Cryptography & Cryptanalysis | 3 | | |
| CSC 750 | CS 910 | Coding Theory | 3 | AMS 750 | |
| CSC 760 | | Advanced Topics in Data Science | 3 | CSC 580 | |
| DGA 501 | MMM 905 | New Media Production | 3 | | |
| DGA 502 | MMM 930 | Manufacturing Cinematic Space | 3 | | |
| DGA 503 | MMM 910 | Storyboard Design | 3 | | |
| DGA 504 | MMM 820 | Global Storytelling | 3 | | |
| DGA 505 | MMM 955 | Math and Programming for Artists | 3 | | |
| DGA 506 | MMM 940 | Architectural Tours | 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 514 | MMM 837 | Photographic Principles and Advanced Image Manipulation | 3 | | |
| DGA 515 | MMM 904 | Sound Design | 3 | | |
| DGA 516 | | Production Sound Recording | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recommended |
|---|---|---|---|---|---|
| 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 604 | MMM 749 | From Hero to Superhero: Classical Archtypes | 3 | | |
| DGA 606 | MMM 903 | Animation I | 3 | DGA 508 | |
| DGA 607 | MMM 921 | Storyboards and Layouts | 3 | DGA 503 | |
| DGA 608 | MMM 860 | CG Modeling | 3 | DGA 508 | |
| DGA 609 | MMM 923 | 3D Modeling and 3D Printing | 3 | DGA 508 | |
| DGA 610 | MMM 931 | Rigging for 3D Animation | 3 | DGA 508 | |
| DGA 611 | MMM 950 | Lighting and Compositing | 3 | DGA 508 | |
| DGA 612 | MMM 988 | Concept Art and Storyboarding | 3 | DGA 503 | |
| DGA 613 | MMM 880 | Real-Time Lighting & Compositing | 3 | | |
| DGA 614 | MMM 888 | Real-Time Lighting & Real-Time Compositing & FX Workshop | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recommended |
|---|---|---|---|---|---|
| DGA 615 | | ZBrush | 3 | DGA 608 | |
| DGA 616 | | Android Wear | 3 | CSC 519, DGA 518 | |
| DGA 617 | | Motion Capture | 3 | DGA 610 | |
| DGA 621 | MMM 720 | Producing Digital Media | 3 | DGA 511 | |
| DGA 622 | MMM 824 | Editing II | 3 | DGA 522 | |
| DGA 626 | MMM 916 | Animation II | 3 | DGA 606 | |
| DGA 631 | MMM 900 | Digital Media Startup | 3 | DGA 621 | |
| DGA 641 | | Augmented Reality Design and Production | 3 | DGA 524 & DGA 508 | |
| DGA 642 | | 642 Virtual Reality Design and Production | 3 | DGA 524 & DGA 508 | |
| DGA 661 | | Unity 2D/3D Game Development Platform | 3 | DGA 508 | |
| DGA 690 | MMM 999 | Master's Project I | 3-6 | Faculty Approval | |
| DGA 692 | | Master Thesis | 3 | Department approval and completion of 27 credit hours | |
| EEN 500 | EEN 900 | Electrical Engineering | 3 | | |
| EEN 501 | EEN 901 | Fundamentals of Semiconductor Physics | 3 | Knowledge of Physics | |
| EEN 505 | EEN 905 | Digital Design in HDL | 3 | | |
| EEN 506 | EEN 906 | Electromagnetic Fields and Waves | 3 | Know-ledge of Physics | |
| EEN 511 | EEN 911 | VLSI Design | 3 | Knowledge of Data Structure | |
| EEN 512 | EEN 912 | Memory Design | 3 | EEN 511 | |
| EEN 513 | EEN 913 | Microprocessor Design | 3 | CEN 551 | |
| EEN 515 | EEN 915 | Analog Circuit Design | 3 | Knowledge of Electrical Circuits | |
| EEN 520 | EEN 920 | ASIC Design I | 3 | Knowledge of Digital Structure | |
| EEN 521 | EEN 921 | FPGA Design | 3 | | |
| EEN 522 | EEN 922 | Design Verification | 3 | EEN 500 | |
| EEN 525 | EEN 925 | ASIC Design II | 3 | Knowledge of Digital Structure | |
| EEN 526 | EEN 926 | Design for Testability | 3 | EEN 520 | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recommended |
|-----|-----|--------------|--------------|--------------|-------------|
| EEN 531 | EEN 931 | Nanotechnology | 3 | | EEN 501 |
| EEN 541 | EEN 941 | Digital Signal Processing and System Analysis | 3 | | AMS 514 |
| EEN 551 | EEN 951 | Circuit Design and PCB Implementation | 3 | EEN 500 | |
| EEN 561 | EEN 961 | Fundamentals of Communication Systems | 3 | | |
| EEN 570 | EEN 970 | Introduction to Microwave Engineering | 3 | EEN 506 | |
| EEN 577 | EEN 977 | Green Energy | 3 | | |
| EEN 616 | EEN 916 | Mixed Signal IC Design | 3 | EEN 511 or EEN 515 | |
| EEN 618 | EEN 918 | RF IC Design | 3 | EEN 515 | |
| EEN 627 | EEN 927 | IC Design to Silicon | 3 | EEN 511 or EEN 515 | |
| EEN 628 | EEN 928 | Low Power IC Design | 3 | EEN 500 | |
| EEN 629 | EEN 929 | System on Chip (SOC) Design | 3 | EEN 513 | |
| EEN 630 | EEN 930 | Quantum Devices | 3 | EEN 501 | |
| EEN 635 | EEN 935 | Introduction to MEMS Design | 3 | EEN 500 | |
| EEN 637 | EEN 937 | Bioelectronics and Bioengineering | 3 | EEN 500 | |
| EEN 638 | EEN 938 | Signal Integrity of High-Speed Digital Circuits | 3 | EEN 500 | |
| EEN 646 | EEN 946 | Embedded System Design | 3 | | |
| EEN 671 | EEN 971 | Introduction to Wireless Communication Systems | 3 | EEN 561 | |
| EEN 676 | EEN 976 | Introduction to Near Field Communication | 3 | EEN 561 | |
| EEN 680 | EEN 992 | Special Topics in Electrical Engineering | 3 | Approval from a faculty advisor | |
| EEN 691 | | Research Project | 1 | Approval from a faculty advisor | |
| EEN 692 | | Research Project | 2 | Approval from a faculty advisor | |
| EEN 693 | | Research Project | 3 | Approval from a faculty advisor | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recommended |
|-----|-----|--------------|--------------|--------------|-------------|
| EEN 698 | EEN 999 | Master Thesis I | 1-3 | Approval from a faculty advisor | |
| EEN 699 | EEN 999 | Master Thesis II (Publication Required) | 3 | Approval from a faculty advisor | |
| EEN 714 | EEN 914 | Advanced Microprocessor Design | 3 | EEN 513 | |
| EEN 717 | EEN 917 | Advanced Analog IC Design | 3 | EEN 515 | |
| EEN 719 | EEN 919 | Advanced RF IC Design | 3 | EEN 515 or EEN 618 | |
| EEN 732 | EEN 932 | Advanced Nanotechnology | 3 | EEN 531 | |
| EEN 736 | EEN 936 | Advanced MEMS Design | 3 | EEN 635 | |
| EEN 739 | EEN 939 | Advanced Bioelectronics and Bioengineering | 3 | EEN 637 | |
| EEN 749 | EEN 949 | Advanced Digital Signal Processing | 3 | EEN 541 | |
| EEN 753 | EEN 953 | Advanced Machine Learning Engineering | 3 | CEN 510 or CSC 580 | |
| EEN 758 | EEN 958 | Advanced System Design | 3 | EEN 646 | |
| EEN 766 | EEN 966 | Advanced Communication Systems | 3 | EEN 561 | |
| EEN 774 | EEN 974 | Advanced Wireless Communications | 3 | EEN 671 | |
| EEN 891 | EEN 996 | Independent Study | 1 | Approval from a faculty advisor | |
| EEN 892 | EEN 996 | Independent Study | 2 | Approval from a faculty advisor | |
| EEN 893 | EEN 996 | Independent Study | 3 | Approval from a faculty advisor | |
| EEN 907 | EEN 999 | Doctoral Dissertation Research | 3 | Approval from a faculty advisor | |
| 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 522 | | Fundamentals of Business Analysis for Software Development | 3 | | |
| EMG 545 | | Introduction to Medical Devices and Other Regulated Products | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| EMG 549 | | Introduction to Software Development and Architecture for Engineering Managers | 3 | | |
| EMG 550 | | Software QA and Testing for Business Analysis | 3 | | |
| EMG 551 | | Agile Methodologies | 3 | | |
| EMG 552 | | DeOps and Microservices Architecture | 3 | | |
| EMG 553 | | Business Technology Strategy | 3 | | |
| EMG 554 | | Business Transformation Consulting | 3 | | |
| EMG 557 | | The Internet of Things (IoT) Management Issues | 3 | | |
| EMG 559 | | Introduction to Sensor Technology for Engineering Managers | 3 | | |
| EMG 560 | | Cubersecurity Management | 3 | | |
| EMG 563 | | Introduction to Intellectual Property Management | 3 | | |
| EMG 565 | | Healthcare Product Economics and Outcomes | 3 | | |
| EMG 568 | | Technology Management | 3 | | |
| EMG 570 | | Cloud Computing Management | 3 | | |
| EMG 574 | | Physics for Engineering Managers | 3 | | |
| EMG 575 | | Introduction to Lasers & Photonics for Engineering Managers | 3 | | |
| EMG 579 | | Business Process Management | 3 | | |
| EMG 580 | | Special Topics | 3 | Approval of the instructor. | |
| EMG 690 | | Capstone Project | 3 | Department approval and completion of 18 credit hours | |
| EMG 697 | | Thesis | 3-6 | Department approval and completion of 18 credit hours | |
| ERP 509 | ERP 901 | Introduction to ERP Systems using SAP | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| 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 | | |
| ERP 514 | ERP 910 | Software as a Service (SaaS) | 3 | | |
| ERP 515 | | BI1 & BI2: SAP NetWeaver Business Warehousing | 3 | | |
| ERP 516 | | Business Analytics using SAP Lumira Cloud | 3 | | |
| FIN 515 | FINN 933 | Managerial Finance | 3 | | |
| FIN 516 | | 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 | | |
| 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 524 | ECON 921 | Microeconomics for Business Decisions | 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 | FINN 916 | Securities Analysis | 3 | FIN 515 or equivalent | |
| FIN 605 | FINN 920 | Financial Derivatives and Risk Management | 3 | FIN 515 or equivalent | |
| FIN 606 | FINN 932 | Corporate Finance | 3 | FIN 515 or equivalent | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| FIN 607 | FINN 935 | Mergers and Acquisitions | 3 | FIN 515 and ACT 600, or equivalents | |
| HCM 509 | | Healthcare Writing and Research | 3 | | |
| HCM 510 | BPS 821 | A Regulatory Overview for New Drug Development | 3 | | |
| HCM 511 | HCM 901 | Concepts of Healthcare Management | 3 | | |
| HCM 512 | HCM 902 | Health Service Delivery | 3 | | |
| HCM 513 | HCM 904 | Translating Biomedical Innovation from the Laboratory to the Marketplace | 3 | | |
| HCM 514 | HCM 905 | Health Sector Innovation | 3 | | |
| HCM 515 | HCM 906 | Health Information Technology | 3 | | |
| HCM 516 | HCM 907 | Healthcare Sector Marketing Tools and Techniques | 3 | | |
| HCM 517 | HCM 908 | Global Entrepreneurship in the Health Sector | 3 | | |
| HCM 518 | HCM 909 | Good Clinical Practice (GCP) | 3 | | |
| HCM 519 | HCM 911 | Healthcare Ethics | 3 | | |
| HCM 520 | HCM 912 | Healthcare Leadership, Patient Safety and Quality Improvement | 3 | | |
| HCM 521 | HCM 915 | Healthcare Strategic Management | 3 | | |
| HCM 522 | HCM 916 | Healthcare Environment: Cultural and Behavioral Theories | 3 | | |
| HCM 523 | HCM 918 | Principles of Global Healthcare | 3 | | |
| HCM 524 | HCM 919 | Aging in America | 3 | | |
| HCM 525 | HCM 921 | Principles of Managed Care | 3 | | |
| HCM 526 | HCM 922 | Ambulatory Care Administration | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| HCM 527 | HCM 926 | Organizational Development in Healthcare | 3 | | |
| HCM 528 | HCM 927 | Principles of Health Promotion and Education | 3 | | |
| HCM 529 | HCM 930 | Mental Health and Wellbeing | 3 | | |
| HCM 530 | HCM 932 | Healthcare Risk Management | 3 | | |
| HCM 531 | HCM 933 | Complementary and Alternative Medicine | 3 | | |
| HCM 532 | HCM 934 | Health Information and Communications Systems | 3 | | |
| HRM 528 | HRMG 940 | Human Resource Management | 3 | | |
| HRM 529 | HRMG 941 | Employee Training and Development | 3 | | |
| HRM 530 | HRMG 942 | Employment Law for Business | 3 | | |
| HRM 531 | HRMG 943 | International Human Resource | 3 | | |
| HRM 532 | HRMG 944 | Managing Human Capital | 3 | | |
| HRM 533 | HRMG 945 | Strategic Compensation: Issues and Opportunities | 3 | | |
| HRM 535 | HRMG 946 | Human Resources and Information Technology | 3 | | |
| HRM 536 | HRMG 948 | Managing Global Diversity | 3 | | |
| 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 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| IDS 901 | CONS 1999 | Doctoral Dissertaion | 1-9 | Approval from a faculty advisor | |
| INB 553 | INBS 910 | Fundamentals of International Business | 3 | | |
| INB 554 | INBS 911 | International Financial Markets | 3 | | |
| INB 555 | INBS 912 | International Law | 3 | | |
| INB 556 | INBS 913 | Global Strategic Management | 3 | | |
| INB 557 | INBS 914 | International Monetary Economics | 3 | | |
| INB 558 | INBS 916 | Global Marketing and Strategy | 3 | | |
| INB 559 | INBS 921 | International Business Management | 3 | | |
| INT 593F | GRN 900F | Internship | 3 | CFL 591 (can be taken con-currently) | |
| INT 593P | GRN 900P | Internship | 1 | CFL 591 (can be taken con-currently) | |
| MBN 697 | MBAN 999 | MBA Thesis | 3 | Completion of 27 credit hours | |
| MGT 503 | MGTN 903 | Organizational Leadership Theories | 3 | | |
| MGT 560 | MGTN 901 | Principles of Management | 3 | | |
| MGT 561 | MGTN 904 | Coaching – Changing Lives, Changing Organizations | 3 | | |
| MGT 562 | MGTN 905 | The Art of Transformational Coaching | 3 | | |
| MGT 563 | MGTN 915 | Organizational Teamwork | 3 | | |
| MGT 564 | MGTN 916 | Principles of Public Relations | 3 | | |
| MGT 565 | MGTN 917 | Non-Linear Strategies for Business Success | 3 | | |
| MGT 566 | MGTN 920 | Production and Operations Management | 3 | | |
| MGT 567 | MGTN 922 | Quality Control Management | 3 | | |
| MGT 568 | MGTN 925 | Impact of Intellectual Property in a Global Economy | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| MGT 569 | MGTN 930 | Strategic Operations Management | 3 | | |
| MGT 570 | MGTN 935 | Contracts and Purchasing 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 574 | MGTN 947 | High Performance Leadership | 3 | | |
| MGT 575 | MGTN 948 | Project Management | 3 | | |
| MGT 576 | MGTN 949 | Organizational Theory | 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 584 | | Supply Chain Management | 3 | | |
| MGT 593 | MKT 584 | Intrapreneurship – Innovation from Within | 3 | | |
| MGT 608 | MGTN 902 | Business Statistics | 3 | | Calculus, Algebra II, or equivalent |
| MGT 609 | MGTN 906 | The Business of Coaching | 3 | | MGT 561, or equivalent |
| MGT 610 | MGTN 907 | Influencing the Brain for Success | 3 | | MGT 561, or equivalent |
| MGT 611 | MGTN 923 | Lean Six Sigma | 3 | | Calculus, Algebra II, or equva-lent |
| MGT 612 | MGTN 954 | Advanced Project Management | 3 | | MGT 575, or equivalent |
| MGT 690 | MGTN 945 | Pitching a Business Plan to Venture Capitalists | 3 | | MGT 503 OR taken concurrently with MGT 503, Completion of 27 credit hours |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| MIS 527 | MISY 927 | Technology and Operations Management: Creating value | 3 | | |
| MIS 537 | MISY 915 | Management Information Systems | 3 | | |
| MIS 538 | MISY 910 | Business Database Appli-cations | 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 | | |
| MIS 549 | MISY 925 | Public Information Management | 3 | | |
| MIS 550 | MISY 926 | Strategic Management of Information Technology | 3 | | |
| MIS 552 | MISY 930 | Business Information Systems & Technologies | 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 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom-mended |
|---|---|---|---|---|---|
| MKT 586 | MKTN 954 | Marketing Research | 3 | | |
| MKT 587 | MKTN 956 | Comparative Studies of MNC, FDI, and International Trade | 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 | MKT 582, or equivalent | |
| SWE 500 | SEN 941 | Software Engineering | 3 | | |
| SWE 510 | CS 810 | Information Security Countermeasures | 3 | | |
| SWE 518 | SEN 948 | User Interface Design & Implementation | 3 | | |
| SWE 520 | CS 820 | Principles of Ethical Hacking | 3 | Knowledge of C++, Java, or Python | |
| SWE 525 | | Version Control Tools/GIT | 3 | | |
| SWE 530 | CS 830 | Cloud Computing Security | 3 | SWE 561 | |
| SWE 535 | CS 840 | Cloud and Virtualization Security (CPO) | 3 | SWE 561 | |
| 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 546 | SEN 960 | SQA/Performance Testing | 3 | | |
| SWE 550 | SEN 947 | Software Project Management (CPO-ACP) | 3 | | |
| SWE 560 | SEN 934 | Principle of Database Systems | 3 | | |

| New | Old | Course Title | Credit Hours | Prerequisite | Recom- mended |
|---|---|---|---|---|---|
| SWE 561 | SEN 961 | Cloud Computing | 3 | Knowledge of Operating Systems | |
| SWE 562 | SEN 982 | Oracle Database Management/ Administration | 3 | | |
| New | Old | Course Title | Credit Hours | Prerequisite | Recom- mended |
| SWE 575 | | Current Topics in Software Engineering | 3 | | |
| SWE 600 | SEN 942 | Advanced Software Engineering | 3 | SWE 500 | |
| SWE 602 | SEN 946 | Software Requirements Elicitation | 3 | SWE 500 | |
| SWE 610 | SEN 905 | Ruby on Rails | 3 | Knowledge of HTML, JavaScript, database | |
| SWE 615 | CS 936 | Angular JS | 3 | CSC 530 or previous Javascript experience | |
| SWE 618 | | Software Design using UML | 3 | | |
| SWE 620 | CS 925 | Scala Programming | 3 | | |
| SWE 630 | CS 921 | Semantic Web | 3 | Knowledge of Java, HTML, Database, information systems, or AI principles | |
| SWE 632 | SEN 943 | Software Risk Management | 3 | | |
| SWE 633 | SEN 944 | Software Refactoring | 3 | SWE 500 | |
| SWE 640 | SEN 985 | Artificial Intelligence | 3 | Knowledge of Discrete Mathematics | |
| SWE 645 | CS 926 | Performance Critical Design | 3 | | |
| SWE 646 | CS 927 | Model Driven Architectures | 3 | | |
| SWE 680 | SEN 950 | Software Architecture | 3 | SWE 600 | |
| SWE 690 | SEN 998 | Capstone Project | 3 | Department approval and completion of 27 credit hours | |
| SWE 695 | SEN 999 | Master's Thesis | 3-6 | Department approval and completion of 27 credit hours | |
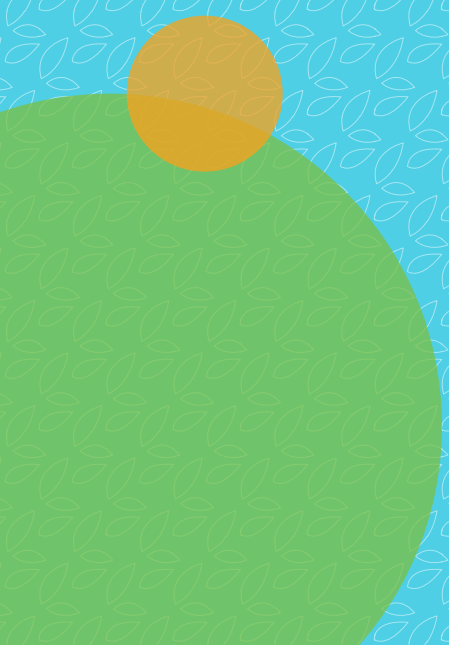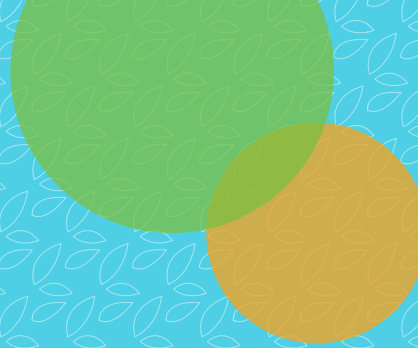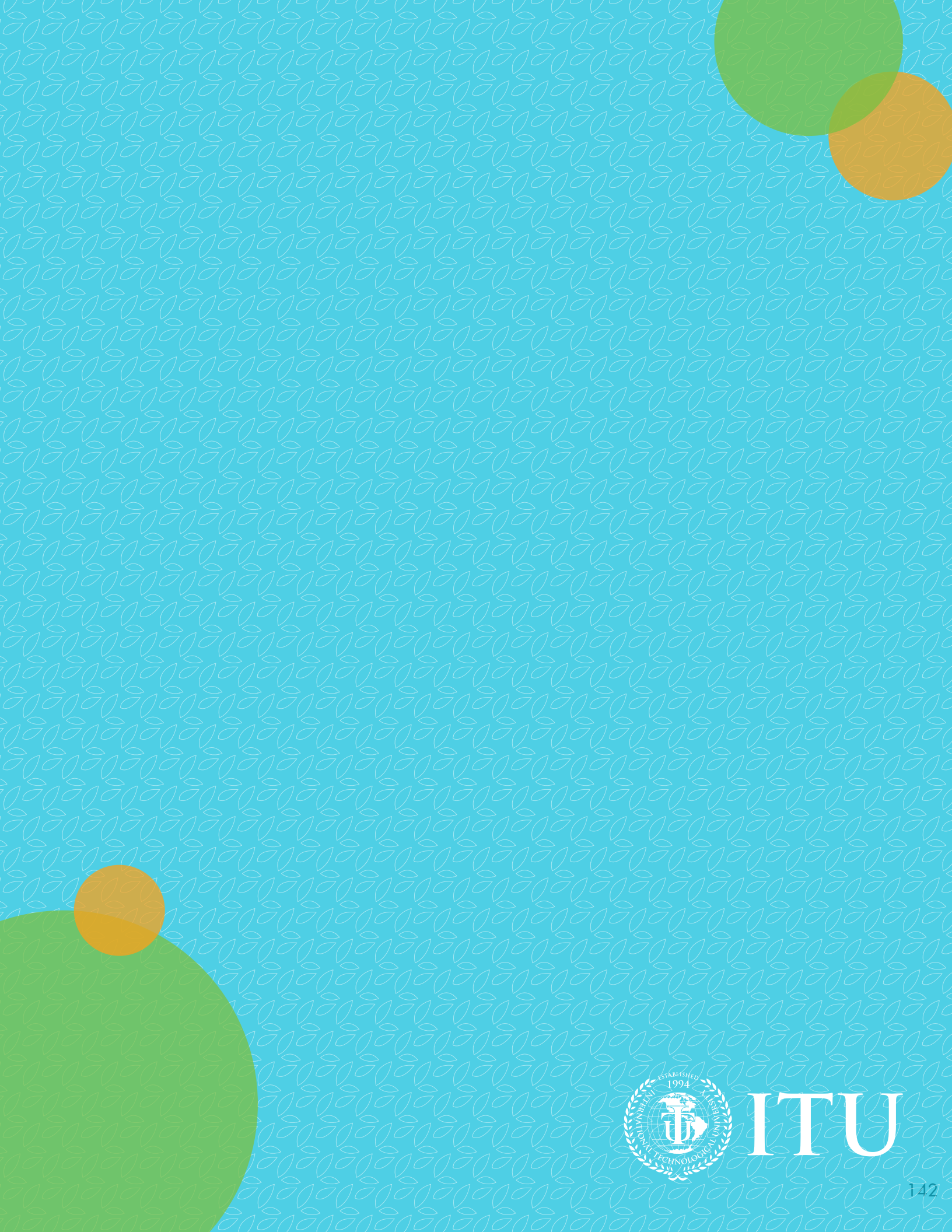
# 2016-2017  ADDENDUM
# COURSE CATALOG &
# STUDENT HANDBOOK

## DOCTORAL PROGRAMS POLICY

The policy below applies to all Doctoral programs and replaces the relevant section in the catalog found on pages 49, 67 and 71.

ADMISSION 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 course work 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 course work 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 course work will receive a terminal Master's degree, if 30 credits of PhD (or 42 credits of DBA) have been successfully completed.

## ADMISSION POLICIES FOR RECIPIENTS OF THREE-YEAR BACHELOR'S DEGREES 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 pre-requisite.

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

## PROOF OF ENGLISH LANGUAGE PROFICIENCY

*This is a supplement to the existing policy: Proof of English Proficiency found on page 12, Number 2 of the current 2016-2017 catalog.*

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.

## MBA PROGRAM: NEW COURSE

MGT 583 Global Entrepreneurship and Innovation (3)
Prerequisite: None

Course Description:
This course will discuss Entrepreneurship that exists in the United States as well as in several select countries of the world. We will compare and contrast the differences and similarities that affect the entrepreneurs and their teams and how these teams are formed and act in different countries and environments. We will review how innovation in the different countries is formulated and how this concept impacts the entrepreneurial teams. We will summarize best practices of entrepreneurism as compared with the United States.

## INDEPENDENT STUDY POLICY

The policy below replaces the Independent Study policy found on pages 24 and 25 of the current 2016-2017 catalog.

**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 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

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.

## 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.

## 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.

## 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.