LNG 181   English I for Engineering & Computing

LNG 181 builds on the reading and writing skills. This course provides practice in analyzing and responding to various rhetorical modes of writing with an emphasis on authentic texts. The course focuses on exposition and argumentation specialized for Engineers. *Pre-requisite None*

LNG 182   English II for Engineering & Computing

This course builds the written and oral communication skills that enable Engineering students to communicate according to the conventions of the profession. It includes writing (letters, memos, proposals, emails, and reports), principles and practices in delivering informal and formal public speaking, and presenting solutions and results of research in a clear and effective way. *Pre-requisite LNG-181*

GED 198   Islamic Culture

The course presents an elementary survey of Islam as a religion and an approach to life. Topics include: the Quran, its names characteristics and miracles, the scientific miracles in the Quran, an introduction to the prophetic heritage (the Sunnah), the history of Islam and the Islamic civilization, Islam's vision of the human being, the universe and life, and the pillars of Islamic faith. Students are invited to reflect on the relationships between Islam and other civilizations. *Pre-requisite None*

GED 196   Communication Skills in Arabic 1

يطمح هذا المساق إلى تحقيق مجموعة من المهارات التعليمية الأساسية لبناء شخصية الطالب الجامعي بناء ثقافياً يوافق حياته المهنية ، ويدفعه نحو آفاق ثقافية تساعده على بلوغ مرحلة متقدمة من مراحل استخدام اللغة العربية في المجال العلمي ، والبحث الأكاديمي.

ويشمل هذا المساق ثلاثة محاور أساسية تنطلق من حاجات الدارسين اللغوية :

1- قراءات في مجال الاتصال والتواصل الإنساني .

2- قراءات في الثقافة الأدبية : يتناول مجموعة من المقالات والدراسات المتقدمة التي تطرح إشكاليات وقضايا تتلاءم مع أهداف التنمية العلمية والفكرية والثقافية والاقتصادية التي تسعى الجامعة إلى تحقيقها على مستوى الفرد والمجتمع .

3- أنشطة البحث العلمي : وتتناول البحث الصفي ومجالاته المختلفة ، اختيار نقطة بحثية وإجراءات معالجتها بدءًا من صياغة عنوان البحث ، و طرق جمع مادته و كيفية تدوينها و توثيقها ، و صوغ أفكاره وإخراجه في صورته النهائية

Pre-requisite None

GED 199E   UAE Society

This course is an introduction to the UAE society in its political, geographical, cultural, demographical and social aspects. Students are encouraged to reflect on the evolution of society in view of the fast changes brought by modernization and globalization. Topics include: the Emirates geography and history, aspects of life before and after the Emirates political union, economic and social development, the cultural life before and after the union. *Pre-requisite None*

ENT 141   Fundamentals in Innovation and Entrepreneurship 1

This course is developed for the UAE based on decades of practices and experiences of teaching innovation and entrepreneurship at Stanford University that has fueled innovation and high growth in Silicon Valley. The goal of the course is to equip the next generation of leaders in the UAE with an innovative and entrepreneurial mindset and its related core skills. Most sessions include a mix of components: lecture, discussion, interactive activities in class,

and open Q & A if an appropriate expert or guest speaker is available. The session descriptions below contain a summary of the session, a list of materials to read and videos to watch before the session, and a set of study questions to contemplate beforehand and to be used in class discussion. You will focus on the principles of design thinking. ***Pre-requisite None***

ENT 142   Fundamentals in Innovation and Entrepreneurship 2

This course is developed for the UAE based on decades of practices and experiences of teaching innovation and entrepreneurship at Stanford University that has fueled innovation and high growth in Silicon Valley. The goal of the course is to equip the next generation of leaders in the UAE with an innovative and entrepreneurial mindset and its related core skills. Most sessions include a mix of components: lecture, discussion, interactive activities in class, and open Q & A if an appropriate expert or guest speaker is available. The session descriptions below contain a summary of the session, a list of materials to read and videos to watch before the session, and a set of study questions to contemplate beforehand and to be used in class discussion. ***Pre-requisite ENT-141***

GED 110E   Modern Art Appreciation

Modern Art Appreciation' is a broad-based (1) theoretical and (2) practical course. It focuses on (1) visual theory, the major modern art movements, such as The Origins, The Islamic Art, The Renaissance Art, The Modern (19th century) Artistic Movements. (2) In addition, students will identify various styles within Modern Art Movements, and apply this knowledge in studio and class assignments. ***Pre-requisite None***

GED 111   Music Appreciation and Communication

Stimulate music appreciation and communication. Identify factors that promote and inhibit music, music history, music practice and communication via music. Look at popular music and its impact on every-day life. Understand the value of music as part of mass communication and media. Learn the building blocks of music history, music practice and music appreciation. ***Pre-requisite None***

GED 112   Using Positive Psychology at Work

This advanced psychology course invites students to explore the emerging field of Positive Psychology with a focus on the workplace. Students will learn about the science of happiness by exploring theory and concepts relative to a state of well-being, such as the architecture of sustainable happiness, adaptation, broaden and build theory and flow. The second part of this class will focus on the application of theory in the workplace as well as in one's personal life. Students will be invited to engage in several positive psychology interventions (PPIs), such as generating positive emotions to improve creativity, relationships with coworkers, and work performance. How these techniques are currently being used within organizations to increase employee retention and job satisfaction will also be reviewed through the identification and evaluation of two corporate wellness programs. Students should be aware that there is a significant amount of reading involved. Failure to keep up with the readings will result in poor academic results. ***Pre-requisite LNG-172 or LNG-182***

GED 252E   Critical Thinking

This course aims to engage student's in critical thinking in a range of contexts. Student's will analyze and evaluate the language of argumentation by identifying premises and conclusions, deductive and inductive reasoning. Furthermore, students will evaluate arguments; validity, soundness and problems of interpretation as well as common fallacies of reasoning. Students will distinguish different types of thinking through evaluating independent and collaborative learning, and group dynamics. In addition, students will acquire strategies and methods to solve problems, equate probability and causality. Lastly, students will learn to analyze reading texts and respond by composing a critical analysis. ***Pre-requisite LNG-172 or LNG-182***

GED 205E   Psychology in Every Day Life

An introduction to concepts and principles of selected areas of psychology and their applications to daily living. The aim is to foster students' understanding of the self and its interactions with the environment. Topics include: research methodology in psychology, basic neuro-psychology, theories of learning, memory, motivation, development, and intelligence, as well as a focus on health, psychotherapy, and social psychology. ***Pre-requisite LNG-172 or LNG-182***

GED 272E   Fundamentals of Public Speaking

Being able to communicate well in public situations is something any university graduate is expected to be able to do with ease.

This course will introduce students to the fundamentals of public speaking. These include the steps of the speech-making process. The course will also focus on developing oral communication skills and presentation skills that students need to succeed in their major programs of study and to advance in their future careers. Students will be asked to give various speeches in a wide range of settings and for a variety of purposes to enhance their appreciation of and comfort with the art of public speaking. Fundamentals of Public Speaking' also focuses on developing skills for thinking critically, whether one is designing one's own presentation, listening to the presentations of others, or evaluating information and solutions in the process of accomplishing a group task. ***Pre-requisite LNG-172 or LNG-182***

GED 324E   Ethical Reasoning for Today's World

This course examines the theories, skills and applications of moral philosophy, including a description and a discussion of the three influential approaches to morality, namely: character ethics, consequence- based ethics, and principle-based ethics. Students will also engage in a good citizenship project where they will put into action their character strengths as per the Aristotelian theory and consider what their role is in the larger social context as a good, ethical citizen. ***Pre-requisite LNG 172 or LNG 182***

ENG 410   Professional and Ethical Practice

This course introduces the engineering profession, professional practice, engineering law and ethics. To fully assume responsibilities towards society the engineer should consider social implications and environmental impacts of technologies. Topics include: History of the profession of engineering, Principles of professional engineering practice, Professionalism and Codes of Ethics, Understanding Ethical Problems, Ethical Problem-Solving Techniques, Social implications and environmental impacts of technology, The Rights and Responsibilities of Engineers, Ethical Issues in Engineering Practice, Ethics in Computer and Internet Crime, Security and Privacy, Ethics related to Intellectual Property. ***Pre-requisite None***

GED 298E   Special Topics in Western Culture

Field Study – English Language and Canadian Culture: The course will allow students to enhance their English language skills and develop a firm understanding of Canadian culture and history. The field course will see students spending 4 weeks at the University of Ottawa located in Canada's Capital region where they will study intensive English, and also, through a series of lectures and seminars, learn about Canadian history and culture. Complementing the course will be an extensive schedule of cultural excursions aimed at exposing students to life in Canada. ***Pre-requisite GED-198E , LNG 172 or LNG 182,***

SHS 103   Chemistry

It is basic course of chemistry introducing students to chemical symbols, formulae and equations describing experiments. Topics include: Properties of Materials, Atomic Theory, Periodic Table, Chemical Formulae, Energy, Molecular and Ionic compounds, Measurement,

Chemical Equations, Equations for Ionic Reactions, Acids and Bases, Morality and the composition of a solution, Study of rates of reactions. ***Pre-requisite None***

SCI 220   Engineering Mechanics

This course covers Newton's laws, forces, equilibrium, moment and couples, structures in equilibrium, centroids and centers of mass, moments of inertia, motion in two and three dimensions, and rotation. ***Pre-Requisite: MTH-112***

MTH 112   Calculus I

The course introduces the students to the fundamental concepts of calculus: limits, continuity, differentiation and integration; and trains them to apply these concepts to problems that arise in science and engineering. ***Pre-Requisite:* Pass Math Placement Test or MTH-012**

MTH 113   Calculus II

The course introduces techniques of integration, polar coordinates, and functions of several variables including partial differentiations and multiple integrals. In addition, students will develop the skills to apply these concepts to solve problems arising in science and engineering. ***Pre-Requisite:* MTH-112**

MTH 212   Calculus III

The course introduces the students to the fundamental concepts of calculus: limits, continuity, differentiation and integration; and trains them to apply these concepts to problems that arise in science and engineering. ***Pre-Requisite:* MTH-113**

SCI 210   Modern Physics

This course covers Electrostatic, Magnetostatics, waves, Doppler effect, reflection, refraction, geometrical optics, photons, wave nature of particles, and thermodynamics.

Pre/<u>Co</u> Requisite <u>MTH-113</u>, SCI-220

SWS 110   Programming I

Problem solving; Basic elements of programming; Syntax and semantics of programming language including variables, data types, expressions, and assignment; program flow of control; conditions; iterations; Methods and parameter passing; Program debugging and testing; Object-oriented programming (OOP); Event-driven programming. ***Pre-Requisite: None***

MTH 130   Probability and Statistics

The course serves as an introduction to probability models and statistical methods for students in engineering and the physical and natural sciences. Topics include: descriptive statistics, probability, conditional probability, discrete and continuous random variables and their probability distributions, correlation and simple linear regression. ***Pre-Requisite:* MTH-112**

MTH 220   Ordinary Differential Equations

The course introduces the main concepts in differential equations and exposes the students and trains them on solving ordinary differential equations by several quantitative methods: First order ODEs, Second and higher order linear ODEs, Series solutions at ordinary and regular singular points, Laplace transforms, Linear systems of differential equations with a short review of linear algebra. It also enables the students to relate the topics taught in the course to applications in engineering, science, and technology. ***Pre-Requisite:* MTH-212**

SWS 316   Programming II

This course focuses on the object-oriented paradigm. Course topics include: Objects and Classes; Object-Oriented design; encapsulation and information hiding, inheritance and composition, polymorphism, class library, Simple Data Structures and their Applications (Array, String, and String Manipulation), GUI, Programming Practice using a modern high level language. *Pre-Requisite:* **SWS-110**

ENG 221   Electric Circuit

This course provides students with fundamental understanding of electric circuits. Voltage and Current Sources, Resistors; Ohm's Law; Jule's Law: Energy and Power; Resistors in Series; Resistors in Parallel; Series-Parallel Resistive Circuits; Source Conversions, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Alternating Current, Capacitors and inductors; RC, RL, and RLC circuits, First order Analysis, Second Order Analysis, Phasor Circuit Analysis, Circuit Theorem with Phasor. **Pre/<u>Co</u> Requisite <u>SCI-210</u>**

ENG 310   Electronics I

This course provides an introduction to electronic components in terms of implementation and application. Topics include: Semiconductor material; Semiconductor Diodes; Diode applications; LED and Laser Diodes; Zener Diodes; BJT Transistors; BJT Switching Applications; BJT Amplifiers, Power Amplifiers, JFET Transistors; MOSFET Transistors; Switching and logic CMOS applications of MOSFETs. *Pre-Requisite:* **ENG-221**

ENG 101   Digital Logic

This course provides an introduction to digital systems with Verilog implementation. Topics include: Number systems and codes; Logic gates, truth table and universal gates, Combinational Circuit, Karnaugh Map, Flip-Flops and related devices, Decoders, Encoders, Adders, Multiplexers, Binary Adders, Signed Binary Adders, Counters and Registers. *Pre-Requisite:* **None**

ENG 223   Electric Circuit II

This course provides the students the fundamental theory and mathematics for the analysis of Alternating Current (AC) electrical circuits, frequency response and transfer function of circuits. Topics include: Sinusoids and Phasors, Sinusoidal Steady-state Analysis, AC Power Analysis, Three-Phase Circuits, Magnetically Coupled Circuits, Frequency Response, Frequency selective circuits and two-port networks. *Pre-Requisite:* **ENG-221**

BUS 310   Project Management

This course provides the student with tools ensuring the maximum of success in his future projects. Poorly or wrongly managing of engineering projects have been wrongly or poorly managed, delivering them behind schedule, and/or over budget, lead to failure and disappointment. The nine project management knowledge areas are tackled, namely project

1. Project Integration Management
2. Project Scope Management
3. Project Time Management
4. Project Cost Management
5. Project Quality Management
6. Project Human Resource Management
7. Project Communications Management
8. Project Risk Management

Project Procurement Management. *Pre-Requisite:* **Completion of 60 Credit Hrs.**

BUS 311   Engineering Economy

This course gives provides basic concepts of engineering economics by focussing on the theoretical and conceptual financial project analysis. Topics include: Engineering economic decisions, interest, cost of money, nominal and effective interest rates, changing interest rates, mortgages, describing project cash flows, internal rate of return criterion, comparing mutually exclusive alternatives, applications of economic evaluation techniques, design economics, depreciation, natural resource allowances, income taxes, developing project cash flows, capital budgeting decisions, personal investments, inflation and economic analysis, project risk and uncertainty, computer simulation. *Pre-Requisite:* **MTH-130**

ENG 210   Computer Architecture

This course provides an introduction to computer system architecture and organization. Topics include: Data representation, CPU and Memory; Design, Implementation and Enhancement, Analysis and Comparison of CPU architectures; I/O Operation; and Computer Peripherals. *Pre-Requisite:* **ENG-101**

ENG 314   Electric Machines

This course provides an introduction to Electrical Machines. Topics includes; Magnetic circuits, ideal and practical transformers, instrument and autotransformers. DC motors and generators, DC motors speed control, brushless DC motors. AC machines, induction motors characteristics, synchronous generators, fractional horsepower machines. AC machines frequency and speed control. Servomotors and stepper motors. *Pre-Requisite:* **ENG-223**

ENG 315   Control Systems

This course provides an introduction to Control Systems. Topics include Introduction to: Characteristics, time response, steady-state error. Open loop and closed loop concepts, transfer function, time domain, frequency domain, stability of linear feedback control systems, Root Locus method, Bode diagram. Design of feedback control systems: principles of design, design with the PD, PI, and PID controllers. Performance evaluation of feedback control systems. Software tools for simulation of control systems and analyze their performance are integrated throughout the course. *Pre-Requisite:* **MTH-220**

COM 411   Digital Filter Design

This course provides an introduction to digital signal processing and its applications. Topics include: Discrete time signals and systems, z-transform, Discrete Fourier Transform, Computation of the Discrete Fourier Transform, Structures for discrete time systems, Design of Nonrecursive Filters (FIR), Design of Recursive Filters (IIR), and Multirate signal processing. *Pre-Requisite:* **MTH 220**

NET 110   Computer Networks Fundamentals

Introduction to data communication systems; Local Area Networks and OSI layer model, with emphasis on data link and physical layers; Analog and digital communication systems; Multiplexing, bandwidth and throughput; Modulation techniques; Transmission lines; Switching and routing; Ethernet technologies; Internet Protocol. *Pre-Requisite:* **ENG-101**

ENG 301   Electronics II

This course covers Small-signal BJT Amplifiers; Small-signal FET Amplifiers; MOSFET Amplifier; Amplifier Frequency Response ; Ideal Operational Amplifier Circuits and Analysis; OpAmp applications, such as, adder, integrator, differentiator, active filters, and oscillators. *Pre-Requisite:* **ENG-310**

ENG 222   **Engineering Electromagnetics**

This course is intended to develop both physics and engineering related understanding of electromagnetic forces and fields. It also explains propagation process through materials, devices as well as systems. It starts by reviewing Complex Numbers, Phasors, Vector Analysis, Differential operators. Topics include: Waves and Phasors; Transmission Lines; Electrostatics; Magnetostatics; Time-Varying Fields; Faraday's Law; Boundary Conditions for Electromagnetics, Electromagnetic Potentials; Plane-Wave Propagation. ***Pre-Requisite: MTH-212, SCI-210***

ENT 241   **Entrepreneurship I**

Introduction to entrepreneurship theory and practice. Business plan development and execution. Funding possibilities and investments. Definition of entrepreneurship; classical and modern management theories and identification of opportunities; strategic planning and execution. ***Pre-Requisite: ENT-142***

ENT 242   **Entrepreneurship II**

Business plan and pitch development and execution. Funding possibilities and investments. Definition of entrepreneurship; classical and modern management theories and identification of opportunities; strategic planning and execution. ***Pre-Requisite: ENT-241***

COM 311   **Signals and Systems**

This course covers, Continuous and discrete-Time Signals and System, Continuous and Discrete Linear Time-Invariant Systems, Fourier series, Fourier Transform and Applications, sampling and Laplace transform. ***Pre-Requisite:MTH-220***

ENG 320   **Internship**

Internship is a course designed to provide students with opportunities to gain work experience in a real world environment, to practice critical thinking, to solve real problems, and to develop design and innovation skills. By interacting with professionals on real problems and commercial devices, systems or software, the student learns how to tackle real world tasks, manage his/her duties, identify objectives, respect constraints, explore new ideas, investigate practical issues, design new elements (device, system, software) and make some decisions. ***Pre-Requisite:90 Cr.H + CGPA 2.0***

ENG 400   **Graduation Project-1**

This project provides the students with the opportunity to use the learning they acquired to: apply critical thinking, further develop their design skills, and innovate. The students are expected to complete literature survey; develop a project plan; analyze requirements and acquire the necessary material and steps for their intended project. Graduation Projects in industrial environment with the co-supervision by an industrial expert are encouraged. ***Pre-Requisite: Completed 100 Cr***

ENG 401   **Graduation Project-2**

This project provides the students with opportunities to demonstrate the learning they acquired to: apply critical thinking, further develop their design skills, and innovate. The students are expected to implement, test and perform the analysis of the results of a project based on the design and schedule completed by the same student team during the graduation project 1. Graduation Projects in industrial environment with the co-supervision by an industrial expert are encouraged. ***Pre-Requisite:ENG-400***

ELC 323   Instrumentation and Measurements

In this course, students will learn how to select and use appropriate electronic test instruments for various applications based on an understanding of the capabilities and limitations of modern electronic test instrumentation. They will also develop an understanding of the basic principles of operation of these instruments. Comprehension of the topics covered in lectures will be reinforced with a broad spectrum of laboratory experiments. Through attractive practical applications, student will learn fundamentals of the "LabView" instrumentation software. ***Pre-Requisite: ENG-223***

ELC 320   Power Electronics

This course is intended to teach the fundamentals of power conversion and will cover the design, analysis, modeling and control of all types of power converters – such as, dc-dc converters, dc-ac inverters, ac-dc rectifiers/converters and also introduce the concepts of direct ac-ac converters. ***Pre-Requisite: ENG-301***

ELC 330   Microcontrollers and Embedded Systems

This course provides Basic introduction to microcontroller-based embedded systems design, development and implementation. It includes embedded system types, microcontroller architecture, programming, I/O interfacing, task scheduling, interrupt management and other related topics.

Pre-Requisite: ENG-210

ELC 411   Communication Electronics

The course explores the design and analysis of high frequency circuits and the corresponding measurement techniques. Topics covered; Amplitude modulation/demodulation circuits, Frequency modulation/ demodulation circuits, Oscillators, power amplifiers, mixers, matching networks, Radio and TV transmitter/ receiver circuits. ***Pre-Requisite: ENG-301***

ELC 412   Digital System Design

This course proposes advanced topics of digital logic with emphasis on the design of digital circuits. It includes the following topics: Hardware Description Languages (HDL) HDL-Based Digital Design, VHDL Hardware Description Language, Combinational Logic Design Practices, Sequential Logic Design Principles, Sequential Logic Design Practices, Memory, CPLDs, FPGAs, Complex Programmable Logic Devices. Design with VHDL. By the end of the course the student will be able to design, simulate, build, and debug complex combinational and sequential digital circuits based on an abstract functional specification. The student will also understand the basic internal workings of the central processing unit of a computer and its interface with memory and input/output subsystems. ***Pre-Requisite: ENG-210***

ELC 421   VLSI Design

This course covers basic theories and techniques of digital VLSI design in CMOS technology and the fundamental concepts and structures of designing digital VLSI systems include CMOS devices and circuits, standard CMOS fabrication processes, CMOS design rules, static and dynamic logic structures, interconnect analysis, CMOS chip layout, low power techniques, design tools and methodologies, VLSI architecture ***Pre-Requisite: ELC-411***

ELC 422   Optoelectronics

Introduction to the principles and design of semiconductor optoelectronic devices including photodiodes, solar cells, light-emitting diodes, laser diodes, and CCDs. Applications include photovoltaics, displays, photodetection, and optical communications. ***Pre-Requisite: ENG-301***

ELC 425   Nanoelectronics

This course provides students with knowledge and understanding of physical background and applications of nanoelectronics. The course will cover electrical, optical and thermal properties of materials and nanostructures, fabrication of nanostructures, nanoelectronic devices including field effect transistors and single-electron transistors. *Pre-Requisite: ENG-301*

ELC 427   Analog Integrated Circuits

This course provides essential information to the design of analog integrated circuits. Topics include: Integrated Circuit Devices and Modelling, Current Mirrors and Single-Stage Amplifiers, Frequency Response of Electronic Circuits, Feedback Amplifiers, BasicOpAmp Design and Compensation, Stability and Frequency Compensation, Noise and Linearity Analysis and Modelling, Switched-Capacitor Circuits, Phase-Locked Loops, Layout and Manufacturing. *Pre-Requisite: ELC-411*

MEC 412   Sensors and Actuators

In this course, students are introduced to advanced concepts in sensing and actuation for mechatronics systems, including both traditional sensors and actuators an introduction to advanced topics in micro electromechanical system (MEMS) sensing, and smart materials..

Pre-Requisite: ELC-323

ELC 423   Data Acquisition and Interfacing

This course covers the fundamentals of real time embedded data acquisition systems: their architectures, components, algorithms, data storage and presentation. Elementary theory of the operation of digitally controlled equipment will be covered as well as elementary data analysis. Programming of data acquisition systems using graphical programming language and software is also covered. *Pre-Requisite: ELC-330*

ELC 424   Digital ASIC Design

This course introduces the fundamentals of Computer-Aided Design tools for the modelling, design, analysis, test, and verification of Application Specific Integrated Circuit (ASIC) systems. It explores techniques for modelling digital systems at various abstraction levels, and the computer-aided design (CAD) algorithms that are applied to these models to support the various design and analysis tasks. The course will cover: modelling of digital systems for simulation and automated synthesis using modern hardware description languages VHDL), logic synthesis and optimization, physical design automation (placement, floor-planning and routing) considering the CMOS technology, testing (fault models, simulation, basic test generation), timing analysis and verification. *Pre-Requisite: ENG-301*

ELC 430   Solid State Devices

This course examines the fundamental concepts of solid state materials and the principles of operation of modern electronic and optoelectronic devices. Students will learn the underlying physics responsible for the operation of Solid State Devices. This course has two main components: Materials and Devices. Topics in materials include: Crystal Structure, Energy Bands and Carrier Processes. Topics in device operation include: p-n Junction Diodes, Bipolar Junction Transistors, Field-Effect junction Transistors, and Optoelectronic Devices. Specific devices including Metal-Oxide-Semiconductor Field-Effect Transistors and double heterojunction lasers will be introduced. *Pre-Requisite: ENG-222, ENG-301,*

ELC 435   Hardware Functional Verification

As design complexity in chips and devices continues to rise, so, too, does the demand for functional verification. This course introduces the basic. Techniques for verification of hardware designs; writing test benches; verification of increasingly complex computer circuit designs provided by industry using simulation environments used in industry. ***Pre-Requisite: ELC-412***