PHOENICIA UNIVERSITY

Innovation . Inspiration . Integrity

College of Engineering

Suggested Electrical and Communication Engineering Degree Plan

2024-2025

www.pu.edu.lb

College of Engineering

COE Curriculum

The Engineering curriculum at PU is designed to provide the students with broad, yet robust foundations in mathematics, basic science, and core engineering specialty within the context of a broad liberal arts academic environment. In addition to the science and engineering courses, our students are required to take general education courses, a necessary stepping stone for being well-rounded engineers. Besides conceptual/theoretical learning, the curriculum also emphasizes experiential learning as well as teamwork via laboratory work, practical training, and other types of hands-on experiences.

BE Program Design

The BE degree is awarded upon the satisfactory completion of 147 course credits. The program is a five-year program with the possibility to be completed in a four-year time period should the students elect to take courses during the summer term.

The breakdown of the engineering program courses is as follows:

- ***General Education courses – 30 credits***
  These are common courses that all students will take with minor variations pending College selection. The target is to instill a significant dose of liberal arts education in the minds of engineering students. In this respect, the General Education requirement is a precondition for graduation.

- ***Free Elective course – 3 credits***
  This course gives the students the opportunity to take a course of their choice to expand their horizon, and gain knowledge in a topic that matches their own interests.

- ***Core courses – 117 credits***
  This category is divided into six groups of courses:
  1. *Basic science and math requirements*: These science and math courses serve as the foundations to subsequent engineering courses.
  2. *General Engineering common course requirements*: These are generally common and required engineering courses spanning across various engineering disciplines. In addition, students from any engineering discipline have the flexibility to take a 3-credit elective course from the general engineering course offering.
  3. *Discipline-specific technical course requirements*: These courses represent the backbone technical knowledge necessary to gain proficiency and competency in a specific engineering discipline. The course offerings integrate a depth and breadth of expertise within each engineering discipline.
  4. *Capstone design project*: All engineering departments have a 4-credit capstone design project course that the students should take in their final two semesters prior to graduation.

5. *Technical electives*: All engineering departments offer a minimum of 6 credit courses of technical electives. These courses offer opportunities for students to further deepen their knowledge in their program of study.
6. *Practical training (Pass / Fail basis).* The students are expected to have an eight-week ofprofessional training in an area related to their engineering discipline. This training provides a hands-on experience while giving the students a glimpse on what to expect in their career post-graduation.In addition, this is a unique opportunity to land a job and/or network with influential people in a specific engineering discipline.

Graduation Requirements

- Course fulfillment: Students need to complete all academic requirements needed according to the BE program.
- Residence Requirements: Students must maintain full-time status over four regular consecutive semesters with at least 12 credits of completed courses per semester.
- Academic Performance: Students must obtain a minimum "Program GPA" of 2.0 and a minimum "Cumulative GPA" of 2.0; no rounding (e.g., a GPA of 1.99)—whatsoever—will be applied. Additionally, students must obtain a minimum core-course GPA of 2.0.
- Graduation Clearance: Students obtain "Graduation Clearance" as detailed in the followingsection.
- College satisfaction: Students must exhibit personal and professional conduct in compliance with the "Student Conduct Policy".

Graduation Clearance

Upon reaching senior-level status, students must fill out the graduation clearance form after completing all their degree requirements. The graduation clearance form should be signed by the following personnel: Departmental Coordinator, Dean of College, IT Director, Library Coordinator, Finance Director, Registrar Director, Career Center Director, Head of the Exit Interview Committee, President, and Chancellor. Failure to do so will delay graduation.

COE Course Nomenclature

COE course structure and nomenclature is derived based on departmental course requirements and the common general course requirements:

- General Engineering courses – GENG
- Civil & Environmental Engineering courses – CENG
- Electrical & Communication Engineering courses – EENG
- Mechanical Engineering courses – MENG
- Petroleum Engineering courses – PENG

Department of General Engineering

The Department of General Engineering was established in 2015. This department is an engineering service department; hence, it is a non-degree conferring department. The department offers basic engineering courses covering technical, managerial, economic, and professional expertise.

GENG Course Description

GENG 201. Introduction to Engineering – 3 cr.
This is an introductory course that gives a background to different types of engineering majors. Basic engineering projects are assigned so that students develop their individual and teamwork skills. At the end of this course, students are expected to understand the role of an engineer in society, and be able to identify the field of engineering as matching their interests. **Concurrent prerequisite: ENGL 101**

GENG 202. Statics – 3 cr.
The course covers the principles of force and moment vectors, the distribution of loads, the use of free-body diagrams and the internal forces, with applications to shear and moment diagrams under different loading conditions. **Concurrent prerequisite: MATH 201**

GENG 203. Dynamics – 3 cr.
This course presents the fundamentals of engineering dynamics, namely kinematics and kinetics. Students will learn to apply kinematics and kinetics to a particle and then move on to the principles of work and energy and impulse and momentum. These concepts are then applied to rigid bodies. **Prerequisite: GENG 202**

GENG 205. Engineering Drawings & Tools – 3 cr.
The course teaches undergraduate students the fundamentals of engineering drawing. Technical engineering drawing is covered in details: orthogonal projections, sectional views, auxiliary views, dimensions and detailing. Applications focus on using a computer to generate CAD drawings and designs (AutoCAD).

GENG 206. Mechanics of Materials – 3 cr.
This course covers the mechanical behavior (stress-strain relationships) of different materials under tension, compression, bending, and shear stress. Mohr's circle, transformation equations, and Hooke's law are discussed. **Prerequisite: GENG 202**

GENG 207. Probability & Statistics in Engineering – 3 cr.
Covered topics include understanding and interpreting statistical measures, calculating probabilities associated with multiple events as well as common probability distributions. Other covered topics

include conditional probability, Bayes theorem, correlation, linear regression, confidence intervals, and hypothesis tests. The course will be given from an Engineering perspective, with focus on solving probability and statistics problems in Engineering. ***(Students can substitute GENG 207 with STAT 202 (Students cannot receive credit for both GENG 207 and STAT 202)***

GENG 208. Thermodynamics – 3 cr.
This introductory course in Thermodynamics provides students with the tools (laws, skills, etc.) required to solve classical problems involving open and closed thermodynamic systems. From the basic zeroth law of thermodynamics to the energy conservation expressed in the first law to the concept of entropy generation in the second law, students learn to calculate work, heat transfer, and compare real systems to theoretical systems having maximum efficiency.

GENG 209. Fluid Mechanics – 3 cr.
This course covers the fundamentals of fluids properties and the principles of fluid mechanics. Topics include fluid statics, fluids in motion, drag and lift, hydraulic design, energy and momentum principles, turbulent and laminar flows, and measurement techniques. Other applications include Bernoulli's and Euler's equations. **Prerequisite: GENG 202**

GENG209L. Fluid Mechanics Laboratory – 1cr.
The laboratory introduces the students to the basic fluid mechanics experiments to supplement theoretical concepts covered in the classroom. **Corequisite: GENG 209**

GENG 210. Electric Circuits – 3 cr.
This course covers electric circuits' fundamentals. Starting with basic circuit variables, definitions, and relationships, to DC circuit analysis tools, such as node and mesh analysis, source transformations, Thevenin and Norton equivalent circuits, and maximum power transfer. Students will also cover AC circuit basics, basic inductor and capacitor circuits, phasor analysis, AC power calculations, and steady-state and transient responses.

GENG 211. Material Science – 3 cr.
This course covers the relationship between the structure of materials (metals, ceramics, and polymers) and their optical, thermal, mechanical, and electrical properties. It also includes the study of the bonding and atomic structure of materials including the crystal structures and defects. Microstructural development and phase equilibria will also be covered.

GENG 212. Introduction to Engineering Programming – 3 cr.
This course aims to familiarize students with programming as a tool for solving Engineering problems. It encompasses the fundamentals of computer programming, such as language structure, arithmetic operations, operator precedence, file input and output, conditions, loops, functions, arrays, and memory allocation. The course also includes 2.5 teaching hours of weekly lab sessions.

Non-Technical Core General Engineering Courses

GENG 204. Engineering Economics – 3 cr.
This course investigates methods of economic analysis for decision making in engineering applications. Topics include cost of capital, net present value, rates of return, investment decision, replacement analysis, capital financing and financial statement analysis.

GENG 213. Accounting & Finance for Engineers – 3 cr.
The intent of this course is to provide engineering students with the information and skills necessary to understand the language of business and, accordingly, make informed financial decision making at both an operational level and a business enterprise level. Some of the covered topics include basic principles in financial/managerial accounting, the generation and understanding of financial statements, ratio analysis, financial planning and growth, capital asset pricing model, cost of capital, capital structure and other relevant topics. **Prerequisite: GENG 204**

GENG 214. Engineering Ethics, Leadership & Professionalism – 3 cr.
This course is an analytical excursion into the behavioral aspects of the engineering leader, particularly as it relates to the moral responsibility of the engineering leader. The course first introduces the fundamental leadership theories, namely the traits' approach, the behavioral approach, the contingency approach and the contemporary approach. The course then tackles moral philosophy, including universalism, utilitarianism, relativism, egoism, and virtue ethics. The course further tackles engineering professionalism from the standpoint of how engineers ought to practice and conduct themselves to be good stewards of the profession and society. The course then explores the relative effectiveness of ethics programs, such as compliance-based versus integrity-based ethical programs. Finally, the relevance and importance of engineering licensure will be discussed. **Prerequisite: ENGL 201**

GENG 216. Engineering Management & Public Policy – 3 cr.
This course exposes students to the fundamentals of engineering management principles and exposes them to the policy making process that integrates political, economic, social, technological, ecological (sustainability) and legal considerations. **Prerequisite: MNGT 201**

GENG 217. Strategic Management for Engineers – 3 cr.
This course is an integrative, big-picture course in which the engineering professional learns the key strategic issues facing managers in engineering corporations, including strategy formulation, strategy implementation, and strategy evaluation. This course enables the student to appreciate the integrative nature of engineering in relation to other core functional disciplines such as finance, accounting, marketing, sales supply chain, and human resources. This course heavily relies on case studies and/or simulation games. **Prerequisite: GENG 216**

GENG 218. Advanced Engineering Economics – 3 cr.
This course exposes the engineering students to advanced topics in economics and finance. Some covered topics include cost of capital, financial engineering, risk diversification, and valuation tools for the levered and unlevered firm/project. This is an experiential learning course that heavily makes use of simulation techniques via spreadsheets. **Prerequisite: GENG 204**

GENG 219. Effective Communication for Engineers – 3 cr.
This course provides engineering students with the effective communication skills necessary to convey engineering ideas and technical information through well-developed oral presentations and written reports. Students will learn how to prepare persuasive engineering presentations, write technical reports, and communicate across different contexts and situations team members and leaders. **Prerequisite: ENGL 201**

GENG 220. Advanced Engineering Programming– 3 cr.
This course introduces students to MATLAB specific programming topics that are relevant to Engineering. Topics include: Vectorization, 2D and 3D plots, timer functions, hardware interfaces, and creating Graphical User Interfaces. The course includes a project where students create a complete MATLAB application that supports one of their other course requirements. **Prerequisite: GENG 212**

General Engineering Courses across various Engineering Departments

Course Code	Course Title	Prerequisite(s)
MENG210	Advanced Thermodynamics	GENG208
MENG220	Mechanics of Machines	GENG203
MENG225	Characterization & Properties of Materials	GENG211
EENG202	Analog Signal Processing	GENG210
EENG211	Fundamentals of Microcontrollers	GENG212 or CMPS200
EENG251	Power & Machines	GENG210
CENG202	Geology for Engineering	ENGL101 *(concurrent prerequisite)*
CENG240	Hydraulics & Hydrology	GENG209
CENG260	Construction & Project Management	ENGL201 & GENG204
PENG202	Petroleum Geology	ENGL101 *(concurrent prerequisite)*
NB: Any of the above listed courses can be deemed as a general engineering elective, given that the course is not part of the student's degree plan and that the prerequisite(s) is/are met.		

Department of Electrical & Communication Engineering

The Department of Electrical & Communication Engineering was established in 2015 and offers a Bachelors of Engineering in Electrical & Communication Engineering. The electrical & communication engineering program covers various focus areas in electrical engineering domain such as telecommunications, power systems, instrumentation and control, and signal processing.

EENG Program Educational Objectives

Within the first few years following graduation, the program's graduates are expected to demonstrate:

- PEO1. Technical knowledge and expertise in electrical and communication engineering.
- PEO2. Life-long learning through graduate studies and continuous professional development.
- PEO3. Leadership, teamwork, and professional skills in a global environment.
- PEO4. Ethical conduct and societal responsibility for the benefit of their organizations and societies.

EENG Program Design

The BE degree is awarded upon the satisfactory completion of 147 course credits. The program is a five-year program with the possibility to be completed in a four-year time period should the students elect to take courses during the summer term.

General Education Courses	
Arabic	3 Credits
English	6 Credits
Communication	3 Credits
Computing	3 Credits
Civilizations	6 Credits
Basic Science	3 Credits
Social Science	3 Credits
Globalization & World Cultures	3 Credits
Total GE Courses	**30 Credits**
Free Elective Courses	
Free Electives	3 Credits
Total Free Elective Courses	**3 Credits**
Core Math & Science Courses	
Math Courses	18 Credits
Science Courses	6 Credits
Total Core Math & Science Courses	**24 Credits**
Core General Engineering Courses	
GENG Courses	30 Credits
GENG Elective Courses	3 Credits
Total GENG	**33 Credits**
Electrical & Communication Engineering Courses	
Core Courses	41 Credits
Professional Internship	
Capstone Project	4 Credits
Engineering Technical Electives	12 Credits
Total EENG Courses	**57 Credits**

Suggested Electrical and Communication Engineering Degree Plan

First Year					
Fall 1			**Spring 1**		
Course	**Title**	**Wt.**	**Course**	**Title**	**Wt.**
ENGL 201	English 1	3	ENGL 202	English 2	3
GENG 201	Introduction to Engineering	3	MATH 212	Differential Equations	3
MATH 201	Calculus & Analytical Geometry	3	GENG 205	Engineering Drawings & Tools	3
GENG 210	Electric Circuit	3	GENG 212	Introduction to Engineering Programming	3
PHYS 201	Introduction to Physics	3	CHEM 201	General Principles of Chemistry	3
PHYS 202	Introduction to Physics Lab	1	CHEM 202	Introduction to Chemical Laboratory Techniques	2
Total Credits		**16**	**Total Credits**		**17**

Summer 1		
Course	**Title**	**Wt.**
ARAB 201	Arabic 1	3
GENG 204	Engineering Economics	3
MATH 210	Linear Algebra	3
Total Credits		**9**

Second Year					
Fall 2			**Spring 2**		
Course	**Title**	**Wt.**	**Course**	**Title**	**Wt.**
MATH 211	Discrete Structures	3	CIVL 201	Civilizations 1	3
GENG 202	Statics	3	GENG 203	Dynamics	3
EENG 202	Analog Signal Processing	3	GENG 207	Probability & Statistics	3
EENG 251	Power and Machines	3	EENG 201	Electronics	3
EENG 251L	Power and Machines Laboratory	1	EENG 201L	Electronics Laboratory	1
XXXX XXX	Free Elective	3	EENG 232	Signals and Systems	3
Total Credits		**16**	**Total Credits**		**16**

Summer 2		
Course	**Title**	**Wt.**
CIVL 202	Civilizations 2	3
MATH 213	Numerical Methods	3
COMM 201	Communication Elective (Public Speaking)	3
Total Credits		**9**

Third Year					
Fall 3			**Spring 3**		
Course	**Title**	**Wt.**	**Course**	**Title**	**Wt.**
MNGT 201	Principles of Management & Organizational Behavior	3	GENG 214	Engineering Ethics, Leadership & Professionalism	3
GENG 211	Material Science	3	GENG 208	Thermodynamics	3
EENG 211	Fundamentals of Microcontrollers	3	EENG 222	Communication Systems	3
EENG 221	Electromagnetics	3	EENG 222L	Communication Systems Laboratory	1
EENG 241	Control Systems	3	EENG 242	Instrumentation	3
EENG 241L	Control Systems Laboratory	1	EENG 242L	Instrumentation Laboratory	1
BCOM 300	Workplace Etiquette (Mandatory Workshop)		EENG 253	Power Systems Analysis	3
Total Credits		**16**	**Total Credits**		**17**

Summer 3		
Course	**Title**	**Wt.**
EENG 290	Professional Internship	
Total Credits		

Fourth Year					
Fall 4			**Spring 4**		
Course	**Title**	**Wt.**	**Course**	**Title**	**Wt.**
GENG 216	Engineering Management & Public Policy	3	SOCL 210	Globalization & World Cultures	3
EENG 291	Final Year Project I	1	EENG 292	Final Year Project II	3
EENG 212	Digital System Design	3	EENG 203	Advanced Electronics	3
XXXX XXX	Engineering Elective 1	3	XXXX XXX	Engineering Elective 3	3
XXXX XXX	Engineering Elective 2	3	XXXX XXX	Engineering Elective 4	3
GENG XXX	General Engineering Elective	3			
Total Credits		**16**	**Total Credits**		**15**

EENG Technical Elective Courses

Course Details		Cr.
EENG 223	Wireless Communication	3
EENG 224	Digital Communications	3
EENG 225	Communication Networks	3
EENG 233	Digital Signal Processing	3
EENG 252 *	Renewable Energy Engineering	3
EENG 254	Power Electronics	3
EENG 293	Honor Thesis	3
EENG 255	Special Topics in Electrical Engineering	3
EENG 256	Energy Efficiency	3
MENG 235	Mechatronics	3
MENG 245 *	Energy Engineering	3
* Electrical and communication engineering students are not allowed to register in both EENG252 and MENG245. They can only choose either of these two courses.		

EENG Course Description

Circuits & Electronics Engineering

EENG 201. Electronics – 3 cr.
This course is an introduction to semiconductors and their junctions, diodes, transistors (BJT and MOSFET), as well as their applications in active circuits (such as amplifier circuits or switch circuits). **Prerequisites: EENG 202 or both GENG 210 and MATH 212**

EENG 201L. Electronics Laboratory – 1 cr.
This is a laboratory course that complements the electronics course. It includes experiments covering both Circuits and Electronics Courses: Voltage and current dividers, Thevenin and Norton equivalent circuits, sinusoidal waveforms and their properties, RLC circuit responses, and transistor and diode circuits. **Corequisite: EENG 201**

EENG 202. Analog Signal Processing – 3 cr.
This is a fundamental course in Electrical Engineering following the Circuits course. It covers the op-amp, combinations of RLC circuits, and their steady-state and transient response, as well as natural and forced response. It also covers frequency transformations, such as Laplace and Fourier, as well as their applications in circuits Analysis**. Prerequisite: GENG 210**

EENG 203. Advanced Electronics – 3 cr.
This course addresses advanced topics in electronics not covered in course (electronics) such as A/D converters, power converters, PLLs, oscillators, and RF circuit design and measurements.
Prerequisites: EENG 201 and EENG 202

Computer Engineering

EENG 211. Fundamentals of Microcontrollers – 3 cr.
This course covers the hardware and software organization of a typical microcontroller, programming in C, interfacing with peripheral devices, input-output programming, interrupts, A/D converters, DSP operations, and real-time applications. **Prerequisite: GENG 212 or CMPS 200**

EENG 212. Digital System Design – 3 cr.
This introductory course to digital systems covers combinational and sequential circuit design, synchronous and asynchronous systems, comparison of standard and programmable logic devices and ICs, finite state machines, and introduction to CAD software (such as VHDL). **Prerequisite: GENG 210**

Communication Engineering

EENG 221. Electromagnetics – 3 cr.
This course covers fundamentals electromagnetics laws, properties of electromagnetic waves, Maxwell's equations, plane wave propagation, and transmission lines. **Prerequisites: GENG 210 and MATH 212**

EENG 222. Communication Systems – 3 cr.
This course exposes the students to the fundamentals of electronic communication systems: Characteristics of transmitters and receivers, the frequency spectrum, modulation techniques, and electrical noise. Students are expected to interpret digital and analog communication circuit diagrams, as well as analyze, design and test transmitter and receiver circuits. **Prerequisite: EENG 232**

EENG 222L. Communication Systems Laboratory – 1 cr.
This laboratory course supports the Communications Systems Course. It covers the fundamentals of communications: modulation and demodulation techniques (AM and FM), sampling and quantization. It also covers digital modulation and demodulation techniques, and inter-symbol interference. **Corequisite: EENG 222**

EENG 223. Wireless Communication – 3 cr.
This course covers the fundamentals of wireless communications, and provides an overview of existing and emerging wireless communications networks. Topics covered include: channel modeling, digital modulation, channel coding, and multiple access techniques. **Prerequisite: EENG 222**

EENG 224. Digital Communications Course – 3 cr.
This course covers the theoretical and practical fundamentals of digital communications, including digital baseband communications, system building blocks, filter matching, digital modulation techniques, spread spectrum analysis, channel coding and channel capacity (such as linear and convolutional codes), AWGN channels, and Nyquist criterion. In this course, students use relevant software, such as Matlab and Simulink, to demonstrate digital communication systems. **Prerequisite: EENG 222**

EENG 225. Communication Networks – 3cr.
This introductory course on data communication networks delves into fundamental concepts encompassing network topologies, protocols, socket programming, and explores emerging trends within the field. It covers a spectrum of topics including network protocols, circuit and packet switching, routing, and congestion control. Additionally, the course explores local area networks, the 7-layer model, TCP service protocols, and internetworking. Alongside these established topics, students are exposed to emerging areas such as software-defined networking, providing a comprehensive understanding of evolving network landscapes. **Prerequisite: GENG 212 and EENG 212.**

Signal & Systems Engineering EENG

232. Signals & Systems – 3 cr.
This course introduces signals and systems (especially linear, time-invariant systems) and their properties, sampling, transforms, stability analysis, and convergence. Signal transmission and reception arealso covered, including noise, performance, and interference. **Prerequisite: EENG 202**

EENG 233. Digital Signal Processing – 3 cr.
This course covers the fundamentals of digital signal processing: sampling and reconstruction, quantization, properties of discrete-time systems, A/D and D/A conversion, discrete-time Fourier analysis, and digital filter design. **Prerequisite: EENG 202**

Instrumentation & Control Engineering

EENG 241. Control Systems – 3 cr.
This course covers the mathematical principles of control systems: Modeling of linear, time-invariant continuous systems, transfer functions, open and closed loop state-space models, system stability, and feedback. **Prerequisite: EENG 232**

EENG 241L. Control Systems Laboratory – 1 cr.
This laboratory course supports the control systems course. Covers different types of control systems (On/Off, PD, PI, PID), designing controllers depending on applications, simulating system response, and experimentally demonstrating stability and output of different control systems. **Corequisite: EENG 241**

EENG 242. Instrumentation – 3 cr.
This design course covers various sensors used in the industry, their integration into instrumentation systems, and data acquisition methods. The emphasis is on industrial control and automation systems. **Prerequisite: EENG201 and EENG232**

EENG 242L. Instrumentation Laboratory – 1 cr.
This laboratory course supports the instrumentation course. Covers different types of sensors, their properties and limitations, industrial applications, and data acquisition. **Corequisite: EENG 242**

Power & Energy Engineering

EENG 251. Power & Machines – 3 cr.
This course covers fundamentals of AC machines: principles of magnetic systems, three-phase circuits, power calculation, transformers, synchronous generators, induction motors, including construction, principle of operation, testing, regulation, and efficiency. **Prerequisite: GENG 210**

EENG 251L. Power & Machines Laboratory – 1 cr.
This laboratory course supports the Power and Machines course. The experiments include single and three-phase transformers, open and short circuit transformer tests, synchronous generators and induction motors, including their operation and testing for torque, and power efficiency. **Corequisite: EENG 251**

EENG 252. Renewable Energy Engineering – 3 cr.
This course covers the different sources of renewable energy, such as solar energy, solar water heating, photovoltaic generation, wind power, hydropower, biomass, with analysis of various economic factors affecting adoption. **Prerequisite: EENG 251**

EENG 253. Power Systems Analysis – 3 cr.
This course covers principles of power systems, including transmission line, transformers, power compensation, load flow analysis, symmetrical components and fault analysis, line losses, and power flow analysis using Gauss-Seidel and Newton-Raphson methods. **Prerequisite: EENG 251**

EENG 254. Power Electronics – 3 cr.
This course covers applications of electronics to power conversion and control: Inverters, diode circuits, rectifiers, DC-DC, bridge converters, and PWM inverters. **Prerequisite: EENG 251**

EENG 256. Energy Efficiency – 3 cr.
This course aims to provide a comprehensive understanding of energy efficiency within the power sector, covering aspects related to generation, transmission, and consumption. Students will actively engage in case studies that delve into the practical application of modern energy-efficient design and operational considerations. The course encompasses topics such as utility companies and energy supply, energy sustainability, cogeneration systems including Combined Heat and Power (CHP) Plants and Combined Cycle Gas Turbines (CCGT), reciprocating engines, distributed generation, demand-side management, energy audit, smart grids, energy-efficient rotating machines, as well as design and performance optimization, all supported by relevant case studies. **Prerequisite: EENG 251**

Projects (Team / Individual) – Special Topic Courses

EENG 255. Special Topics in Electrical Engineering– 3 cr.
This course addresses advanced topics in electrical engineering. The topics varies to meet the market demands and comply with ABET requirements. The detailed course description will be available with the course offering. Prerequisite: Advisor's Consent.

EENG 290. Professional Internship.
This course encompasses an eight-week professional exposure in applications related to electrical and software engineering. Students become eligible to register for this course after completing 90 credit hours. **Prerequisites: EENG 201, EENG222, EENG 251, EENG241, BCOM 300, ENGL 202, COMM 201, and MNGT 201.**

EENG 291. Final Year Project I – 1 cr.
A group of engineering students are required to write a proposal for a capstone project under the guidance and approval of a faculty member. The group is expected to clearly define the project, state its objectives, complete a literature survey, and select a design method that will culminate in the actual construction of a product and/or the generation of an actionable plan in the subsequent semester. The criteria to evaluate project proposal include a substantive evaluation of proposal content, an ability to communicate effectively (both orally and in writing), and a keen awareness of project management skills, health, safety, social, economic and environmental impacts of their proposals. **Prerequisites: Senior Standing, Departmental Approval, EENG251, and either EENG222 or EENG241**

EENG 292. Final Year Project II – 3 cr.
This is a continuation to Final Year Project 1. Students will implement their proposals by taking into account the feedback offered by the faculty committee in Capstone Project 1. Students are expected to defend their product at the end of the semester to a committee, and submit a technical report and presentation. The criteria for evaluation of the Capstone Project 2 include a demonstration of strong technical knowledge, an ability to communicate effectively (both orally and in writing), a keen awareness of project management skills, an understanding of ethical conundrums in the context of a contemporary global world, and an ability to intertwine technological, economic, societal, ecological, legal and health issues. **Prerequisite: EENG 291**

EENG 293. Honor Thesis – 3 cr.
This course gives exceptional students the opportunity to work on a challenging research or industry project, where the outcome is either a research publication or industry prototype. **Prerequisite: EENG 290**

BCOM 300. Workplace Etiquette
This is a mandatory workshop that all students should successfully complete prior to their internships. The course comprises a series of workshops that focus on workplace etiquette and communication in formal and professional settings. In this course, students develop their business etiquette and professional practice skills in addition to their presentation skills so that they are well-equipped for their internships. **Prerequisite: ENGL 201**

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