



PHOENICIA UNIVERSITY

Innovation . Inspiration . Integrity

College of Engineering

Suggested Civil and Environmental Engineering Degree Plan

2023-2024

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 – 114 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 – 0 credit (Pass / Fail basis)*. The students are expected to have an eight-week of professional 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 following section.
- 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 covers the fundamentals of programming, starting with the language structure and best practices, arithmetic and operator precedence, input/output and reading from and writing to files, conditions, loops, functions, arrays, structures, and memory allocations. The focus is on using programming as a tool to solve Engineering problems.

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 (<i>concurrent prerequisite</i>)
CENG240	Hydraulics & Hydrology	GENG209
CENG260	Construction & Project Management	ENGL201 & GENG204
PENG202	Petroleum Geology	ENGL101 (<i>concurrent prerequisite</i>)

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 Civil & Environmental Engineering

The Department of Civil & Environmental Engineering was established in 2015 and offers a Bachelors of Engineering in Civil and Environmental Engineering.

The civil and environmental engineering program exposes the student to the salient sub-disciplines within the civil and environmental engineering profession, namely structural engineering, geotechnical engineering, transportation engineering, construction management, construction materials, environmental engineering, and water resources engineering. The students would be equipped with the robust skills to meet the local and global contemporary challenges inherent to the civil and environmental engineering profession.

CENG Program Educational Objectives

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

- PEO1. Contribute to the betterment of their communities through the practical application of the knowledge and skills gained through their degree.
- PEO2. Be effective team members, exhibiting progress towards becoming leaders, managers, and mentors.
- PEO3. Uphold the ethics of the profession through steadfast wisdom and determination even in the face of apathy.
- PEO4. Pursue lifelong professional development through continued learning, certification, licensure, and graduate studies.
- PEO5. Become advocates for sustainable standards and practices.

CENG 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	15 Credits
Science Courses	9 Credits
Total Core Math & Science Courses	24 Credits
Core General Engineering Courses	
GENG Courses	37 Credits
GENG Elective Courses	3 Credits
Total GENG	40 Credits
Civil & Environmental Engineering Courses	
Core Courses	38 Credits
Professional Internship	0 Credits
Capstone Project	4 Credits
Engineering Technical Electives	8 Credits
Total CENG Courses	50 Credits

Suggested Civil and Environmental 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	GENG 205	Engineering Drawings & Tools	3
GENG 202	Statics	3	GENG 203	Dynamics	3
MATH 201	Calculus & Analytical Geometry	3	MATH 212	Differential Equations	3
CHEM 201	General Principles of Chemistry	3	PHYS 201	Introduction to Physics	3
CHEM 202	Introduction to Chemical Laboratory Techniques	2	PHYS 202	Introduction to Physics Lab	1
Total Credits		17	Total Credits		16

Summer 1		
Course	Title	Wt.
ARAB 201	Arabic 1	3
GENG 204	Engineering Economics	3
GENG 212	Introduction to Engineering Programming	3
Total Credits		9

Second Year					
Fall 2			Spring 2		
Course	Title	Wt.	Course	Title	Wt.
MATH 210	Linear Algebra	3	CIVL 201	Civilizations I	3
GENG 207	Probability & Statistics	3	GENG 209	Fluid Mechanics	3
CENG 202	Geology for Engineering	3	GENG 209L	Fluid Mechanics Laboratory	1
GENG 206	Mechanics of Materials	3	GENG 210	Electric Circuit	3
GENG 208	Thermodynamics	3	GENG 211	Material Science	3
			CENG 220	Soil Mechanics	3
			CENG 220L	Soil Mechanics Laboratory	1
Total Credits		15	Total Credits		17

Summer 2		
Course	Title	Wt.
CIVL 202	World Civilizations II	3
MATH 213	Numerical Methods	3
CENG 231	Surveying	2
Total Credits		8

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
XXXX XXX	Free Elective	3	CENG 250	Construction & Transportation Materials	3
CENG 210	Structural Analysis	3	CENG 250L	Construction & Transportation Materials Laboratory	1
CENG 241	Environmental Engineering & Science	3	CENG 211	Concrete Design	3
CENG 241L	Environmental Engineering & Science Laboratory	1	COMM 201	Communication Elective (Public Speaking)	3
CENG 221	Foundation Engineering	3	GENG XXX	General Engineering Elective	3
BCOM 300	Workplace Etiquette (Mandatory Workshop)				
Total Credits		16	Total Credits		16

Summer 3	
Course	Title
CENG 290	Professional Internship

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
CENG 291	Final Year Project I	1	CENG 292	Final Year Project II	3
BIOL 201	General Biology	3	CENG 242	Water Supply & Waste Water Management	3
CENG 240	Hydraulics & Hydrology	3	XXXX XXX	Engineering Elective 1	2
CENG 230	Transportation Engineering	3	XXXX XXX	Engineering Elective 2	3
CENG 260	Construction / Project Management	3	XXXX XXX	Engineering Elective 3	3
Total Credits		16	Total Credits		17

CENG Technical Elective Courses

Course Details		Cr.
CENG 212	Steel Analysis & Design	3
CENG 213	Advanced Concrete Design	2
CENG 214	Advanced Structural Analysis	2
CENG 215	Bridge Design	3
CENG 216	Structural Dynamics	3
CENG 217	Finite Element for Civil Engineering	3
CENG 218	Structural Design Software	2
CENG 219	Special Topics in Civil Engineering	3
CENG 262	Advanced Scheduling	3
CENG 232	Pavement Design	3
CENG 243	Special Topics in Environmental Engineering	3
CENG 251	Advanced Mechanics of Materials	2
CENG 261	Project Financial Risk Management	3
CENG 293	Honor Thesis	3
MENG 214	Advanced Fluid Mechanics	3
MENG 225	Characterization & Properties of Materials	3
PENG 228	Corrosion in Oil & Gas Industry	3

CENG Course Description

Geology for Civil Engineering Courses

CENG 202. Geology for Engineering – 3 cr.

This course introduces the engineering students to the fundamentals of geology, including the classification of rocks and minerals, the natural processes influencing the nature of the earth structures, and geological phenomena of particular interest to engineering students. **Concurrent prerequisite: ENGL 101**

Structural Engineering Courses

CENG 210. Structural Analysis - 3 cr.

This course exposes the students to the analysis of idealized determinate and indeterminate structures using the elastic beam theory, principles of superposition and equilibrium equations. Some salient covered topics include moment area method, conjugate beam method, force method, slope-deflection method and moment distribution method. **Prerequisite: GENG 206**

CENG 211. Concrete Design – 3 cr.

This course exposes the students to both the analysis and design of reinforced concrete structures in flexure, shear, compression, torsion, and combined stresses using the ACI-318 code methodology.

Prerequisite: GENG 206

CENG 212. Steel Analysis & Design – 3 cr.

This course covers the analysis and design of steel tension members, compression members, beam members, and connections (bolted and welded) using LRFS and ASD methodologies. The course also introduces the students to linear and nonlinear steel structure theories and collapse mechanisms.

Prerequisite: GENG 206

CENG 213. Advanced Concrete Design –2 cr.

This course exposes the students to both the analysis and design of specialized reinforced concrete structures. Special emphasis is given to prestressed concrete as well as other reinforced concrete structures that are subjected to special loading conditions and production methods. **Prerequisite:**

CENG 211

CENG 214. Advanced Structural Analysis – 2 cr.

This course exposes the students to the stiffness method of analysis for trusses, beams and frames. In the process, the students are exposed to advanced topics in structural modeling using computer packages. **Prerequisite: CENG 210**

CENG 215. Bridge Design – 3 cr.

This course exposes the students to the analysis of existing bridges as well as the design of various bridge components to satisfy multiple loading conditions and serviceability requirements. **Prerequisite:**

CENG 210

CENG 216. Structural Dynamics – 3 cr.

The course introduces the students to structural systems with single and multi-degrees of freedom with vibration responses in free and forced modes. The course is a backbone to subsequent courses in earthquake engineering. **Prerequisite: CENG 210**

CENG 217. Finite Element for Civil Engineering – 3 cr.

The course exposes the students to the finite element modeling techniques using the fundamental concepts of stress and strain analysis. This course includes a significant practical computer application component to analyze a variety of continuous systems subjected to multiple loading, temperature, and boundary conditions. **Prerequisites: CENG 210 and MATH 213**

CENG 218. Structural Design Software– 2 cr.

This computer lab course exposes students to two common civil engineering structural design software packages: ETABS and SAFE. In this course, students explore the methods of importing plans, running structural analysis, setting parameters, running design analysis, and outputting results.

Prerequisite: GENG205

CENG 219. Special Topics in Civil Engineering – 3 cr.

This course covers topics of special interest in civil engineering. The topics may vary each time the course is offered and the content of the course will be made available with the course offering.

Prerequisite: Advisor's Consent.

Geotechnical Engineering Courses

CENG 220. Soil Mechanics – 3cr.

The course introduces the students to the characteristics and behaviors of soil materials. Topics presented include mechanical analysis of soil, gradation, weight-volume relationships, liquidity and plasticity, classification of soil, soil compaction, flow of water, permeability, effective stress, stresses in a soil mass, compressibility and consolidation, and shear strength. **Prerequisites: GENG 206; CENG202, and Departmental Approval**

CENG 220L. Soil Mechanics Laboratory – 1 cr.

The lab introduces the student to the measurements of moisture content, specific gravity, grain size distribution, liquid and plastic limit, compaction, soil consolidation test, and shear strengths using direct shear and triaxial tests. **Corequisite: CENG 220**

CENG 221. Foundation Engineering – 3 cr.

The course exposes the students to the design and analysis of shallow foundations, mat foundations, lateral earth pressure, and retaining walls. **Prerequisite: CENG 220**

Transportation Engineering Courses

CENG 230. Transportation Engineering – 3 cr.

The course introduces the student to highway engineering and traffic analysis to satisfy various functional and socio-economic underpinnings. Examples of covered topics include vehicle road performance, geometric design (horizontal and vertical curves), traffic flows, highway capacity, traffic intersection, and other relevant topics in traffic control and forecasting.

CENG 231. Surveying – 2 cr.

The course introduces the students to practical and hands-on experience related to distance, level and angle measurements that are relevant for a variety of engineering applications. The course integrates field surveys with AutoCAD tools to efficiently process surveying data. The course also uses statistical techniques to estimate measurement errors.

CENG 232. Pavement Design – 3 cr.

The course exposes the students to the fundamental design and analysis of flexible and rigid highway pavements, including special considerations for drainage systems, pavement distress, and pavement repair measures.

Environmental & Water Engineering Courses**CENG 240. Hydraulics & Hydrology – 3 cr.**

The first half of the course introduces the students to the fundamental theories of hydraulics (e.g., energy principle, flow in conduits, varied flows in open channels) and their design applications under various flow conditions. The second half of the course exposes the students to the fundamental concepts in hydrology (e.g., hydrological cycles, surface water hydrology and certain aspects of groundwater hydrology) to design drainage and retention systems. **Prerequisite: GENG 209**

CENG 241. Environmental Engineering & Science – 3 cr.

The course exposes the students to the scientific analysis of environmental engineering problems related to water, land, and air and the subsequent development of traditional and non-traditional engineering solutions to such problems (such as sustainable energy strategies and pollution control technologies) while accounting for technological, ecological, economic, social, legal and political considerations.

Prerequisite: CHEM 201

CENG 241L. Environmental Engineering & Science Laboratory – 1 cr.

The lab introduces the students to the measurement of water, air, and land pollution. The students are expected to carry their experimentations in the lab or in-situ. **Corequisite: CENG 241**

CENG 242. Water Supply & Waste Water Management – 3 cr.

The course exposes the students to the fundamentals of water quality and distribution systems, as well as the analysis and design of wastewater collection systems, water and wastewater treatment technologies and design strategies. **Prerequisite: CENG 241**

CENG 243. Special Topics in Environmental Engineering – 3 cr.

This course focuses on integrated solid waste management. Topics covered include principles, practices and techniques for the management of solid wastes: sources, composition, properties, impacts, generation, storage, collection and transport, processing, resource recovery, and disposal.

Prerequisites: Senior Standing and CENG 241

Materials Engineering Courses

CENG 250. Construction & Transportation Materials – 3 cr.

This course introduces the students to the properties, behaviors and quality assurance of various materials needed to effectively and efficiently select materials for construction and transportation systems, including building materials, pavement materials, as well as materials relevant to specialized civil engineering applications such as highways, bridges, tunnels, dams and runways. **Concurrent prerequisite: GENG 211**

CENG 250L. Construction & Transportation Materials Laboratory – 1 cr.

The lab exposes the students to hands-on experience on investigating the mechanical and durability properties, as well as the strength behaviors, of construction and transportation materials under various production processes, loading conditions, and environmental conditions. **Corequisite: CENG 250**

CENG 251. Advanced Mechanics of Materials – 2 cr.

The course introduces the students to specialized topics in mechanics of materials, including the analysis of asymmetric beams, curved beams, prismatic elements, thick-walled cylinders and other advanced topics in applied elasticity. **Prerequisite: GENG 206**

Construction & Project Management Courses

CENG 260. Construction & Project Management – 3 cr.

The course exposes the student to the various phases of the construction process from its inception to its successful completion and operation. Topics covered include: project feasibility study, project organizational structures, contracting pricing schemes, cost estimating, contracts and specifications, project scheduling, construction productivity, cost control, quality control and construction safety. **Prerequisites: ENGL 201 and GENG 204**

CENG 261. Project Financial Risk Management – 3 cr.

The course introduces the students to advanced topics in project and corporate finance, including economic valuations of levered and unlevered projects, the use of advanced financial modeling techniques, and the use of sophisticated risk management tools to assess the economic viability of a megaproject with high levels of uncertainties. **Prerequisite: CENG 260**

CENG262. Advanced Scheduling– 3 cr.

This course focuses on scheduling techniques, including the Critical Path Method (CPM), Line of Balance (LOB), resource leveling, multiple activity crashing, delay determination, and controls. The course introduces students to using scheduling software to create and track a project, allocate resources and costs, and conduct schedule controls. **Prerequisite: CENG260**

Projects (Team / Individual) / Special Topic Courses

CENG 290. Professional Internship

The students are expected to have an eight-week of professional training in an area related to civil engineering. Students become eligible to register for this course after completing 90 credit hours.

Prerequisites: CENG 210, CENG 220, CENG 241, CENG 250, BCOM 300, ENGL 202, COMM 201, and MNGT 201.

CENG 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(s) 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 the project proposal include a substantive evaluation of the proposal and the preliminary design 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, CENG210, CENG211, CENG220, CENG241, and Departmental Approval**

CENG 292. Final Year Project II – 3 cr.

This is a continuation of the 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: CENG 291**

CENG 293. Honor Thesis – 3 cr.

The honor thesis course is to give opportunities to outstanding students to work on a challenging research or industry project, where the outcome is either a research publication or an industry prototype and/or a professional report. **Prerequisite: CENG 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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