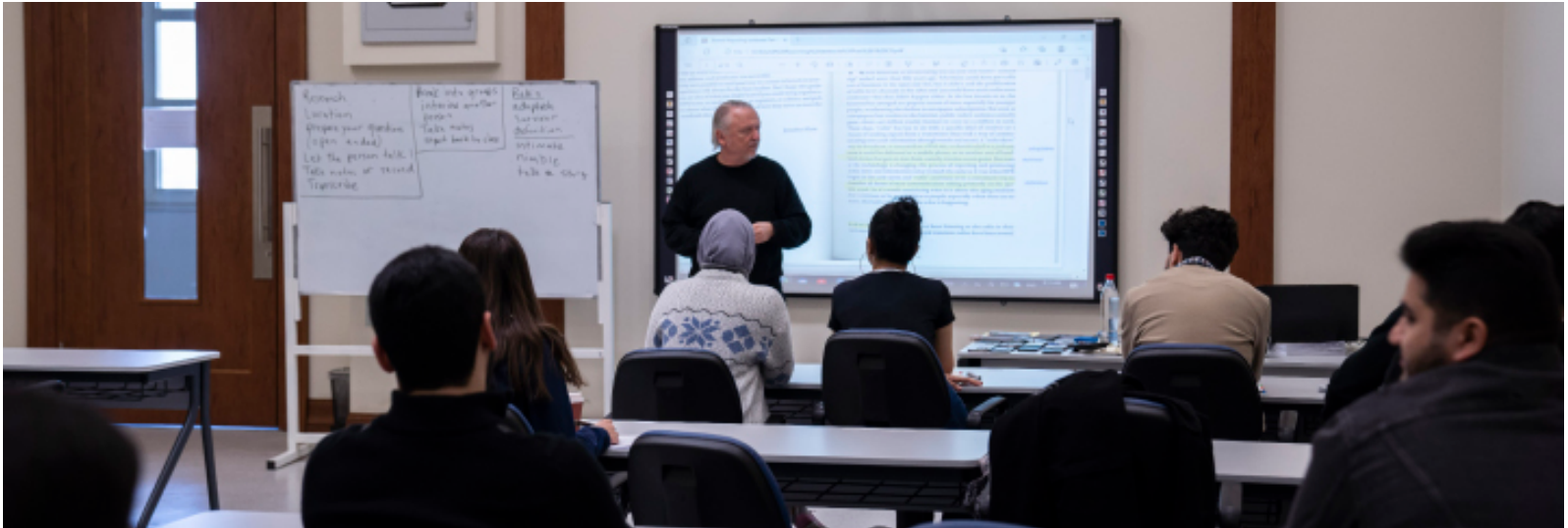




THE AMERICAN UNIVERSITY OF  
**KURDISTAN**



THE AMERICAN UNIVERSITY OF KURDISTAN  
**COURSE DESCRIPTIONS**  
2023 - 2024



## AUK COURSE DESCRIPTIONS

### ■ A

#### **ACCT2318 Principles of Accounting**

**3 credits**

Teaches and develops an understanding of accounting concepts, principles, procedures, and systems for preparation of financial statements, knowledge of computer-based accounting applications, accounting treatment of current assets, liabilities, tangible and intangible assets, and owner's equity. The aim is to develop knowledge and understanding of the underlying principles and concepts relating to financial accounting and technical proficiency in the use of double entry accounting techniques including the preparation of basic financial statements. Students should become adept at classifying problems, situations and applying the required accounting principles. Fall. Prerequisites: MGMT1314.

### **ACCT2321 Financial Accounting**

**3 credits**

Combines two intermediate financial accounting subjects and builds on the foundation laid in the principles of accounting course to better equip students with the required techniques in preparing and interpreting financial statements. It examines basic financial accounting concepts and concentrates on recording and reporting significant asset side balance sheet entries. It will examine the conceptual framework of accounting and financial statement presentation and further aid managerial decision-making. Thus, it provides the prerequisite knowledge that will prepare students for advanced accounting courses. Students shall adept at classifying problems, situations and applying the required accounting knowledge. Spring. Prerequisite: ACCT2318.

### **ACCT3324 Cost Accounting**

**3 credits**

Used in manufacturing, merchandising, and services for internal and external reporting and managerial decision-making. The course aims to teach students cost accounting fundamentals and data analysis and creation of reports for managerial decision making. The lecturer and students collaborate to identify areas that need clarification for achievement. Classes should be proactive and interactive. Visual presentations and classroom discussions will aid course understanding of various topics. A significant number of mathematical problems will be solved to understand the subject effectively. Fall. Prerequisites: ACCT2321.

### **ACCT4331 Introduction to External Auditing**

**3 credits**

Comprises a fundamental component of the recurrent and strategic activities of nearly all professional occupations. While a group of jobs focus exclusively on external audit tasks, the majority of commerce graduates will utilize the principles and practices of risk assessment, internal control, systems evaluation and forensic accountability in their professional lives. This course thus aims to introduce the principles and practices of external auditing. In this context, it will also outline and critically examine contemporary audit issues and challenges. Fall. Prerequisites: ACCT 2318, ACCT232.

### **ACCT4332 Strategic Managerial Accounting**

**3 credits**

Provides key data to managers for planning and controlling, as well as data on costing products, services, and customers. By focusing on basic concepts, analyses, uses, and procedures instead of procedures alone, we

recognize cost accounting as a managerial tool. This course will present and analyze a framework for creating a value-based performance management system. The main aim of the course is to raise participants' awareness to the best practices and latest developments in performance management accounting and to illustrate real-life uses of the changing nature of accountancy in the organization. Fall. Prerequisites: ACCT3324.

### **ACCT4336 Accounting for Mergers, Acquisition**

**3 credits**

Master the intricacies of consolidation and merger, parent-subsidary relationships, and consolidated statements in Accounting for Merger and Acquisitions (ACCT 438). This course delves into the accounting complexities associated with business combinations and the preparation of consolidated financial statements, guided by IFRS 10. It aims to enhance the relevance, representational faithfulness, and comparability of financial reporting in conveying comprehensive information about business combinations and their impact. Additionally, it explores partnership accounting, covering formation, operational accounting, changes in ownership interests, limited partnerships, and dissolution procedures. Further, it gains a comprehensive understanding of essential accounting domains. Prerequisites: ACCT2318, ACCT2321. Spring.

### **AENG1305 Basic Design**

**3 credits**

Basic Design Studio I- Introduces students to understand design basics and express ideas coherently to communicate design fundamentals, particularly in architecture. Learn the design elements and principles that apply. Elements, including line, value, color, texture, shape, size, and direction, are analyzed in both theatrical and practical aspects. Principles including unity, conflict, dominance, repetition, harmony, balance, and gradation are applied to integrate theories into design solutions. Students are also introduced to visual elements such as points and lines, shape and mass, texture, light, color, and space. Students must apply concepts learned from research and course lectures to create 2D and 3D compositions. Fall.

### **AENG1306 Architecture Drawing I**

**3 credits**

This course introduces students to the fundamentals of drafting; it examines the use of drafting equipment, multi-view drawing techniques, simple architectural construction, pictorial representation, and notation. The course includes drafting fundamentals, lettering, geometric construction, orthographic projection, isometric Drawing, dimensioning, and sectional views. Fall.



### **AENG1310 Architectural Design I**

**3 credits**

This studio course builds on Basic Design and satisfies the three-credit hour specialization requirement and specific requirements for programs outlined in the AUK Undergraduate Catalog. The course includes elementary architectural design practical exercises and texts from books, architecture periodicals, and internet publications. The texts are designed to develop students' ability to deal with fundamental architectural design principles and increase their basic knowledge and understanding of architectural engineering design. Other topics included primary elements, forms, and shapes in architecture, basic rules of order, grouping and composition, and basic rules of harmony, scale, and transformation forms. Toward the end of the course, students are given a design exercise that is less abstract and more realistic--involving space planning, Programming, functional relationships/ bubble diagrams, circulation, and building construction. Prerequisites: AENG1305, AENG 1306. Spring.

### **AENG2304 Architecture Drawing II**

**3 credits**

The course has been formulated to explain advanced architectural drawing techniques to students. Fundamentally, it has been designed to teach AutoCAD software parallel with conventional drawing techniques. Students, through the course, will explore standard techniques of converting complicated architectural forms to plans, sections, elevations, and isometrics while obtaining the required drafting/drawing skills. Revit's introduction allows new drawing skills, including rendering, concepts of light and shadow, and perspective drawing. Prerequisite: AENG1306. Fall.

### **AENG2305 Architecture Design II**

**3 credits**

The course includes an introduction to architecture function by focusing on functional relationships in a simple domestic project (house), teaching students how to fulfill space requirements reflected in a final design on a specific site. The student will be introduced to basic construction, simple structural principles (load-bearing walls and skeleton systems), and information regarding international architectural standards (e.g., Neufert's Architectural Standard). The student will be required to understand domestic form by studying similar examples/ precedents, working on the design process in-studio class and at home, and considering design as a problem-solving process. Drawings will be rendered by hand and digitally. Prerequisite: AENG1310. Fall.

### **AENG2309 Design III:3D Design**

**3 credits**

This studio course satisfies the three credit hours of specialization requirement and meets specific requirements for programs as outlined in the AUK Undergraduate Catalog. It is a continuation of ARCH 203 with an emphasis on synthesizing essential form determinants of sustainable, medium-sized, mixed-use, multi-story public buildings (in this case, a museum/gift-book-convenience shop/ gallery/visitors' center/café-restaurant/curatorial offices and labs-workshops for AUK). Students will demonstrate competence in basic architectural design, digital drafting, and preparedness for the third-year focus on building construction materials and methods. Students must bring a laptop computer to this class and work in the studio. Prerequisite: AENG2305. Spring.

### **AENG2312 Freehand Architectural Drawing**

**3 credits**

This studio course will enhance visualization abilities towards effective 2D and 3D freehand graphic representation and design communication and includes in-class drawing exercises, lectures/videos/demonstrations, and out-of-class assignments. A sketchbook is required and to be submitted at the end of the semester. Various freehand drawing styles, mediums and techniques will be explored. While dependence on digital drawing is increasing in the architectural design field, freehand drawing and sketching remain critical to conceptual design thinking and communication. Spring. Prerequisite: AENG1305.

### **AENG3304 Design IV – Lighting Design and Analysis**

**3 credits**

This studio course builds on previous architectural design studio courses and related engineering, environmental, and drawing coursework. The students are introduced to lighting design through lectures, a studio project including exterior and interior lighting systems, and student PPT presentations/research. Final project renderings will be produced digitally, including complex lighting systems and analyses. Day and night, shade and shadow, comfortable levels of office/residential/commercial lighting, ornamental lighting, natural lighting, new and sustainable lighting technologies, the impact of climate and season on lighting, and light as a medium. Prerequisite: AENG2309. Fall.

### **AENG3306 Architecture Culture, Community and Climate**

**3 credits**

The course includes an introduction to architecture as a cultural form and a fulfillment of the community's needs,

and includes practical exercises and texts of particular topics from books, architecture periodicals, and internet publications. Reading these texts will help develop student understanding regarding the relationships mentioned above. The course covers culture, culture forms, sub-cultures, architecture as a cultural form, Kurdish culture, community, community types and phases, the sense of community index, climatic influences, and settlements. By the end of the course, the student will understand that architecture involves a permanent manifestation of culture and the fulfillment of community needs. This course satisfies the specialization requirement of three credit hours and meets specific requirements for programs as outlined in the AUK Undergraduate Catalog. Prerequisite: COMM1301. Fall.

### **AENG3307 LEED Lab I**

**3 credits**

LEED Lab I is a multidisciplinary immersion course that utilizes project-based learning and the built environment to educate and prepare students to become green building leaders and sustainability-focused citizens. In the course, students assess the performance of existing facilities on campus and choose one building where they will facilitate the LEED for Building Operations and Maintenance (LEED O+M) process to certify the facility. LEED Lab connects concepts to practical application by immersing students in the integrative process foundational to green buildings. In this innovative course, students. Students learn about LEED's comprehensive approach, covering the prerequisites and credits related to site considerations, energy use, water consumption, waste management, and occupant comfort. Students assess the performance of existing facilities on campus and choose one building where they will facilitate the LEED for Building Operations and Maintenance (LEED O+M) process to certify the facility.

### **AENG3308 Design V- Perspective and Shadow**

**3 credits**

This studio builds on and integrates previous studios and coursework and involves designing complex architectural projects situated in challenging urban contexts (e.g., former war zones), developed concerning the program, climate, culture, site, building, and representation. In addition to the expected deliverables, the final project requires digital animation and public participation to focus on sustainability and equity. Prerequisite: AENG3304. Spring

## **AENG4206 LEED LAB II**

**2 credits**

In the second section of the LEED Lab course, the students are prepared to sit for the LEED AP O+M professional credential exam. LEED Lab meets the needs of the building industry by equipping students with the skills, knowledge, and expertise required to be effective communicators, project managers, critical thinkers, problem solvers, engaged leaders, and team players.

. Prerequisites: AENG3307. Spring.

## **AENG4288 Internship for Architecture Engineers**

**2 credits**

The Department will set up and oversee this opportunity to work at architectural engineering, architecture, or engineering firm for the semester in conjunction with coursework. A final student report will be required. International opportunities may be considered after completing six weeks. Spring.

## **AENG4301 Structural Systems and Analysis**

**3 credits**

This course introduces analyzing structural elements subjected to transverse and axial loads. It builds on prior knowledge of the mechanics of materials. This course provides foundation knowledge, skills, and application relevant to subsequent courses in designing steel and concrete structures. Topics include the Classification of Structural Systems, Loads, Truss Analysis, Shear and Moment Diagrams, Deflection of Beams, and Analysis of Indeterminate Structures. Prerequisite: GENG3303. Fall.

## **AENG4302 Construction Project Management**

**3 credits**

This course offers various project delivery methods such as; Design-Bid-Build, Design-Build, and Construction Management and the underlying principles for choosing the appropriate system. The management and administration skill improvement can allow students to exercise various topics such as; the preconstruction process's complexity, conceptual estimating and scheduling, life cycle costing, constructability reviews, value engineering, risk management, and special contract requirements of a construction project. Prerequisite: MGMT1314.



### **AENG4303 Building Technology: Materials and Methods**

**3 credits**

This course has been formulated to introduce students to the most commonly utilized materials to construct buildings and explain their properties, ingredients, and classifications. Fundamental structural, physical, and long-term performance principles are also explained and discussed. Additionally, the course provides basic information about main building elements, their type, functions, and an overview of various construction systems. Prerequisite: AENG1305. Fall.

### **AENG4304 Architecture Design VI – Architecture Sustainability**

**3 credits**

This studio focusing on sustainability builds on and integrates previous studios and current coursework (Green Buildings) and involves designing complex architectural projects situated in challenging contexts and developed concerning the program, climate, culture, site, building, and representation. In addition to the expected deliverables, the final project requires digital animation and public participation to focus on sustainability, environmental impact, and equity. Prerequisite: AENG3308. Spring.

### **AENG4305 History of Architecture I**

**3 credits**

This course satisfies the three credit hours of specialization requirement and meets specific programs outlined in the AUK Undergraduate Catalog. The course includes an introduction to Ancient History of Architecture, concentrating on prehistoric architecture and main Mesopotamia, Egypt, Greek, and Roman architecture, allowing students to understand how culture impacts and informs architecture and how to read historical architectural forms of cultural values. This introduction includes practical exercises and selected texts from books, architecture periodicals, and internet publications. The texts are designed to develop student appreciation of architecture's history as a precedent for future development. By the end of the course, the student will understand that architecture is one of the most permanent manifestations/reflections of history. Prerequisite: AENG3306. Fall.

### **AENG4307 Architecture Analysis I: Buildings and Drawings**

**3 credits**

This course analyzes individual architects' remarkable buildings and works by exploring drawings and built forms, historical and contemporary, through field trips, videos, photography, discussion, and documentation. Internationally recognized architects, buildings, and movements that have influenced architecture development

will be studied in detail—evaluating design significance through comparative research and writing. The final project consists of a building analysis through drawings, text, a bibliography, and a physical model in a poster format for the exhibition. Prerequisite: AENG4303. Spring.

### **AENG4308 History of Architecture II**

**3 credits**

This course satisfies the three credit hour specialization requirements and meets specific programs outlined in the AUK Undergraduate Catalog. The course continues from History of Architecture I and covers a broad chronological spectrum and contemporary international architecture. Allowing students to understand how culture impacts and informs architecture and reading historical architectural forms in terms of cultural values. This introduction includes practical exercises and selected texts from books, architecture periodicals, and internet publications. The texts are designed to develop student appreciation of architecture's history as a precedent for current and future development. Prerequisite: AENG4305. Spring.

### **AENG4309 Architecture Design VII – Urban Design**

**3 credits**

This studio course will explore the fundamentals of urban design concerning the built environment – focusing on a local “live project” urban design initiative (e.g., integration of a refugee or IDP camp to its broader urban context or the adaptive re-invention of a demolished city block). Prerequisite: AENG4304. Spring.

### **AENG4312 Construction Safety**

**3 credits**

This course introduces occupational safety hazards associated with the construction industry. Emphasis is placed on recognizing, evaluating, and controlling safety hazards, mainly related to the Occupational Safety and Health Act. Prerequisite: AENG4303.

### **AENG4313 Construction Methods**

**3 credits**

Theory and practice of equipment utilization and construction methods. Analysis of costs through production rates. Optimizing crew and equipment. Labor and heavy equipment production. Earthwork (site work) execution methods and inspection. Prerequisite: AENG4303.

**AENG4314 Construction Estimation****3 credits**

This course covers principles and practices in making quantity surveys and labor estimates for construction projects. (Basic Estimating in Residential, Commercial, and Heavy Civil). Prerequisite: MATH1322.

**AENG4315 Geotechnical Engineering****3 credits**

Composition, engineering properties, and behavior of soils. Principles of soil mechanics. Experimental determination of engineering classification, strength, and deformation characteristics of natural and artificially placed soils. Prerequisite: AENG4303.

**AENG4316 Advanced Reinforced Concrete Design****3 credits**

Theory and design of two-way slabs, footings, retaining walls, shear walls, and composite beams using ultimate strength design. Precast and prestressed concrete fundamentals. Prerequisite: AENG5305.

**AENG4317 Foundation Engineering****3 credits**

This course focuses on the structural analysis and design of shallow and deep foundations. Topics include single footing, combined footing, strip footing, mat foundation, and piles. Prerequisite: AENG4315.

**AENG4318 Advanced Steel Structure Design****3 credits**

Advanced structural steel design topics: thin-walled rolled and built-up members, beam-columns, lateral-torsional buckling, steel fatigue design, connection details, and steel design project. Prerequisite: AENG5308.

**AENG5302 Architectural Technology****3 credits**

This course examines building construction from the perspectives of health and life safety (including zoning, fire regulations, and international building code), security, building service systems (HVAC: plumbing, electrical, heating, air conditioning, ventilation, vertical circulation, fire protection), sustainability, materials, structural components, life-cycle analysis, accessibility, technical documentation and outline specifications, POE (post-operative evaluation). Prerequisite: AENG4303. Fall.

### **AENG5303 Architectural Analysis II: Architecture, City, and Landscape**

**3 credits**

This course builds on and continues from Architectural Analysis I with a broader purview, including architecture, urbanism, and landscape design. Analysis through an exploration of drawings, aerial photography, videos, and built form. Comparative historical and contemporary urban patterns, city planning, field trips, discussion, documentation, and classic texts. Evaluation through research, student PPT presentations, and writing. Architecture within and around the city, suburbia, urban and landscape theories/designs, and an interdisciplinary study of mixed-media representations of the city, garden, and urban landscape. Prerequisite: AENG4301. Fall.

### **AENG5305 Design of Structural Elements I: Concrete**

**3 credits**

This class will introduce the students to the fundamentals of reinforced concrete design following ACI 318 Code. Topics include Flexural analysis and reinforced concrete beams for rectangular beams and T-beams, shear and diagonal tension, serviceability, bond, anchorage and development length, short and slender columns, slabs, footings, and retaining walls, including computer applications. Prerequisite: AENG4301. Fall.

### **AENG5307 Landscape Design**

**3 credits**

This introductory course involves lectures, reading, and problem-solving studio exercises to give an overview of historical, cultural, and technical aspects of the art and science of planning/designing on the land, arranging, and creating spaces and objects to complement built form. The course will also explore how the site, climate, environment, and legislation affect the design process. Topography, grading and surveying techniques, plant identification, characteristics, hardscape, softscape, vegetal landscaping, and vertical farming will be considered. Prerequisite: AENG2309.Spring.

### **AENG5308 Design of Structural Elements II – Steel**

**3 credits**

This course covers structural steel design concepts and is designed to introduce steel structure members' behavior and design using the LRFD method under the AISC Steel Construction Manual. Topics include the design of tension and compression members, beams, beam-columns, eccentric and straightforward connections, composite construction, plate girders, and computer applications. Prerequisite: AENG5305. Spring.

### **AENG5310 Construction Planning and Control**

**3 credits**

This course applies the critical path method and program evaluation review technique to construction planning, scheduled vs. actual job expenditures, cost forecasting, and development of unit prices from field data. Prerequisite: MGMT1314.

### **AENG5311 Construction Techniques**

**3 credits**

The course offers to teach vertical construction process, including wooden platform frame construction, cast-in-place, pre-cast concrete construction, and steel erection, including masonry construction, interior, and exterior finishes, vertical transportation systems, roofing, and other building components. Prerequisite: AENG4302.

### **AENG5312 Project Scheduling**

**3 credits**

Students will learn the fundamental project scheduling techniques and procedures, including; creating a network diagram, defining the importance of the critical path in a project network, and defining project activities float. Moreover, fundamentals of Bar Charts, Gantt Charts, Precedence Diagrams, Activity on Arrow, PERT, Range Estimating, linear project operations, and the line of balance are covered. Prerequisites: AENG4302 and AENG4313.

### **AENG5313 Project Performance Measurement**

**3 credits**

The course aims to determine the importance of project value and understand how to work with stakeholders to define, measure, and report project performance in achieving the desired value. Topics include Understanding Project Success and Failure, Value-Driven Project Management, Managing Uncertainty, Stakeholders and Effective Communications, and Monitoring Performance. Prerequisites: MATH1322 and AENG4303.

### **AENG5314 Structural Engineering CADD**

**3 credits**

This course focuses on using computer programs in structural design and drafting. Software used includes AutoCAD, SAP 2000, ETABS, Autodesk Robot Structural Analysis, Advanced Steel, and Advanced Concrete. Prerequisites: ARCHE2304, AENG5305, ARCHE5308



**AENG5315 Design of Pre-stressed Concrete Structures****3 credits**

The course estimates various structural members' capacities, such as beams and columns, and their response to various structural actions, such as flexure, vertical shear, horizontal shear, and combined axial and flexure loads. Performance at service is discussed regarding stresses, deflections, and crack control. The principle and methods of pre-stressing are also discussed, including approaches for computing pre-stress losses. Prerequisite: AENG5305

**AENG5316 Intermediate Structural Analysis****3 credits**

Effect of axial loads on the stiffness of flexural members. Buckling of trusses and rigid frames. Matrix method of analysis. Complex structures. Computer applications. Prerequisite: AENG4301

**AENG5317 Finite Element Analysis****3 credits**

Matrix structural analysis, discretization of continuous structural systems, stress analysis. Commercial finite element software preprocessing for developing finite element models; post-processing for evaluating analysis results. Prerequisites: MATH3202.

**AENG5390 Capstone Project I****3 credits**

This studio focusing on sustainability builds on and integrates previous studios and current coursework and involves designing complex architectural projects situated in challenging contexts and developed concerning the program. Prerequisite: AENG4309. Fall.

**AENG5391 Capstone Project II****3 credits**

Advanced studio work in architectural design, with thesis options to be chosen from (but not limited to) urban design, ecology/sustainability, architectural technology, computational design, affordable housing, culture, reconstruction/planning, and representation. Prerequisite: AENG5390. Spring.



### **BIOL1401 Biology & Lab**

**4 credits**

This course highlights the basic principles of biology, its history, the scientists who developed fundamental biological concepts and theories, and the basic description of life properties and building blocks, such as the cell, its main components and functions. The class will highlight cellular reproduction and the main types of cellular divisions, the patterns and laws of Mendelian Inheritance, and a description of the main life molecules (biological macromolecules), their structures, and functions. The class will also cover the basics of modern biology, including DNA and RNA structures, replication and gene structure, genes and genetic diversity, and gene and protein production. Finally, the class will explore evolutionary theory in relation to the origin of life, and how interactions between mutations, recombination, selection, migrations and genetic drifts drive the patterns and processes of biodiversity at different levels of biological organization. Fall.

### **BIOL1402 Human Anatomy and Lab**

**4 credits**

This course will provide a comprehensive study of the microscopic and gross structures of the human organism including the cells, tissues, and the following anatomical systems: integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, lymphatic, respiratory, digestive, urinary, and reproductive systems. The lab component provides a hand-on learning experience for exploring the fundamental structure of the human body and the relationship between the major organ systems. The course is designed primarily to meet the requirements for students majoring in Nursing. Prerequisite: BIOL1401. Spring.

### **BIOL1403 Microbiology and Lab**

**4 credits**

Fundamental concepts of microbiology including viruses, bacteria, fungi, protozoa and parasitic worms. Survey of microbial classification, morphology, physiology, and genetics; beneficial and pathological aspects; growth and control of microbes; virology, immunology, and host-microbe interactions. Important infectious diseases of humans are surveyed. Laboratory exercises examine microbial morphology, physiology, and genetics as

well as environmental influences of microorganisms. Laboratory techniques include culturing, examining, and identifying microorganisms. Field trips may be needed. This course is intended for nursing major. Prerequisite: BIOL1401; CHEM1401. Spring.

### **BIOL2404 Human Physiology and Lab**

**4 credits**

Integrated study of the physiological principles, function, integration and homeostasis of the human body at the cellular, tissue, organ, organ system and organism level, including integumentary system, bone, skeletal, smooth and cardiac muscles, nervous system, sensory organs, cardiovascular system, lymphatic and immune systems, respiratory system, urinary system, digestive system, endocrine system, and reproductive system as well as some of their common pathologies. Experiments are performed in the laboratory to illustrate functional characteristics of cells, membranes, and organ systems discussed in lecture. The course is designed primarily to meet the requirements for students majoring in Nursing. Prerequisite: BIOL1402; CHEM1401. Fall.

### **BLAW2319 Business Law**

**3 credits**

Explores commercial laws which are directly or indirectly related to Business. It includes a short study of contract law, partnership Act, companies" ordinance and Negotiable instrument. The emphasis in this course is to introduce the students with the basic concepts of conventional business law and its implementation in the contemporary financial institutions. The course is outlined in such a way to show the basic philosophy of conventional Business Law along with some example from case study. Fall. Prerequisites: MGMT 1314.

### **BUSI1317 Organizational behavior**

**3 credits**

Examines the impact that individuals, organizational structures and processes have on behavior within organizations. It studies how individual and small-group behavior affects organization development and objectives. Further, management students are introduced to the principles underpinning the discipline of organizational behavior with a particular emphasis on achieving a better understanding of how humans interact in organizations and how these interactions shape the organization itself. The course covers a number of disciplines including management theory, the economics of organization, the principles of psychology that underpin how decisions are made.

Spring. Prerequisites: MGMT 1314.

### **BUSI2322 Sustainable Business**

**3 credits**

Practices sustainable business, considering profit-making business opportunities. It enhances students to be knowledgeable not only about their specific business functions, but also how their business that will be affected by government environmental regulations, corporate sustainability initiatives, green marketing regulations and corporate social responsibility (CSR). Furthermore, the course recognizes the business risks and opportunities created due to globalization that push towards more sustainable business practices. Spring. Prerequisite: MGMT 1314.

### **BUSI2323 Business Ethics and Society**

**3 credits**

Requires students to critically examine the major ethical issues currently in the world of business and society. Emphasis is placed on students to establish proper characters and integrity as well as to gain a practical understanding of ethical principles and the application of these principles in ethical decision-making. A primary focus of the course is challenging students to analyze and resolve moral problems and ethical dilemmas they may face in their own business, professional, or personal lives. Spring. Prerequisites: MGMT 1314, PHIL 1311.

### **BUSI3326 Entrepreneurship**

**3 credits**

Arises entrepreneurial opportunities from many fields, including engineering, natural sciences, communications and media, architecture, education, and music. Pursuing these opportunities requires building a team with a diverse knowledge base. This course aims to enhance the knowledge and understanding of issues related to ideas, opportunities, growing, and harvesting a firm, preparing the students to take a leadership role in an entrepreneurial venture. The course comprises a variety of teaching modes which may include lectures, tutorials, independent study and opportunities for formative feedback. Fall. Prerequisites: MGMT1314, MRKT1315, MGMT1316, ACCT2318.

### **BUSI3329 International Business**

**3 credits**

Provides an introduction to international business due to the fundamental shift which has occurred in the world economy over the past three decades. The world is shrinking in which barriers to cross-border and investment are declining and national self-contained economies are merging into an interdependent and integrated global

economic system. Many issues in international business are complex and thus necessitate considerations of pros and cons. This course aims to explain how and why the countries differ, the strategies and structures of international business and the various functions involved in international business. Spring. Prerequisites: MGMT1314.

### **BUSI3377 Research Methods**

**3 credits**

Explores a step-by-step approach to the implementation of quantitative, qualitative, and mixed research techniques including research enquiry in the context of Business Management. This course provides an opportunity for students in understanding of research through critical exploration of research language, ethics, and approaches. It introduces the language of research, ethical principles and challenges, and the elements of the research process within all approaches. Students will critically review literature relevant to their interests and determine how research findings are useful in forming their understanding of their field of specialty in social or physical, basic and applied sciences. Fall. Prerequisites: MGMT1314, IT literacy, Quantitative literacy.

### **BUSI3388 Internship**

**3 credits**

Offers students a chance to gain knowledge and skills through relevant work experience in Business Administration. In addition to meeting Core Competencies, jointly developed Specific Learning Outcomes are evaluated by the Faculty Internship Advisor and Work-site Supervisor. Internship placements, purposefully aligned with students' program of study, serve as a fertile ground for cultivating critical thinking by decision-making, innovative thinking by adapting to new situations, and effective problem-solving abilities, directly applicable to the challenges encountered within real world business settings. Students also gain insight into ethical and social practices within the industry. Internships provide unique learning experiences, valuable career-related skills, and competencies sought by employers. Finish 60 credits/CGPA 2.0 and above. Fall.

### **BUSI4390 Final Year Project FYP- 1 (Proposal)**

**3 credits**

Enables students to develop deeper knowledge, understanding and capabilities in the context of thesis writing and improving the overall quality of their thesis. The course assist students selecting thesis topics in various specialization, including deeper insight into current research and development work. It covers in depth knowledge of research philosophy, literature review, research problems, formulating research questions and



hypotheses, objectives, design and relevant ethical issues in research. Further, it helps students connect data collection methods to the in-depth knowledge and expertise needed to address research questions. Finally, the course helps students compose thesis chapters effectively. Fall. Prerequisites: BUSI3377, IT Literacy, Quantitative literacy.

### **BUSI4391 Final Year Project FYP- 2 (Report)**

**3 credits**

Produces and defends a thesis under supervision in the field of Business specializations. The students will carry out a research project on a topic of their interest. Further, they identify the research gap from the existing body of knowledge. Additionally, the panel will approve the candidate topic for final thesis which is then formed into a proper report that covers all parts of research, which assist the candidate to answers all the research questions. A well written thesis is required to be presented, defended orally and submitted to the faculty advisory committee for approval. Spring. Prerequisites: BUSI4390.



### **CHEM1401 Chemistry & Lab**

**4 credits**

This course is a general chemistry class which covers fundamental concepts and that provides students with the knowledge required to further their understanding of chemistry, master chemistry problem-solving skills, and develop an understanding of how the concepts learned are relevant to other courses and to daily life. The course covers concept of atoms, molecules, stoichiometry, chemical reactions, thermochemistry, gas laws, atomic structure, the periodic table, and chemical bonding. Students will also become familiarized with the laboratory environment and safety precautions required in such environments. Students will be introduced to basic quantitative and qualitative chemical laboratory techniques and will learn various laboratory methods, including titration, reaction yields, and thermochemistry. Spring.

## **CHEM2205 Organic Chemistry**

**2 credits**

This course covers the basics of organic chemistry. It serves as an initiation to the language, thinking, breadth and methodology of organic chemistry, insofar as the area has ramifications in health sciences, pharmacy, ecology, engineering, etc. For this fundamental module, students will see relevance in some topics related to petroleum engineering: recognize the different major organic functional groups; correctly name them and account for the major differences among them; and predict reaction products for different organic compounds, and account for electron flow in reaction mechanisms and contributions in petrochemical industry. Prerequisite: CHEM1401.Fall.

## **COMM1301 Introduction to Communication**

**3 credits**

In this course, students will learn and develop basic essay and writing skills, as well as public speaking and presentation skills that are necessary to succeed at the university level, and in academic and professional life. Students will master basic paragraph structure and development and then proceed to compose summaries that accurately paraphrase and give the essential points of writings and video presentations. They will learn to develop narrative and comparison-contrast essays and expository essay and demonstrate how expository essays can be used to investigate or evaluate a topic, or to argue for or against an idea. Students will also become proficient in presenting effectively through both individual and group presentations that includes a final class project that is expository in nature. Through their written work, participating in class discussions building critical thinking skills, and delivering group and individual presentations, students will be prepared for the rigors of formal communication in an academic setting. Spring and Fall.

## **COMM2301 Academic Writing**

**3 credits**

This course builds on skills developed in COMM1301, and introduces research paper and composition skills that are essential for pursuing investigative work for academic purposes. It introduces basic academic skills such as conducting research, note taking, paraphrasing, summarizing, direct quotation, and the use of APA style for citations and references. An important component of the course is understanding, identifying, and eliminating plagiarism. At the end of this class, students will be prepared for higher level courses in which doing research and writing papers are a requirement. Spring and Fall. If required for graduation, this course must be completed by the end of each student's first (freshman) year. Prerequisite: COMM1301.

### **COMM2310 Media and Society**

**3 credits**

This class examines the relationship of media to society and the fundamental concepts of journalism, including freedom of expression and journalistic independence and integrity, the media's role in war and conflict, and how the media has been used to incite hatred by some and as a peacebuilding tool by others. In looking at the different potential roles of media, the course makes the argument that media itself is merely a tool, neither good nor bad, but dependent on use and motive. The course introduces students not only to media theories but also to theories of radicalization and de-radicalization, the concept of peace journalism, and ideas of reconciliation and transitional justice theories. After successfully completing the course, students will not only understand of media, its concepts and potential uses, they will also be able to recognize and counter media manipulation. Spring, odd-numbered years.

### **COMM2320 Introduction to Journalism**

**3 credits**

This course investigates principles of independent journalism and free media and explores the relationship between a free media and systems of governance. The class will trace the development of journalism and mass communication in the West, and compares this to the development and understanding of journalism in the former colonies in sub-Saharan Africa, in the Middle East and in Asia. The course teaches basic understanding of the principles and practices of journalism, including the characteristics of good stories and why an issue is considered to be newsworthy or not. Students will learn to gather facts through skillful interviewing and research, develop sources, craft appealing leads and endings, and will learn to create news and feature articles. Editing is stressed throughout the course. Students taking this class will complete some of their assignments working in the AUK radio station. Students considering this class should have excellent English abilities. Though not a pre-requisite, it is suggested that students wishing to take this class first complete Communications 1301 and Academic Writing 2301. Fall, even-numbered years.

### **COMM2321 Introduction to Translation Studies**

**3 credits**

Provide students with the theoretical knowledge to allow them to undertake in-depth written translations from English to Kurdish and Kurdish to English. By the end of the course, students will have translated major articles or works from English to Kurdish or Kurdish to English. This course is being offered with the support of the Ideas Beyond Borders (IBB) NGO, and any articles translated may be posted on the Kurdish Wikipedia page in

order to expand the available knowledge base of original Kurdish works for English speakers, and also to provide enhanced access for Kurdish speakers to articles translated from the English language. The course will also develop students' Kurdish-English/English-Kurdish translation skills as a means to enhance their professional marketability. Some students may be chosen to receive monetary awards for their translation work, which will be provided by IBB. It is expected that students will already have integrated the necessary research methods and critical thinking and information literacy skills to complete this course successfully. In order to be successful in this course, students should have solid writing skills in both Kurdish and English, so this course is recommended only for students who have completed Communications 1301 and Academic Writing 2301, both with at least a B average (3.00 or 80 percent).

### **CSIT1301 Computer Literacy**

**3 credits**

In this course, students are introduced to basic concepts of information and communication technologies and their applications. This course will guide students through the basics of computer hardware and software and all other important terms related to computers, such as the personal computer (PC) and its types, its Input and output devices. The more common types of operating system are covered, such as MS Windows, OSX, UNIX, etc. Moreover, students will learn about MS Windows 10 as an operating system, and various applications used on the Internet and in web browsing, emails and group applications. Students will also learn about some useful applications, such as word processing apps, spreadsheets, presentations, database, and some internet and communication applications. Students will gain all required knowledge and skills to become competent users of computers in the future. Finally, students will be introduced to the specific knowledge of computer literacy and information and communication technology ICT used at the university level.

### **CSIT1302 Principles of Information Systems**

**3 credits**

This class provides information systems tools and techniques in various areas needed to enable businesses and other organizations to analyze and make informed decisions, to solve complex problems, and to capitalize on opportunities that contribute to their success in areas such as business marketing, accounting, analysis of sales trends, operational management, human resources, and financial operations. By the end of this course, students will have acquired fundamental knowledge of information systems, including information and system concepts, information system in organizations, information technology, including computer hardware, parallel and grid computing, software systems and applications software, telecommunications and networking, the Internet,

the Intranet, Extranet, business information systems, including electronic, mobile commerce, and enterprise systems, and the personal and social impact of computers.

### **CSIT1304 Computer Ethics**

**3 credits**

The Computer Ethics course provides students with the opportunity to reflect on significant issues, including intellectual property rights, and privacy and security concerns faced by computer professionals. This course further demonstrates challenges facing computer users now and, in the future, including those associated with the development of artificial intelligence, the increasing popularity of video games, and the increasing use of technology in the health sector. It provides students with sufficient knowledge to make ethical choices and to take values, such as trust, into account when designing or evaluating systems. The course uses case studies to provide practical training for students to enable them to identify the consequences of design decisions in areas including issues involving the public and the private sector. Spring.

### **CSIT1306 Human-Computer Interaction**

**3 credits**

Human-computer interaction is an interdisciplinary field that integrates theories and methodologies from computer science, cognitive psychology, design and many other areas. The aim of this course is to provide students with a comprehensive understanding of Human-Computer Interaction and how it relates to people's everyday use of technology. It covers the various phases of interactive system design, from identifying needs and requirements, designing and prototyping. This course helps students to understand what makes a good and bad design and what factors influence user interaction with interactive systems. Spring. Prerequisite: CSIT1302.

### **CSIT1403 Introduction to Programming**

**4 credits**

This course takes the student, step by step, through the concept of computer programming using C# programming language. The course provides students with a foundation that is needed to become a good programmer in the future. In this course, students also are introduced to the basics of computer programming and will be equipped to use and keep up with the new technologies of C# during their professional lives. The main course objective is to let students gain all knowledge and skills required for programming computers using C#. Fall.



## **CSIT1405 Database Systems I**

**4 credits**

This course offers lectures and labs to provide a foundation in data management concepts and database systems. It provides students with the knowledge of database architecture, models, and processes necessary for using, designing, and implementing database systems and applications. Students will have a hands-on session to use a database management system (DBMS) and manipulating data with an interactive query language (SQL). Internet applications, database security, integrity and privacy, and other issues related to the database management system are also discussed. Spring.

## **CSIT2307 Web Application development I**

**3 credits**

This is an introduction course to web application development and design foundation with HTML5. The course introduces students to the Internet concept, server/client architecture, and web application development process. The course covers foundation skills that students need using HTML5, CSS/CSS3, and JavaScript. Fall.

## **CSIT2308 Network Essentials**

**3 credits**

This course introduces the fundamental concept of computer networks, covering computer networks/Internet, including the protocols and technologies used to transmit data across networks/Internet. Students will learn about the layers of the network, including the physical layer, data link layer, network layer, transport layer, and application layer. The course also covers network security, and wireless networks. Through hands-on labs and projects, students will gain practical experience in network configuration and troubleshooting. Upon completion of the course, students will understand computer networks and be able to design, configure, and troubleshoot network systems.

## **CSIT2309-EENG4319 Data Structure and Algorithms**

**3 credits**

This course aims to provide detail on the fundamental data structures, data types, abstract data types, user-defined data types, algorithms and their complexity, time-space trade-off, arrays, records and pointers, matrices, linked lists, circular lists, two-way lists, sequential (array) and related implementation of stacks and queues, polish notation n, recursion, towers of Hanoi, recursive implementation of stacks and queues, priority queues, tree, binary tree, binary search tree, traversals, threaded trees, heap, general trees, graphs, depth-first/breadth-

first traversal, adjacency matrix, shortest distance algorithms, sorting, insertion sort, selection sort, merge sort, radix sort), hashing, searching: (linear search, binary search, depth-first/breadth-first search. Prerequisite: EENG1303. Spring.

### **CSIT2312 Cyber security**

**3 credits**

This course introduces students to fundamental concept of cyber security, covering cryptography, network security, and security and risk management. Students will learn about common threats facing computer systems and tools and technologies such as firewalls, intrusion detection systems, and encryption method used in cyber security to protect such threats. Through hands-on labs and projects, students will gain practical experience in cyber security operations and management. Upon completion of the course, students will have a strong foundation in cyber security and be able to apply this knowledge to real-world problems. Spring. Prerequisites: CSIT2308 and CSIT1403

### **CSIT2410 Object Oriented Programming**

**4 credits**

In this course, students will be introduced to concepts of OOP, such as, abstraction, encapsulation, polymorphism, and inheritance. Also, students will be provided with all knowledge and skills of OOP. First, the students will be introduced MS Visual Studio, let students use it to design and write codes of OOP. Second, programming knowledge and skills are provided to students to work with OOP models. Third, the students will be given details about how to create and use classes, objects, indexers, delegates, events, operators, polymorphism, inheritance, and interfaces. Spring. Prerequisite: CSIT1403

### **CSIT2411 Database Systems II**

**4 credits**

This course builds upon CSIT1405 and introduces advanced concepts in database systems, including the extended entity-relationship (EER) model, object-oriented systems, and distributed database systems. It explores Complex Data Types, Database indexing, and storage strategies. The emphasis is on managing data using advanced SQL functions like views, sequences, triggers, and stored procedures. It examines the roles of a database administrator (DBA) and addresses database security concerns like confidentiality, integrity, and data availability. Prerequisites: CSIT1405, CSIT2307

### **CSIT3313 Server Administration & Operating Systems**

**3 credits**

This course provides students with fundamental knowledge and understanding of server administration and operating systems. The course first introduces students to conceptual aspects of operating systems and then moves to focus on server administration, where students will be introduced to different server administration concepts, principles, and practices. The students will gain practical experience needed to install Linux server, and manage different services including files sharing DHCP, DNS, web server, files and print services, as well as management of local/remote users/group-users. Fall. Prerequisite: CSIT2312

### **CSIT3314 Web Application Development II**

**3 credits**

This course provides insight into the server-side web development technologies and the advanced features, methods, and tools needed to add interactivity to rich web applications. This course will equip students with the essential background, terminology, and fundamental concepts to build modern full stack web applications. This course uses PHP and MySQL to provide students with a programming background by using applied skills to build professional-quality, database-driven Web applications. By integrating PHP and MySQL with the XHTML and CSS frameworks. Fall. Prerequisites: CSIT1306, CSIT2307, CSIT2411.

### **CSIT3317 Technology Entrepreneurship**

**3 credits**

This course is designed for students who wish to become inventing entrepreneurs by starting technology-based ventures. It is also suitable for those who are interested in a career that involves technology entrepreneurship, such as working for a start-up. During this course, students learn the fundamental skills of identifying, and assessing, problems that can be solved using technology. Then, they learn how to conduct market research and industry analysis, to find out patterns that may impact the success of the business. Students are not required to have business background. Spring. Prerequisite: CSIT1306.

### **CSIT3319 Web Application Development III**

**3 credits**

This course extends Web Application Development II. It provides students with advanced web application development knowledge and skills. The course will focus on developing web-based systems that are not only reliable and secure, but also provide a positive user experience leading to user loyalty. Students will be given the

opportunity to apply a broad range of skills gained in previous courses. Spring. Prerequisite: CSIT3314.

### **CSIT3377 Research Methods**

**3 credits**

The course takes a step-by-step approach to the design and implementation of quantitative, qualitative, and mixed research techniques including empirical research in the context of computer science and information technology. The aim of this course is to develop students' knowledge and understanding of the role and conduct of quantitative, qualitative and mixed research methods. This course will provide an opportunity for students to establish or advance their understanding of research through critical exploration of research language, ethics, and approaches. Spring.

### **CSIT3388 Internship**

**3 credits**

Internship is a 3-hour credit course, which requires students to undertake a significant experiential learning opportunity, with a company, non-profit organization or, Governmental department. The purpose of the internship is to enable students to apply knowledge and skills in practical settings, to analyze problems and furthermore, identify and implement feasible solution(s). During this course, each student is assigned two supervisors: One from the hosting organization and another from the department. By the end of the internship, each student is required to submit a final report, which describes the performed tasks as well as the acquired skills and knowledge. Summer.

### **CSIT3415 Mobile Application Development I**

**4 credits**

In this course, the student explores mobile application development with Dart language and Flutter, a powerful SDK tool to build cross-platform applications that are fast and beautiful. The student learns the basics of mobile application development such as stateless and stateful widgets, button, icon, text field, radio button, slider, scaffold, local SQL databases, routing and navigation. At the end of the course, the student will be able to develop simple multi-screen Android mobile apps. The course is practical and provided at the lab in two sessions per week. Fall. Prerequisites: CSIT1306, CSIT2309.

### **CSIT3416 Information System Analysis & Design**

**4 credits**

Information system analysis and design is a core field of system development that utilizes methodological approaches and processes to plan, analyze, design, and implement improvements in business functions through information systems. The course aims to provide students with understanding and a strong foundation in systems analysis and design methodologies concepts. The course will equip students with knowledge and skills to identify business problems and determine business/user requirements to convert the requirements to a logical system specification and transform the logical specification into a set of designs ready to be developed to functioning applications. Fall. Prerequisite: CSIT2309.

### **CSIT4290 Capstone Graduation Project I**

**2 credits**

The course is an opportunity for students to increase their knowledge, skills, and effectiveness to be as leaders in the future. In this course, students develop an enterprise project based on computer science and information technology fields. Throughout the course, students produce computer application, mobile application, or web-based application that can be work in the real-life. The product delivers a platform for students to use professionally theoretical concepts and practical tools that they have learned during their study. Fall. Prerequisites: CSIT2411, CSIT2312, CSIT3314, CSIT3416

### **CSIT4320 Cryptography**

**3 credits**

This course introduces students to principles of cryptography, focusing on a secure communication in the presence of adversaries. The course covers fundamental concept of symmetric-key cryptography, including substitution ciphers, block ciphers, and stream ciphers. Students will learn about the principles of public-key cryptography, including RSA, and elliptic-curve cryptography, and applications of cryptography in modern communication systems, including digital signatures. Through programming assignments, students will gain hands-on experience with cryptographic algorithms. Upon completion of the course, students will have a strong foundation in cryptography and be able to apply this knowledge to real-world problems Prerequisite: CSIT2312.

### **CSIT4322 Cyber Law**

**3 credits**

Cyberspace is the critical infrastructure that runs our world. Yet, much remains ungoverned and the threats are constantly evolving. This course will explore theoretical and practical aspects of nation-state legal issues



concerning cyberspace, including computer-related crime, espionage, war, and international governance. The course will reflect on the roles of national and international governments, the legal and ethical dimensions of cyber security, the relationship between the public and private sectors, and the increasing tensions between privacy and security. Spring. Prerequisite: CSIT2312.

#### CSIT4323: Mobile Application Development II

3 credits

This course explores mobile application development on Android phones. The student develops apps based on Dart language as well as Flutter SDK, including new widgets and UI elements as well as diving into Dart and Flutter advanced features in more detail. The advanced topics include: user interaction and routing; animation and canvas; state management; Isolates and JSON files; Fire store databases; streams and sinks. The code can be ported to other platforms such iOS, the Web, Windows OS, Linux OS, and macOS. The course is practical and provided in one session per week. Fall. Prerequisite CSIT3415.

#### CSIT4326 Mobile Application Development III

3 credits

This course complements Mobile Application Development I and II. Students learn various packages such as Google Maps and Geo location; Work Manager; Flame game engine; and RIVE interactive animations. The course covers a variety of techniques to secure the application. Students can continue working on projects that were initiated in previous courses, and launch beta versions of these applications to gather data of real-interaction and then use this data to fix bugs and furthermore, to improve the reliability. The course is practical and provided in one session per week. Spring. Prerequisite: CSIT4323.

#### CSIT4391 Capstone Graduation Project II

3 credits

This course complements Capstone Graduation Project I. The student continues working on his/her individual capstone project, however, he/she refine the project design and starts building (i.e. programming) the proposed system. The student presents regular progress reports to supervisor(s) weekly and receives feedbacks that need to be tackled in the project. They also need to conduct comprehensive testing, documents the testing process, and write suggestions for improvement. By the end of this course, students need to submit individual reports and present their projects for evaluation. Spring. Prerequisite: CSIT4290.

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#### **DESN1300 Kurdish Art**

**3 credits**

The course discusses the concepts that make up Kurdish art in its many forms. It follows a historical chronology

that explores the evolution and application of the Kurdish visual arts and craftsmanship, including Kurdish traditional hand-made items, such as artifacts and rugs from the ancient period to the current day. Also, the course outlines the impact of the visual arts on Kurdish architecture and delineates the principles of visual arts with their implications over the other fields and topics. It specifies the art types and the conceptual theories associated with Kurdish art, and emphasizes visual communications critique and critical thinking skills via art analysis and investigation. Fall.

### **DESN1301 Drawing and Freehand Sketching**

**3 credits**

Explore the basics of drawing and freehand sketching in this studio class environment. Gain a comprehensive understanding of theories and techniques used to sketch and draw shapes, forms, human figures, built-in environments, etc. Students learn how to use a variety of mediums for sketching, drawing, and rendering, including but not limited to graphite, ink, watercolors, and sketching markers. Fall.

### **DESN1302 Visual Communication I**

**3 credits**

This course is the first of a continuous series of computer-aided visual communications for design courses commonly used by interior, graphic, and product designers at various scales of illustrations. This class outlines the basics of graphical presentation and digital visual communication, based on the fundamentals of graphic illustration by using Adobe Photoshop, Adobe Illustrator, and Adobe InDesign. Also, the course introduces students to the process of illustrating their ideas with high-quality digital renderings by working with a variety of tools and approaches. Moreover, students will be able to manipulate high-quality presentations in pixel or vector format. Spring.

### **DESN1303 Design Fundamentals I**

**3 credits**

Gain a solid design foundation that introduces the basics to understand and use design elements and principles to communicate design ideas and concepts verbally and visually through lectures, studio exercises, and hands-on assignments. Drafting and drawing tools are required. Spring.

### **DESN1304 Introduction to Photography and Video Production**

**3 credits**

Explore and learn the basic knowledge and skills in digital photography and video production through lectures

and lab-based projects covering photography principles, including composition, exposure, lighting, editing, storytelling, timelines, transitional motions, and framing. A DSLR camera or high-resolution mobile camera, computer, and software are required. Elective. Spring.

### **DESN2304 Design Fundamentals II**

**3 credits**

Enhance design skills that build on the knowledge learned from the elements and principles of design through different studio practices and design projects, transforming 2D concepts to 3D compositions to understand volume and advance verbal and visual communication skills using research and analysis to evaluate outcomes. Drawing and model-making tools are required. Fall. Prerequisites: DESN1303.

### **DESN2305 Color Theory**

**3 credits**

Learn theories to explore the fundamentals and properties of color, providing students with essential knowledge, tools, and techniques to understand the color wheel, hue, value, saturation, and their implications. Moreover, students apply the knowledge gained throughout in-class exercises and assignments. Fall.

### **DESN2306 History of Arts**

**3 credits**

Explore the evolution of artistic expression, from the earliest paintings and artworks to contemporary art scenes, allowing students to delve into the transformative power of art, shaping and reflecting on the societies that produce it. Moreover, the course articulates critical thinking through the ability to think methodologically, synthesizing rational research by linking art with its context as one of the central pillars of understanding the culture. Fall.

### **DESN2307 Technical Drawing**

**3 credits**

Learn the principles of two-dimensional technical drawing of basic geometries, space, and objects through lab-based tutorials, exercises, and assignments to understand and use CAD (Computer Aided Design) technologies in technical drawing media, tools, and equipment. Topics include plan drawing, projection, sections, and multi-view drawings, focusing on line types, lettering techniques, dimensions, symbols, and using units and scales. Computer and software required. Spring. Prerequisites: DESN1301.

### **DESN2308 Materials and Resources**

**3 credits**

Explore the basics of materials and manufacturing processes commonly used in the design industry for better, safer, and sustainable production, throughout lectures, in-class exercises, and assignments, and fostered by field trips allowing students to effectively understand and explore various available materials through academic research. Spring.

### **DESN2309 Visual Communication II**

**3 credits**

Explore advanced Computer-aided design technologies (CAD), enabling students to communicate designs through 3D models visually. This course teaches students basic geometric modeling, lighting applications, camera and scene placement, and photo-realistic rendering for concepts, spaces, and objects. Also, it fosters the students with skills and abilities in the postproduction process. Computer and software required. Spring. Prerequisites: DESN1302.

### **DESN3313 Design Thinking & Process**

**3 credit**

Learn the fundamental principles and processes of design thinking, an advanced problem-solving technique that employs design-based methodologies to address complex challenges and generate innovative design solutions. Students comprehensively understand the design thinking process, including analysis, empathy, ideation, prototyping, and user testing in a project-inquiry-based course, enabling students to apply design thinking techniques to real-world problems & contexts and develop highly effective and innovative design solutions. Fall. Prerequisite DESN2304.

### **DESN3318 Design Psychology**

**3 credits**

Explore the relationship between the psychology of design in Interior, Product, and Graphic Design. Learn how environmental and social factors shape behavior and emotions and influence the users' perceptions and experiences. This course includes theoretical and practical environmental, Gestalt, and behavioral psychology applications enabling students to understand how psychology is integrated into the design and have the practical skills to develop innovative solutions that enhance the user's psychological experience. Spring.

### **DESN3388 Internship**

**3 credits**

Gain practical knowledge and skills through real-world experience by completing 135 hours of strongly advised academic-industry training programs. Eligible students should have earned 60 credits. Students explore field experience, develop technical skills, and build professional portfolios, working alongside experienced professionals in the industry to gain knowledge and insights that foster their future careers. Interns also learn valuable soft skills like professional problem-solving, communication, and teamwork. Summer.

### **DESN3410 Intro Studio Graphic**

**4 credits**

Learn the principles and practices of creating a corporate identity for businesses based on market analysis and marketing strategies through a comprehensive study of logo design and branding applications. Students will acquire the fundamentals of typography, illustrations, and images and their interrelation. Students learn to apply corporate identity concepts to develop branding design solutions ranging from full-scale stationery, pictograms, infographic posters, brochures, leaflets, and flyers. The learning process involves research, analysis, critical thinking, and brainstorming, strategizing, conceptualizing, and creating visual solutions through small-size projects. Computer and software required. Fall. Prerequisites: DESN2305, DESN2307, DESN2308, DESN2309

### **DESN3411 Intro Studio Interior**

**4 credits**

Learn the principles of interior space composition, essential space organization, and aesthetic values. In this course, students create a preliminary interior design based on the elements and principles of design, human factors, and user well-being. Students develop the design process with integrated critical thinking strategies to produce design solutions for projects based on cultural awareness and its influence on society. Computer and software required. Fall. DESN2305, DESN2307, DESN2308, DESN2309

### **DESN3412 Intro Studio Product**

**4 credits**

Learn applied fundamental knowledge through small-scale design solutions concentrating on human needs. Topics include understanding and conceptualizing products in relationship to various types of spaces with a focus on the fundamental knowledge of user experience, human factors, usability, and well-being by practicing research and analysis, learning how to assess, interpret and visually represent design concepts using 2D and

3D drawings and models using CAD technologies. Tools and software required. Fall. Prerequisites: DESN2305, DESN2307, DESN2308, DESN2309

### **DESN3414 Intermediate Studio Graphic**

**4 credits**

Develop branding principles through packaging design for structure and visual communication to explore branding through designing in-position products in the marketplace based on a marketing strategy, reflecting the brand image to create and execute packaging designs, and expanding previous knowledge of forms, visuals, and types. The course introduces students to below-the-line advertising and teaches approaches and theories to promote products through point-of-purchase display design, in-shop and shop-front activities, and promotional still Ads. The learning process involves research, analysis, critical thinking, brainstorming, strategizing, conceptualizing, and developing visual solutions through various commercial projects. Computer and software required. Spring. Prerequisites: DESN3410.

### **DESN3415 Intermediate Studio Interior**

**4 credits**

Develops the necessary skills to comprehend the space function between the items in the design program, the level of privacy in space, and commercial design standards to serve the user's experience and well-being. In addition, the course covers space planning, human factors, functional relations, and problem-solving disciplines that illustrate the requirements and principles of sustainable and eco-friendly retail interior design. Students learn to conceptualize, resolve, and present feasible spatial concepts through research, case studies, visual representation, and physical or digital 3D-rendered models. Tools and software required. Spring. Prerequisites: DESN3411.

### **DESN3416 Intermediate Studio Product**

**4 credits**

Develop product design knowledge and skills through one or more projects through studio-based practices based on research and analysis to conceptualize and evaluate, test results, and synthesize user needs while designing. The course cultivates creativity and expands the ability to communicate innovative design concepts and understand the product's form, function, scale, sustainability, specifications, materials, and manufacturing. Tools and software required. Spring. Prerequisites: DESN3412.

### **DESN4322 Universal Design**

**3 credits**

Explore the principles and practices of universal design, a human-centered discipline that responds to human diversity. It provides inclusive design solutions that enable equity and accessibility for all users, regardless of culture, age, or ability. Also, it introduces students to the disciplinary perspectives of Graphic, Interior, and Product design. Students will learn a range of user-centered design methods and processes, such as user research & analysis, user journey mapping, UX, and user interaction design. Prerequisites: DESN3313

### **DESN4323 Assembly & Installation**

**3 credits**

Gain theoretical knowledge and practical skills in assembly and installation for design, manufacturing, and execution of spaces, products, systems, and structures. The course covers implementation methods for detailing small-scale design projects. It focuses on materials usage and selection through hands-on activities on executive technical drawing, rapid prototyping, and fabrication practices using available technologies. Tools and software required. Spring.

### **DESN4324 Principles of Ergonomics**

**3 credits**

Learn and understand theories and concepts of systems and types of systems, human dimensions of anthropometry and its application in design, general physical ergonomics, environmental conditions, and factors affecting humans, design for disability, product interfaces, and human-computer interaction. Spring. Prerequisites: DESN4322.

### **DESN4325 Exhibition Design**

**3 credits**

Develop practical skills through hands-on experiences in a project-based environment gaining a comprehensive understanding of exhibition design principles and methodologies. Topics and practices include an overview of exhibition design and production practices, refereeing to research, concept development, object selection, spatial planning, display furniture design, object staging, finishing materials, lighting, strategies, and visual graphics to create unique projects that communicate design ideas in two dimensional planning and three-dimensional environments. Tools and software required. Spring. Prerequisites: DESN4322.



### **DESN4419 Advanced Studio Graphics**

**4 credits**

Advance visual communication skills through advertising campaigns applied to a marketing strategy based on a target audience, objectives, and message. Students learn to create and develop advertising campaigns to meet relevant goals through corporate and tactical marketing strategies. In this course, students explore skills in copywriting in the form of headlines, end lines, taglines, punchlines, and signatures. Students advance skills in visual problem-solving and develop Above-The-Line (ATL) advertising applications such as magazine ads, press ads, billboards, unipole, mupis, and posters for social media and print applications. Computer and software required. Fall. Prerequisites: DESN3414.

### **DESN4420 Advanced Studio Interior**

**4 credits**

Advance the interior design processes and problem-solving skills to break design problems into components compatible with the program requirements to create a complex multi-use project concentrating on spatial, functional, and technical requirements, emphasizing international building codes and standards. The course aims to generate sustainable and salutogenic interior designs such as multi-use, biophilic, and complex interiors to satisfy users' well-being. The course allows students to develop advanced critical thinking skills to synthesize well-ordered concepts from site analysis, recognize the building's structural qualities and settings, and respond to client briefs, user profiles, human psychology, and human behaviors. Computer and software required. Fall. Prerequisites: DESN3415.

### **DESN4421 Advanced Studio Product**

**4 credits**

Advance and innovate product design concepts developing verbal and visual communication skills in highly resolved, professional design solutions, focusing on real-world, complex design problems, using recent research, and market benchmarks, targeting specific consumer groups, and utilizing trending materials, technologies, anthropometrical and ergonomic standards, and industrial manufacturing processes to develop a product that meets future demands. Tools and software required. Fall. Prerequisites: DESN3416.

## **DESN4626 Senior Exhibition**

**6 credits**

Demonstrate and achieve advanced-level competencies in two chosen design tracks: interior and product design, interior and graphic design, or product and graphic design. Students will undertake a final independent project focusing on sustainability, user-centered design, well-being, and innovation. The final project is based on research, the definition of a design problem, reporting, concept development, concept detailing, design finalization, and two and three-dimensional presentation of the final project, demonstrating an ability to develop an entry-level competency to solve professional design problems, and exhibit a coherent set of intellectual goals that are evident in their work. Tools and software required. Spring. Prerequisites: DESN4419/DESN4420/DESN4421.



## **ECON2320 Microeconomics**

**3 credits**

Inspects key microeconomics concepts and techniques applicable as tools for rational economic decision-making within the micro framework. The course aims to demonstrate the relevance and usefulness of economic analysis to real world business situations. Emphasis is placed on optimal decisions making within the firm and the strategic relationship with other business. Further, the goal of the course is to introduce microeconomics using microeconomics theory, the students will be able to understand the concepts of demand and supply, the price determination in the market, firm behavior and the structure of the markets. Spring. Prerequisites: MGMT1314.

## **ECON3325 Macroeconomics**

**3 credits**

Aims at giving students knowledge about the working of a mixed economy at the aggregate level under pinning of aggregate output and income determination, key macroeconomics problems and major policy debate. The basic themes are extended to find out how the disciplines of national income, macroeconomics in closed and open economy, macroeconomic stabilization policies, macro-economic components (consumption, saving, private investment, interest etc.), public finance, money and banking link up with conventional macroeconomics. Fall. Prerequisites: ECON2320

### **EENG1303 C++ Programming for Engineers**

**3 credits**

This course is designed for students with no prior programming experience. This course introduces the fundamental concepts of procedural programming. Topics include data types, control structures, functions, arrays, files, and the mechanics of running, testing, and debugging in C++. Further, at the end of this course, students will be able to solve engineering problem using C++ programing technique. Fall.

### **EENG1304 Fundamentals of Electrical Circuits**

**3 credits**

This course introduces students to the Physical foundation of electric circuits; electric current; electromotive force; resistance; conventional current; Ohm's law; work, energy, and power; conductance; efficiency; real and ideal sources; resistive networks; Kirchhoff's voltage and current laws. At the end of this course, students will have deep understanding on different concepts in electrical circuits; circuit analysis and network theorems; linearity and superposition; series/parallel combinations of R, L, and C circuits; voltage and current source conversions; mesh analysis; nodal analysis; network theorems with independent and dependent sources and Transient and Steady State analysis. Fall Semester.

### **EENG1310 Digital Technologies**

**3 credits**

This course teaches the Basic concepts and tools for basic arithmetic operations with number representations and code conversions, design of digital hardware consisting of both combinational and sequential logic circuits, Boolean Algebra, Comparator Combinatorial and Sequential Circuits, Encoders, Decoders, Multiplexer, De-multiplexer, Logic Gates (AND, OR, Not, etc.), Karnaugh Maps, circuit optimization, and circuit design procedure, Sequential circuits, Flip Flop, Half & Full Adder and Subtractor, State table and diagram, timing diagrams, propagation delay, Counters, Registers, Memories, PLAs, State Transition Diagram. Programmable Logic Devices (PLDs). Spring.

### **EENG2203 Circuits Analysis**

**2 credits**

This course introduces the students to the analysis of electrical circuits including WYE-delta transformations, the response of first-order RL and RC circuits, the response of second-order RLC circuits; natural and step response of RLC circuits; combinations of electromagnetic induction; sinusoidal stead-state analysis including

the alternating current (AC) fundamentals; phasor representation of alternating current; AC voltage and current relationships for pure resistance; inductive and capacitive circuits, impedance and admittance, Kirchhoff's law, nodal and mesh analysis, superposition and source transmission, Thevenin and Norton equivalent circuit, as well as the balanced three-phase circuits and Laplace transformation. Prerequisite: EENG1304. Fall.

### **EENG2304 Signals and Systems**

**3 credits**

This course introduces the students to the fundamental of signals and systems, signal representations in both time and frequency domains and their effects on different systems. Specifically, the topics covered in the course include the basic properties of continuous-time and discrete-time signals, the processing of signals by linear time-invariant (LTI) systems, Fourier series, Fourier and Laplace transforms, and an introduction to analog filter design. Prerequisites: MATH1322, EENG1304. Spring.

### **EENG2405 Electronic Circuits I**

**4 credits**

This course aims to teach students the fundamentals of electronic circuit design through a range of learning strategies, including lectures, tutorial sessions, laboratory experiments, and mini design projects. Student will explore Semiconductor Diodes, Forward & Reverse Characteristics of Diode, Diode Applications such as Half Wave & Full wave rectifiers, Clipper & Clamper circuits. Further student will explore Bipolar Junction Transistor, Transistor Operation, Transistor Biasing Configurations, DC analysis of BJT, Field Effect Transistors, FET Biasing Techniques and introduction to AC analysis of BJT. Prerequisite: EENG1304. Fall.

### **EENG3204 Control Theory**

**2 credits**

In this course students will learn about the analysis and design of linear control systems utilizing various techniques such as root locus, frequency response, and state space methods further, other important topics will be examined such as open-loop and closed-loop systems, transfer functions, block diagrams, signal flow graphs; introduction to modelling; formation of differential equations of electrical, performance analysis of closed-loop system; stability, Routh's stability criterion, types and analysis of feedback control systems; root locus, Bode plots, polar plots, Nyquist stability criterion, gain and phase margins, Prerequisite: EENG2304. Spring.

### **EENG3288 Internship for Telecommunication/ Electronics Engineers**

**2 credits**

This course covers the practical aspects through Six weeks' summer training of students in electronics and telecommunication companies in Kurdistan and outside. This course evaluation is based on industry advisor assessment, technical report and oral presentation. Summer.

### **EENG3302 Electromagnetic Field Theory**

**3 credits**

This course is structured to provide students with the fundamental concepts and analytical techniques associated with engineering electromagnetics (EM). The topics include Vector calculus: gradient, curl, divergence operations, Gauss's, Stokes, Hemholtz and Green's integral theorems Other topics such as Time varying fields: Faraday's Law of Induction, the conservation of charge and the incompleteness of Ampere's Law, Polarization of waves, Transmission line theory, differential equations for a general transmission line, low loss and lossless lines, impedance characteristics of lines with various terminations, simple mismatch problems and the use of Smith Chart and Maxwell's equations is a crucial part of this course. . Prerequisites: MATH1322, PHY2302.Fall.

### **EENG3305 Integrated Electronics**

**3 credits**

The objective of this course is to equip students with advanced proficiency in digital electronic circuits and design through a range of effective learning approaches, including lectures, tutorials, laboratory experiments, and design projects. Students will learn detailed design of pulse and switching circuits; switch; monostable, astable and bistable circuits; noise margin; propagation delay; Schmitt trigger; saturating and non-saturating logic families (RTL, DTL, TTL, ECL, CMOS); digital circuit interface with applications; design of simple differential amplifier; level translator; use of op-amp as a circuit element, offset and offset compensation, op-amp with negative feedback and ADC & DAC. Prerequisites: EENF1310, EENG2405. Spring.

### **EENG3306 Electronic Circuits II**

**3 credits**

This course aims to teach students advanced of electronic circuit design through a range of learning strategies, including lectures, tutorial sessions, laboratory experiments, and design projects. Student will explore Large-Signal Amplifiers, Frequency Response, Slew Rate and Offset Currents and Voltages. Student will explore different amplifier operating classes and efficiency and will examine and analysis different types of op-amp, CMRR,

Inverting Amplifier, Non-inverting Amplifier, Voltage Summer, and Instrumentation Amp. Students will learn how to design different types of filters including passive and active filters and 555 IC Timer Circuit and applications. This course is also providing hands-on laboratory experiences with a variety of transducers and instruments. Prerequisite: EENG2405. Fall.

### **EENG3308 Microprocessors & Microcontrollers Interfacing**

**3 credits**

This course is designed to provide students with advanced skills in Intel family microprocessors, using a variety of learning strategies such as lectures, tutorial sessions, laboratory experiments, and design projects. By the end of the course, students will have gained a strong understanding of 8086 microprocessor including different addressing modes, assembly language programming, memory design and interfacing with different I/O devices and peripherals. Prerequisites: EENG1303, EENG1310. Spring.

### **EENG3309 Instrumentation Measurement & Sensors**

**3 credits**

This course introduce the students to the principles of measurements and sensors including resolution, sensitivity, accuracy, and uncertainty; engineering units and standards; principles of different measurement techniques; instruments for measurement of electrical properties, pressure, temperature, position, velocity, flow rates (mass and volume. This course is also providing hands-on laboratory experiences with a variety of transducers and instruments. Prerequisite: EENG2405. Fall.

### **EENG3410 Analog and Digital Communications**

**4 credits**

In this course, students will gain an understanding of the fundamental concepts and methods employed in both analog and digital communications. Student will delve into topics such as analog and digital modulation, designing communication receivers and transmitters, baseband and bandpass communication strategies, line coding techniques, as well as noise analysis in diverse transmission scenarios. Upon finishing the course, students will be equipped with analytical skills to assess the efficiency of analog and digital communication systems calculation, error rates. Prerequisite: EENG2304. Fall

## **EENG4202 Data Communications and Networking**

**2 credits**

The objective of this course is to introduce students the fundamentals of data communication and computer networks, types of networks, Introduction to network standards and protocols through a range of effective learning approaches, including lectures, tutorials, laboratory experiments, and research-based assignment. Further, students will learn and use Cisco Packet Tracer - Networking Simulation Tool- to build wired and wireless networks. Fall.

## **EENG4206 Optoelectronics**

**2 credits**

This course introduces the fundamentals of optoelectronics and principles of optoelectronic devices operation, semiconductor optics, and optoelectronic devices. Topics include basic concepts of electromagnetic theory, optical waveguides, an introduction to light-emitting devices, detectors and modulators, optical and electro-optical properties of semiconductors, and low-dimensional semiconductor structures. Prerequisite: EENG3309 Spring.

## **EENG4301 Antenna and Wave-propagation**

**3 credits**

This course introduces the principles of antenna and propagation, while also demonstrating how they can be applied in practical situations. The course delves into the theory of radiation, covering essential concepts and parameters related to antennas, including wire antennas such as loop antennas and dipoles, antenna arrays, aperture antennas (such as horns), and microstrip antennas. Additionally, the course covers topics such as analysis of propagation effects. Prerequisite: EENG3302. Fall.

## **EENG4303 Industrial Electronics**

**3 credits**

The student is introduced to various electronic components and systems used in modern industry. This includes, principles and applications of Electric heating: induction and dielectric heating, high-frequency welding, Spot welding, Industrial Drives: AC Drive, DC Drive, Stepper Motor Drive, Servo Drive and mechanism, Process control. Measurement of non-electrical quantities: Force and Pressure Measuring Transducers, Linear Variable Differential Transformer, Speed and Position Transducers, Semiconductor Photoelectric and Temperature Transducers, Hall Effect Transducers/Sensors. Digital industrial measuring systems. Industrial PLC. Power Distribution in Industries, SCADA and Distributed control system in process industries. Prerequisite: EENG3309 Fall



### **EENG4304 Mobile Communications**

**3 credits**

The objective of this course is to equip students with the concept of modern mobile Communications including System Design Fundamentals of Cellular Communication design of cellular system, and Signal Interference, large scale and small-scale propagation. Further, learning activities in this course including lecture, tutorial sessions, group discussion and research-based assignment to give students ability to gain deeper understating of the modern wireless communications. Prerequisite: EENG3410 Spring.

### **EENG4305 Digital Signal Processing**

**3 credits**

The purpose of this course is to develop physical and mathematical significance of Digital Signal Processing from theoretical, application and implementation perspectives. The topics include a quick review of Discrete-Time signals and systems, z-transform and Discrete-Time Fourier transform (DTFT) and Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT). A good portion of the course focuses on the frequency domain analysis of systems and the structures for system implementation. Further, learning activities in this course including lecture, tutorial sessions, labs and MATLAB simulation-based assignment to give students ability to gain deeper understating of the modern wireless communications. Prerequisite: EENG2304 Spring.

### **EENG4311 Mechatronic System**

**3 credits**

This course aims to introduce students to the synergistic application of mechanical, electrical, electronic, and computer engineering technologies used to control and maintain high-tech devices and equipment. Topics include automation, advanced manufacturing, sensors, actuators, process control, circuits, robotics, electromechanical equipment, hydraulics, pneumatics, electrical drives, motors, and programmable logic controllers. Upon completion, students should demonstrate an understanding of the function of the components of a mechatronic system, their controlling interactions, and the overall operation of the mechatronic control system. Prerequisite: EENG3306, Fall.

### **EENG4312 Artificial Intelligence and Machine Learning**

**3 credits**

This course aims to introduce students to artificial intelligence (AI) and its applications including, but not limited to, Intelligent agents: reactive, deliberative, goal-driven, utility-driven, and learning agents, knowledge

representation issues; procedural knowledge representation vs declarative knowledge; reasoning; components of expert systems, knowledge representation and rule based expert systems; state space search, heuristic search, knowledge representation, resolution, goal-driven problem reasoning; data-driven reasoning, AI-Based Python programming, examples and applications. Upon completion, students should demonstrate an understanding of artificial intelligence and its applications in today's industrial needs. Prerequisite: EENG1303. Fall.

### **EENG4313 Robotics & Automation**

**3 credits**

This course blends multiple disciplines including Electronics, Robotic Controls, Automated Systems and PLCs to give students a well-rounded education in Robotic Technology and Automation. This course provides students with an Introduction to Robotics, Robot Kinematics and Dynamics, Sensor: Contact and Proximity, Position, Velocity, Force, Tactile, Robot Control, P, PD, PID controller and AI in Robotics. Prerequisite: EENG3309. Fall.

### **EENG4314 Python programming**

**3 credits**

Python is a language with a simple syntax and a powerful set of libraries. It is an interpreted language with a rich programming environment, including a robust debugger and profiler. This course introduces the Python programming language to students without prior programming experience. It includes variable types, operations, user input/output, logic, loops, functions, and object-oriented programming. Prerequisite: EENG1303. Fall.

### **EENG4315 Solar Energy**

**3 credits**

This course aims to introduce students to solar energy including, Solar radiation, Solar cells and fabrication methods, solar system components and their functions, Hybrid systems, Smart Grid and Smart Meter. Prerequisite: EENG3309.

### **EENG4316 Microelectronics Circuit Design**

**3 credits**

This course aims to explore advanced of microelectronic circuit design through a range of learning strategies, including lectures, tutorial sessions, and design projects. Further, students will explore numerous topics such as Oscillators, Non-Sinusoidal Oscillators, Timer Circuits, Power Supplies and Voltage Regulators, Main Logic-Circuit Families. Prerequisite: EENG3306. Fall.

### **EENG4317 Bio-Medical Electronics**

**3 credits**

Basic concepts of medical and clinical instrumentation; basic concepts of medical diagnosis and statistical analysis; introduction to techniques for the design of biomedical instrumentation including sensors and associated electronics: biopotentials, biosensors, and amplifiers; electrocardiography (ECG), electroencephalography (EEG), electromyography (EMG), electroretinography (ERG); basic concepts of diagnostic ultrasound; plain x-ray; CT, MRI, PET, and SPECT; supporting instrumentation such as incubator, respirator, anesthesia machine and dialysis machine; tests used in medical care and research: cardiovascular, imaging, and blood analysis; electrical safety in hospitals. Prerequisite: EENG3309. Fall.

### **EENG4318 IoT Systems and Applications**

**3 credits**

This course aims to explore history of IoT, characteristics and benefit of IoT, IoT Structure Layers, IoT Protocols, ESP8266, NodeMCU, Wi-Fi mode of operation and roles, nFR24 Transceiver Module, nFR24 Module Features, nFR24 Module Specifications, MQTT protocol, IoT design tools, MIT App Inventor Platform, Firebase, Firebase ESP8266 Arduino. Upon completion, students should demonstrate an understanding of IoT systems and will be able to design simple project based IoT systems. Prerequisite: EENG1303 EENG3308. Spring.

### **EENG4319 Data Structures and Algorithms**

**3 credits**

This course aims to provide detail on the fundamental data structures, data types, abstract data types, user-defined data types, algorithms and their complexity, time-space trade-off, arrays, records and pointers, matrices, linked lists, circular lists, two-way lists, sequential (array) and related implementation of stacks and queues, polish notation n, recursion, towers of Hanoi, recursive implementation of stacks and queues, priority queues, tree, binary tree, binary search tree, traversals, threaded trees, heap, general trees, graphs, depth-first/breadth-first traversal, adjacency matrix, shortest distance algorithms, sorting, insertion sort, selection sort, merge sort, radix sort), hashing, searching: (linear search, binary search, depth-first/breadth-first search. Prerequisite: EENG1303. Spring.

### **EENG4320 Optical Communication Systems**

**3 credits**

The course introduces optical fiber structures and their characteristics, containing propagation, fabrication process, features, loss, dispersion, nonlinear effects, and optical emission. This course additionally covers the

design and construction of optical communication systems utilizing the components of semiconductor diode lasers, optical amplifiers, multiplexing techniques, transmitter performance, optical modulation, coherent and incoherent detection, switching, and routing. By the conclusion of this course, students will have a deep understanding of the fundamental principles of optical communication and design communication systems. Prerequisite: EENG 3410. Spring.

### **EENG4321 Object Oriented Programming in Java**

**3 credits**

Introduction to object-oriented programming. Emphasis on the fundamentals of structured design with classes, including development, testing, implementation, and documentation, object-oriented programming techniques, classes, and objects, techniques, and applications using the Java programming language. Prerequisite: EENG1303. Spring.

### **EENG4322 Microwave Engineering**

**3 credits**

To introduce the basic theory of Microwave Engineering, such as transmission line theory, scattering parameters, Smith Chart, and impedance matching. Fundamental microwave devices, such as waveguides and resonators, are explained. The students are also introduced to passive and active microwave components such as terminations, couplers, power dividers/combiners, circulators, amplifiers, oscillators, traveling wave tubes, filters, and solid-state microwave devices. Fundamentals in microwave instruments and measurement techniques are introduced. Prerequisite: EENG3302. Spring.

### **EENG4323 Computer organization and Architecture**

**3 credits**

Fundamental principles of computer architecture and its organization, emphasizing basic hardware/software components and functional architectures of computers, structure and behaviour of the various functional modules of the computer; and how they interact to provide the processing needs of the user. In particular, this course covers computer systems ranging from PCs through multiprocessors with respect to hardware design and instruction set architecture including main memory, caches, central processing unit, and pipelines. Prerequisite: EENG1310. Spring.

### **EENG4324 Satellite communication**

**3 credits**

This course is design to help students understanding fundamental knowledge and skills in the analysis and design of satellite systems via different learning strategies including lecture, group discussion, tutorial sessions and assignment. Further, student will explore different topics such as, satellite communication link design; propagation effects and their impact on satellite performance; error control for digital satellite links, broad spectrum of satellite communications and its position in the entire telecommunications network; helps students to develop skills in the design of a satellite communications link. Prerequisite: EENG3410. Spring.

### **EENG4390 Capstone Project I**

**3 credits**

During Capstone Project I (Electronic and Telecommunications), student team gain an understanding of project scope, formulate engineering specifications, develop conceptual solutions and designs, perform concept and engineering analysis, and arrive at a final proposed prototype design. The proposed prototype, either hardware, software or combination of both, must be submitted to a panel of expert who provide evaluation and criticism, and the student team submits a final report at the end of the semester. Prerequisite: EENG3410, EENG3305 Fall.

### **EENG4391 Capstone Project II**

**3 credits**

Students have to showcase their project and provide a design that has been tested and trusted, whether it's hardware, software, or a combination of the two. The design will be defended against panel of experts. Each team then provides a final report that documents the prototype built along with the design, completion, and testing processes. Prerequisite: EENG4390 Spring.

### **ENGL2301 American Literature**

**3 credits**

The class surveys American literature from its colonial beginnings to the present day, including an introduction to basic literary terms. Readings include short stories, essays, and/or novels of celebrated American literary figures, including Mark Twain, Ernest Hemmingway and Edgar Allan Poe. Students write in-class reaction papers to each reading in which they must show an understanding of the work as well as correct use of designated literary terminology. In addition, students are required to select one poem and give a short presentation which includes biographical information on the author as well as an explanation of the poem. Authors and works will vary from semester to semester. Students are encouraged both to read and use multi-media resources to deepen their understanding of the subject matter. At the end of the course, students should have improved their writing

abilities, their ability to summarize and their ability to use and understand literary terminology successfully. Spring.

### **ENVR1301 Introduction to Environmental Science**

**3 credits**

This course introduces students to the basic geophysical processes of the natural environment and their relationship with activities of human and non-human beings. A primary focus is on the functions and interactions of the atmosphere, hydrosphere, lithosphere and biosphere, and how they constitute ecosystems and bioregions. The course examines the human societal influence on earth's complex physical environment and discusses principles of sustainability as a means to reduce our ecological footprint for the benefit of future generations. Spring.



### **FINA3330 Business Finance**

**3 credits**

Introduces the students to the fundamentals of business finance. The course requires an understanding of mathematics as well as economic concepts and accounting principles. This course is corporate-oriented with emphasis on practical applications and problem-solving techniques. The primary objective is to provide the student with the tools to understand and solve the basic financial problems confronting business today. The topics covered include the time value of money, valuation of assets, capital budgeting techniques, and capital structure theory and dividend policy assessment. The application of the topics to international markets will be made whenever possible. Spring. Prerequisites: ACCT2321.

### **FINA4333 Corporate Finance**

**3 credits**

Highlights the financial decision making in any corporation due to the repercussions which may be quite severe due to the wrong financial decisions. Thus, making the appropriate financial decision is crucial, and this course helps participants understand corporate finance. The course will cover the important topics such as capital budgeting, capital structure, corporate investment, sources of corporate funding, corporate contingent claims, dividend policy and financial risk management. These aspects enable a student to apply these fundamentals of

finance in a right way in the corporation so that the goal of the corporation is easily achieved. Fall. Prerequisites: FINA3330.

### **FINA4334 Financial Statement Analysis**

**3 credits**

Processes analyzing a company's financial statements for decision-making purposes. External stakeholders want to understand the overall health of an organization, evaluate performance and determine business value. Internal stakeholders want a monitoring tool for managing finances. This course develops the analytical tools and techniques to assess a potential borrower in light of extending short- and long-term credit. Comprehensive financial statement analysis methods are stressed in this course. Students assess industry considerations, qualitative parameters and loan structures to determine issuance of credit. Loan portfolios are discussed and evaluated. Fall. Prerequisites: ACCT2318, ACCT2321.

### **FINA4335 International Finance**

**3 credits**

Examines the factors encountered by multinational financial manager in making financing and investment decisions with a global perspective. It involves the understanding of the macroeconomic environment governing international business. Students will be introduced to the forces that determine exchange rates, the measures and management of currency exchange and interest rate risks through financial instruments such as currency options, forwards, futures and interest and currency swaps. Students will discuss broad-sweep topics of general interest through in-class group presentations. The emphasis will be on the theory and practice of treasury risk management in today's increasing financial systems. Spring. Prerequisites: FINA 3330

### **FINA4337 Portfolio Management**

**3 credits**

Studies the theory and empirical evidence relevant for portfolio management in this course. An emphasis is placed on understanding how an investment professional would allocate funds in a hypothetical portfolio. Major topics include estimation of capital market parameters, trade-off between risk and return, optimal portfolio selection, equilibrium asset pricing models, and delegated portfolio management. Emphasis will be put on development of techniques that should be part of the tool kit of those interested in becoming professional investors and/or researchers in finance. Spring. Prerequisites: FINA 3330.



## G

### **GENG2211 Introduction to Health, Safety, and Environment**

**2 credits**

This course covers basic safety, health, and environmental issues related to architecture engineering. This module aims for students to understand the principles of safety and environment, which have become important elements of architectural sites. By the end of this module, students will be able to plan for the safe execution of sustainable projects within the architecture sites and firms. Prerequisite: CHEM1401. Spring

### **GENG3303: Mechanics of Materials**

**3 credits**

This course satisfies the 3 credit hours of Specialization requirement and meets specific requirements for programs as outlined in the AUK Undergraduate Catalog. In this course, the student is introduced to mechanics of materials needed as a foundation for the advanced engineering courses. This class is an overview of mechanical properties of metals, polymer, and wood, emphasizing the role of processing and microstructure in controlling these properties. Basic topics in mechanics of materials including: stress and strain, axial load, torsion of a circular shaft, beam bending and stress transformations. Prerequisite: MATH1322. Fall.

## I

### **ILAW2310 International Law and Organization**

**3 credits**

This course provides a foundation for understanding international law, its history, development, institutions, and application. We examine the relationship between states and international organizations in creating and enforcing international law and other rules that govern how the world system operates. What justifies the presence of big countries in the conflicts of the Middle East? On the basis of what some regions claim independence, secession, and statehood, and why do others support them or reject this? In each of these issue areas, we will discuss the role of key states, international organizations, existing rules, and problems associated with the rules themselves or enforcement. Is global governance effective? With this, the course is about the orders and disorders happening at the international level. It is not only about big international organizations and states, but also about individuals

and real people with real problems, and in effect, it asks the question if global governance is effective. Spring. Prerequisite: INTS2306.

### **INDS3301 Interdisciplinary Seminar**

**3 credits**

The aim of the course is to broaden students' perspectives beyond their own major by exploring topics from other interesting scientific fields. The topic doesn't need to be centered on students' disciplines but it must be amenable to a scientific perspective. Topics are often taken from the current news or have an ethical angle that generates a lot of interest and participation. The course is delivered in group style in which students are divided into a small group of students, the host, and the rest of the students, and the audience. The hosts will introduce the topic and then lead learning activities and class discussions. Spring, odd-numbered years.

### **INTR3301 State and Nation**

**3 credits**

The terms nation and state are often used interchangeably, however, they refer to two different yet interconnected concepts. This course will explore the emergence of the state and nation as distinct political ideas, tracing their philosophical roots, their subsequent dominance in international politics and contemporary challenges raised against them. In particular, the course will deal with the social contract traditions of Thomas Hobbes, Immanuel Kant and John Rawls as well as to modern debates relating to secession and self-determination. Students will be encouraged to critically engage with challenging readings as well as to apply what they learn to real world situations. Fall.

### **INTR4302 Comparative Politics**

**3 credits**

This course explores the major topics and theoretical contributions in the field of comparative politics, such as the formation and development of the modern state; democracy; authoritarianism; revolution and political stability; nationalism; voters and parties, constitutional arrangements and their effects and macro theories of political change. Hands on work on data will develop the research skills of the students, motivating for critical thinking and search for empirical back up of the theoretical claims and hypothesis learned during the course. During the course, the students are expected to perform independent work with home readings and small-scale research. Fall. Prerequisite: INTS2306.

### **INTR4303 International Trade and Finance**

**3 credits**

The international economy is increasingly becoming interconnected with technological and legal developments facilitating the cross-border movement of goods, services, capital and people. This course will examine the international economic system from a theoretical and practical perspective. Students will analyze why, how and what states trade and who benefits. Topics covered will include foreign direct investment, bilateral and multilateral trade agreements, international labor stands and the role of multinational corporations. A particular focus will be on the role of international regulatory institutions, including the International Labor Organization (ILO), World Trade Organization (WTO) and United Nations Conference on Trade and Development (UNCTAD). Fall. Prerequisite: ECON2320

### **INTR4305 The History and Practice of Diplomacy**

**3 credits**

The art of diplomacy is a central component of international politics although it is often overlooked in academia. This course covers both the historical development of diplomacy from the beginning of the nineteenth century through to contemporary international politics as well as specific diplomatic tools including: diplomatic reporting, treaty drafting and crisis management. The final section of the course looks at how states use diplomatic instruments in certain areas to further their own goals. The course aims to provide students with theoretical and practical knowledge of the nature of diplomacy and its central role in foreign policy. Spring. Prerequisite: INTS3312.

### **INTR4306 U.S. Foreign Policy**

**3 credits**

This course introduces students to the sources of US foreign policymaking as well as past and present US foreign policies. It provides a cursory survey of US involvement in world affairs from the founding of the country through the 21st century. The course will also discuss key issues and debates in US foreign policy, including the war on terror and US foreign policy in the Middle East. Grounded in conceptual and theoretical rigor and emphasizing historical continuity and change in US foreign policy, this course seeks to help students develop an in-depth understanding of main issues in US foreign policy as well as challenges facing US policymakers as they respond to problems and crises. It also aims to impart to them conceptual tools and research skills that they can use to analyze aspects of, as well as a diverse array of actors involved in, US foreign policymaking. Spring. Prerequisite: INTS3312.

### **INTS1301 Globalization**

**3 credits**

In this class, student will gain an understanding of globalization, whose exact meaning remains contested and which is a uniquely modern phenomenon that is also a continuation of historical processes. This course will encourage students to engage critically with the concept and implications of globalization in order to understand how it affects and will affect the world of today and tomorrow. The class will examine the historical processes of globalization, the roles of institutions and groups in globalization, as well as the impact of developments in a number of areas, including information technology, human rights, and the environment. In contemporary academic and political discourse, the concept of globalization has been used to describe a series of structural changes affecting politics, economics, societies and cultures. The course examines the historical processes of globalization, and the roles of various institutions and groups in promoting globalization. Fall

### **INTS1302 Kurdish Studies**

**3 credits**

This course introduces Kurdish studies for students, including political, cultural and historical topics of scholarly interest and importance. In the first part of the course, students acquire basic knowledge about the Kurdish people and Kurdistan in terms of geography, borders, history, society, culture, arts, and economy. In the second parts, students augment their knowledge with study of the Kurdish language and literature. In addition to this, they also learn about the emergence and historical development of Kurdistan Regional Government (KRG), Kurds after the Arab Spring, and the war against ISIS. At the end of the course, students should have a broad knowledge of Kurdish society and Kurdistan within an academic framework. They will be able to analyze and compare between different periods and different communities within Kurdistan. Fall.

### **INTS1303 Middle East History**

**3 credits**

This course is a comprehensive history of the Middle East that will enable students to develop a refined, historically rooted grasp of the major developments in society and politics in contemporary society, as well their complex and multi-layered histories. It sheds light on the cultural and social diversity of the region, intertwined dynamics, and crisscrossing and overlapping conflicts that constitute the contemporary Middle East. Spring. Prerequisite INTS1302.

## **INTS1304 World Politics**

**3 credits**

This course provides an overview of the current state of world politics as a complex subject area. In order to navigate through, the course is divided into four broad themes. Firstly, the course will provide students with an overview of the (1) historical development of the current world political system as well as (2) explore selected theoretical paradigms that are required to grasp the fundamental concepts encountered in world politics and international relations. Thereafter the focus will shift to the (3) important actors, structures and processes of world politics before critically engaging with (4) contemporary global issues. The aim of the course is to provide students with a basic understanding of world politics and to allow students to critically engage with contemporary global issues. The course will rely on various teaching, engagement, and assessment methods to facilitate student engagement, critical thinking and analytical skills development. Spring. Prerequisite: INTS1301.

## **INTS2306 International Relations Theory**

**3 credits**

The course serves as an introduction to International Relations Theory. The course will consider the historical evolution of IR theories and the international state system as well as address the contemporary debates and challenges in International Relations. The course will familiarize you with the basic concepts and themes of IR and allow you to make sense of the contemporary debates, challenges and issues in international politics. Major topics will include, but not be limited to, security and conflict, trade, environmental issues, human rights and health among others. The course will therefore rely on both theoretical and empirical approaches in the field of International Relations and international politics. Fall. Prerequisite: INTS1304.

## **INTS2307 Power and Society**

**3 credits**

This course introduces the concept of power as a universal social phenomenon this is found and manifested in all forms of human interaction and is a fundamental concept in political science and international relations. Interdisciplinary in nature, the class draws on concepts, insights, and ideas from the whole spectrum of the social sciences, with a focus on political sciences and sociology. The class will investigate basic concepts, such as how power emerges, is created, and maintained, and how it shapes the life of states, groups, and individuals. The course introduces different ideologies and cultural concepts, and investigates some of the major challenges facing today's societies, including ideological conflict, crime and violence, terrorism, racism and sexism, and the struggles that accompany globalization. Spring.

### **INTS2308 Middle East Politics**

**3 credits**

This course will provide students with a comprehensive overview of the politics of the contemporary Middle East. It will begin by outlining the major political developments in the region from the Ottoman and Safavid periods through to colonialization and present day, notably the conflicts over Kurdistan, Arab Spring and rise of Islamic State. Various thematic topics will then be covered including elements of authoritarian governance, political Islam, oil and economic development, political parties and elections as well as minorities. The course aims to enable students to develop a wide knowledge of the politics of the Middle East and to be able to critically engage with academic and policy texts on the region. Students are expected to complement the readings and lectures with independent study and be ready to discuss contemporary events in class each week. Spring. Prerequisite: INTS1303.

### **INTS3311 Democracy and Civil Society**

**3 credits**

In this course, students will engage in a thoughtful examination of the definition, causes and consequences of democracy and civil society, while considering classic and contemporary debates about democratic governance. The aim of this course is to introduce students to theoretical and practical perspectives on democracy and to facilitate a critical knowledge of the strengths and weakness of different approaches to the understanding of those ideas. The course combines the study of approaches to the examination of related social, political and ethical issues. In addressing these questions, student ill explore different model of democracy, economic, political and educational arguments for democracy, and various criticism of democracy in theory and practice. This class examines international agendas to promote good governance and market economies in new and emerging democracies. It covers competing concepts of, and new approaches to democracy and development, and the perceived linkages between human rights, global democracy, and global development. This course will also deal with the role of civil society organizations in public policy making, governance, public administration, and private sector implementation. Fall.

### **INTS3312 Foreign Relations and Defense Policy**

**3 credits**

Conducting external relations is a vital role of states. Even in an era of unprecedented globalization the state remains a key player in the global political and economic system. Foreign and defense policy have usually been an area of state competence that has existed outside of normal democratic control. In matters of war and complex negotiations public oversight has been considered detrimental to the aims of state. The course will examine how

states formulate and execute policy towards the 'outside' world. It focuses upon theories of decision-making, agenda structuring, interactions among policy makers and political leadership. This will be a dynamic, practice-orientated course where students will be expected to be active during in-class role-playing situations and policy analysis. Fall. Prerequisite: ILAW2310.

### **INTS3314 Politics of Kurds and Kurdistan**

**3 credits**

This course aims to make an introduction to the Kurdish Politics with a particular focus on the politics of Kurdistan Region-Iraq (KRI). KRI will be studied as an example of the struggle between authoritarian and democratization efforts at the same time. The course will focus on the politics of Kurdistan from various angles and throughout different periods. Political, economic and social developments in KRI will be the focuses of the course by looking at the emergence of political ideologies, rise of political parties and economic developments in KRI following the emergence of Kurdistan Region as a semi-state actor. Students are expected to engage through critical thinking in analyzing the developments of the KRI's political institutions in an academic framework. Prerequisite: INTS2308.

### **INTS3316 War, Peace and Security**

**3 credits**

This course is an introduction to the study of War, Peace and Security. It will draw on the basic literature on military strategy and its relation to the onset and evolution of international crises, war, and peace. It will also introduce students with major philosophical works on the notions of conflict, security, violence, war, and peace among state actors. Students are equipped with the knowledge and conceptual framework to evaluate paradigms of peace and war, and to assess key issues associated with those concepts. The purpose of this course is to examine the nature and the causes that lead to inter-states and intrastate conflicts and, in opposition to war, how to maintain, achieve and secure peace. The study of war or conflict is of great importance to any student of international relations, politics or security studies. This course will look at different definitions of conflict, security, stability, peace, war and their significance in both historical and contemporary perspectives. It will explore the causes of interstate conflict (war) and interstate peace and their gradations in the international state system. This course's main unit of analysis is the state and the state system. Prerequisite: INTS3312. Spring.



### **INTS3377 Research Methods**

**3 credits**

The course takes a systematic approach to the design and implementation of quantitative, qualitative, and mixed research techniques including research enquiry in the context of social sciences and international studies. The aim of this course is to develop students' knowledge and understanding of the role and conduct of quantitative, qualitative and mixed research methods. This course will provide an opportunity for students to establish or advance their understanding of research through critical exploration of research language, ethics, and approaches. The course introduces the language of research, ethical principles and challenges, and the elements of the research process within quantitative, qualitative, and mixed method approaches. Students will use these theoretical underpinnings to begin to critically review literature relevant to their field or interests and determine how research findings are useful in forming their understanding of their field of specialty, whether in social or physical, basic and applied sciences. Fall.

### **INTS3388 Internship**

**3 credits**

The internship must be related and in line with the student's chosen degree. Students must have completed at least 60 credit hours of their programs to be eligible for the internship program. Upon the completion of the internship placement, a final report must be submitted by the student to his/her supervisor at AUK. The final report by the student should describe their experience(s) during the internship program, including the tasks and duties performed, the learning outcomes drawn from the internship, the experiences and skills learnt. The AUK student is also required to provide a detailed evaluation of the internship placement and state whether or not any incidents took place that were of a serious nature. Summer. Prerequisite: INTS3377.

### **INTS4317 Intervention in International Relations**

**3 credits**

The course examines the theory and practice of interventions in International Relations. The course is divided in two parts. The first part begins with an analysis of the conceptual and normative aspects of interventions, including state and nation building and humanitarian interventions and the Responsibility to Protect. Following this introduction to the idea of interventions in cases of intra-state violence and the connection to the peace of Westphalia and ideas of state sovereignty in a time of globalization, our discussions will center on the objectives, means and ends of interventions. Having thus introduced concepts to analyze interventions through a mainstream as well as through a critical lens, we will move on specific case studies – including, but not limited

to, Rwanda, Bosnia-Herzegovina, Kosovo, Afghanistan and Iraq. We investigate the circumstances, dynamics, and consequences of interventions. The course facilitates a deep understanding of the key themes and trends in the theory and practice of interventions. Fall. Prerequisite: SCST3301.

### **INTS4318 Negotiation and Mediation Models**

**3 credits**

Students in this course will learn about key conceptual models of negotiation and mediation, and have an opportunity to apply those skills through exercises, in-class discussions, self-assessments, and a large-scale negotiation simulation based on an international real-life scenario. The objective of the course is to understand that the negotiation involves an extensive strategy based on principles which can be learned, experienced, and applied in order to solve conflicts of interest in a sustainable way by using the skills of mediation. Fall.

### **INTS4321 Energy Security Politics**

**3 credits**

This course covers topics related to interactions of geographical, political, and security aspects as a way to comprehend events affecting the energy system. First, the course will introduce some theoretical definitions of what energy security politics is, how it has been developed throughout the years. Further, it will focus on some case studies that can better describe the great number of variables that determine the energy security politics of some world areas. Each historical episode will be analyzed to make sense of the international context and the players concerned by pointing out causes and consequences with special attention to the energy sector. Spring. Prerequisite: INTS3312.

### **INTS4390/INTS4391 Graduation Research Project I & II**

**3 credits/3 credits**

This course is divided across two semesters (Parts 1 and 2). Although we will learn about writing academic studies and research methods during both parts, the first part will focus on developing a research proposal and the second part will focus on writing a complete research study. More specifically, students will learn how to collect and analyze empirical data, and how to write an Abstract, Introduction, Literature Review, Current Study, Methodology, Results, and Discussion sections of their Graduation Research Project. We will also learn some professional development skills (e.g. writing an academic CV, preparing to give a presentation at an academic conference) in this course, particularly in the second part. Every Semester. Prerequisites: INTS3377/INTS4390 and permission of Academic Advisor.



### **MATH1301 College Algebra**

**3 credits**

This class provides a basic overview of algebraic skills, including algebraic expressions, linear, absolute value equations and inequalities, lines, systems of linear equations, polynomials, and factoring. By the end of the course, students will be able to use equations and inequalities to solve word problems involving discount and selling price, simple interest, and mixtures. They will also be able to solve equations and inequalities that involve absolute value, or fractions or decimals, find and graph solutions for linear equations in two variables, graph linear equations by finding the x and y intercepts, or graph lines passing through the origin, and graph vertical lines, and horizontal lines. Students will use the distance formula, determine the slope of a line, and use slopes to graph lines. This course satisfies the General Education mathematics requirement and meets specific requirements for programs as outlined in the AUK undergraduate catalog. Fall.

### **MATH1311 Statistics**

**3 credits**

This class provides an overview of fundamental applications and terms in statistics, including sampling methods, data categories, data collection methods and data analysis processes, such as frequency table and stem-leaf plot. The use of appropriate graph types to plot data, determining center-tendency and dispersion of data around a center are also mastered. Familiarization with probability topics and their connection to statistics is also covered, giving students the resources students to collect data systematically and conduct graphing, and analyze and interpret collected data in a wide range of academic majors. By the end of this course students will be able to recognize and understand various types of continuous probability density functions, such as uniform probability distribution, exponential probability distribution, and normal probability distribution. Spring

### **MATH1321 Calculus I**

**3 credits**

Students in this course will gain an in-depth knowledge and understanding of Calculus, a foundation for most mathematics studied at the university level. Calculus I develops practical skills necessary for two main concepts: derivatives (rates of change of a function) and integrals (which, provide a way to recover a function from the knowledge of its derivative). Students will learn the rules of differentiation and integration, and methods of differentiating and integrating algebraic and transcendental functions. Fall.

## **MATH1322 Calculus II**

**3 credits**

The topics covered include derivatives and integrals of exponential and logarithmic functions, applications, Sequences and Series, Power, Taylor and Maclaurin Series, Polar Coordinates. Upon Successful completion students should be able to: Differentiate exponential, logarithmic, and inverse trigonometric functions, integrate exponential, logarithmic, and inverse trigonometric functions, recognize integrands for which integration by parts is appropriate, use the formula to integrate by parts. It covers also vectors, vector operations, equations of curves and surfaces in space, calculus calculations involving curves, the calculation and applications of differentiation of functions of several variables, the calculation of double and triple integrals, vector fields, the calculation of line and surface integrals, and theorems relating certain integrals to others. Topics covered include: Introduction into the 3D coordinate system, Vectors, Dot Product, Cross Product, Lines and Planes in Space, Cylinders and Quadratic Surfaces, Curves in Space and Their Tangents, Curves in Space and Their Tangents, Integrals of Vector Functions: Projectile Motion, Integrals of Vector Functions: Projectile Motion , Arc Length in Space, Curvature and Normal Vectors of Curves, Curvature and Normal Vectors of Curves, Functions of Several Variables, Limits and Continuity in Higher Dimensions, Partial Derivatives, Double Integrals over Rectangles, Double Integrals over General Regions, Area by Double Integration, Double Integration in Polar Form, Triple Integrals in Rectangular Coordinates, Triple Integrals in Cylindrical and Spherical Coordinates. Prerequisites: MATH1321.

## **MATH2304 Numerical Analysis**

**3 credits**

The course covers numerical methods in a variety of petroleum engineering problems; numerical differentiation and integration; root finding; numerical solution of differential equations; curve fitting and interpolation; computer applications; introduction to the principles of numerical simulation methods. Prerequisite: MATH1322. Fall.

## **MATH2312 Statistics II**

**3 credits**

This course provides an overview of quantitative data collection approaches, statistical techniques, and statistical software commonly used by social scientists. As an undergraduate course, it will cover basic statistical skills for social research, up to OLS regression. More specifically, students will learn about: (1) creating quantitative datasets with social surveys and aggregated secondary data, (2) analyzing datasets with univariate (descriptive)

techniques, bivariate techniques, and one multivariate technique (OLS regression); (3) using statistical software such as Excel, R, and SPSS. The course is very practical and lab-intensive, as a clear objective of this course is to educate students about “real world” quantitative data analysis. Fall. Prerequisite: MATH1311.

### **MATH2313 Statistics III**

**3 credits**

This course provides an overview of quantitative research methods in social science. It is organized in a seminar format instead of a lecture format, meaning that students are expected to read many articles and book chapters in preparation for each class. Students will also be active participants in discussion and debates about quantitative research methods instead of passive listeners. Topics will include scientific approaches in quantitative social science, measurement and operationalization, types of quantitative data, strengths and limitations of different quantitative methods, variations in quantitative methods across academic fields (e.g. international studies vs. psychology vs. sociology), and the use of specific quantitative methods and techniques in published empirical articles (e.g. using statistical models to study crime rates, health, gender inequality, political beliefs, and many other questions). Spring. Prerequisite: MATH2312.

### **MATH2323 Calculus III- Multiple Integral and Fourier Series**

**3 credits**

Students will learn about vector calculus and the extension of calculus from 2 dimensions into 3 dimensions. Upon successful completion, the student will be familiar with vectors, vector operations, equations of curves and surfaces in space, calculus calculations involving curves, the calculation and applications of differentiation of functions of several variables, the calculation of double and triple integrals, vector fields, the calculation of line and surface integrals, and theorems relating certain integrals to others. These are covered in Chapters 12-16 of the textbook ‘Calculus Early Transcendentals – 8th Edition’ by James Stewart. Prerequisite: MATH1322.

### **MATH3202 Linear Algebra for Engineers**

**2 credits**

This is an undergraduate course in linear algebra includes linear equations, matrix algebra, vector spaces, Eigenvalues and Eigenvectors, and orthogonally and symmetry, for students of engineering. Solving systems of linear equations is a necessary tool of many mathematical procedures used for solving science and engineering problems. The student will become competent in solving linear equations, performing matrix algebra, calculating determinants, and finding eigenvalues and eigenvectors. On the theoretical side, the student will come to

understand a matrix as a linear transformation relative to a basis of a vector space. The text is Linear Algebra and its Applications by David Lay. Fall.

### **MATH3324 Advanced Engineering Mathematics**

**3 credits**

This course worth 3 semesters credit hours and satisfies the core mathematics requirement and meets specific requirements for programs as outlined in the AUK Catalog. This course includes ordinary differentiations of one variable including First-Order ODE, Second-Order ODE, Higher Order ODE, Systems of ODE, Series Solutions of ODEs, and Laplace Transformations. Passing Calculus II is required prior to taking this course. Prerequisite: MATH2323. Spring

### **MGMT1314 Principles of Management**

**3 credits**

The course will enable students to understand their own management capabilities and learn what it is like to direct an organization. The aim of this course is to provide comprehensive knowledge of both traditional management skills, and new concepts needed in a turbulent environment characterized by economic turmoil, political confusion, and general uncertainty. The main focus of this course is divided into several broad classifications, including introduction to management, examining the environment of management, planning, organizing process, leadership, and information technology. Spring and Fall.

### **MGMT1316 Human Resource management**

**3 credits**

Develops students' understanding of contemporary HRM and the important strategic role that it plays in helping an organization build and maintain competitive advantage. More specifically, the course will examine HR policies, practices, and systems in the areas of: planning and recruitment; ethical and legal frameworks for HR; employee selection; training and development; performance management; compensation; employee relations; diversity management; OH&S; employee separation; and HRM in a global environment. Spring. Prerequisites: MGMT1314.

### **MGMT3327 Operations and Production Management**

**3 credits**

Provides knowledge and understanding of the nature and characteristics of operating systems in both the manufacturing and service sectors. It familiarizes students with the role and functioning of design, planning,

control tasks and responsibilities of managers with regards to the management of operations on various scales. Topics include strategy and sustainability, capacity planning, aggregate planning, forecasting, inventory and supply chain management, distribution planning, materials requirements planning (MRP), life-cycle model, total quality management (TQM), quality assurance (QA). Thus, students will be able to recognize the connection between organizational structures, technology, operational activities and competitiveness. Spring. Prerequisites: MGMT 1314, ACCT 2318

### **MGMT3328 Supply Chain Management and Logistics**

**3 credits**

Enforces the entire process from the market analysis, procurement, production, distribution up to sales. Further, SCM covers and includes all the realm of a business. Thus, the main aim of this course is to identify the relevant factors influencing the Supply Chain and to optimize it to the same degree. Further, it purposes to enable the students to solve complex logistical issues on a global base. It is attempted to learn what exactly is pivotal for SCM and how to approach and implement each strategy. Spring. Prerequisite: MGMT 1314.

### **MGMT4331 Strategic Management**

**3 credits**

Conveys an appreciation of what strategy is, by introducing students to a range of different perspectives. It enables students to use evidence on structural trends within industries to forecast likely changes in industry attractiveness, appraise resource of a firm, understand competitive advantage, the factors that drive the process of industry evolution, trends in diversification and vertical integration overtime, evaluate the potential of innovation and technology, global strategy and consider the implications of such changes for an organizations' future strategy. Students will formulate strategies and appreciate the organizational conditions needed to implement such strategies successfully. Fall. Prerequisites: MGMT 1314

### **MGMT4333 International Human Resource Management**

**3 credits**

Internalizes business which has been increasing exponentially since the last century. This is demonstrated in the growth of the number of enterprises conducting business across the national borders of their headquarters, the amount of foreign direct investment, and the value of trade between countries. This trend has a direct impact on the HR function, which will be focused on in this course. HR professionals are expected to plan a nationally and culturally diverse workforce. Moreover, they are expected to manage migrant workers and international assignees at each geographical location, in addition to its local employees. Fall. Prerequisites: MGMT 1316

### **MGMT4335 Managing Change**

**3 credits**

Identifies the need for change, assessing change options, planning change, implementing and managing change processes to achieve successful outcomes. This course focuses on how change can be most effectively implemented through people within the organizational hierarchy. The course concentrates on the exploration and discussion of cases, illustrating different change efforts in a variety of organizations. Case studies from leading organizations such as Nokia, Xerox, IBM and the NHS etc. are examined to help students identify 'real-life' applications of the material covered. This course is organized around lectures, readings, discussions, cases, videos, exercises and presentations. Spring. Prerequisite: MGMT 4331

### **MGMT4336 Human Resource Planning & Staffing**

**3 credits**

Prepares students to take a strategic and modern approach to the identification, attraction, selection, deployment, and retention of talent. Organizations increasingly realize that their employees are the key to executing their business strategies. The war for talent has made the identification and attraction of high-performing employees essential for companies to compete and win in their marketplaces. The Internet and other technologies have also changed the ways firms identify, attract, hire, and deploy their talent. Grounded in theory but full of real-world examples, the course teaches how organizations can develop a staffing strategy that reinforces business strategy, leverages staffing technology, and evaluates and improves staffing systems. Spring. Prerequisites: MGMT1316.

### **MGMT4337 NGO Management**

**3 credits**

NGO Management (NGOM) is designed as an introductory into creation and administration of an NGO organization and the development of projects with social impact and responsibility. Equal attention to theory and practice of NGOM aspects will be offered during this course. Lectures with theoretical and descriptive content will be alternated with practical, simulative experiential approach, and elements of fieldwork specific to the Kurdistan Region of Iraq. Spring. Prerequisites: MGNT 1314 and permission of instructor.

### **MRKT1315 Principles of Marketing**

**3 credits**

Provides students with a broad introduction to marketing concepts and familiarizing models relevant to understanding marketing and providing students with an overview of marketing and its various aspects.



Students will learn to use various tools of marketing to develop a coherent marketing approach. Case studies and discussions will keep students updated about recent trends in marketing and encourage critical conceptual thinking and improve presentation and teamwork skills. Fall.

### **MRKT4332 International Marketing**

**3 credits**

Identifies various ways to address and attract consumers, especially in order to win their trust and loyalty in the long-run. Thus, the basic objective of this course is to familiarize the students with a broad and profound knowledge of entering new markets abroad and introducing them to Marketing concepts, strategies and models accordingly. Students will learn to use different tools to develop a coherent Marketing approach. Case studies and discussions will keep students updated about recent trends in Marketing on a global level and encourage critical conceptual thinking and improve presentation and teamwork skills. Fall. Prerequisite: MRKT 1315.

### **MRKT4334 Consumer Behavior**

**3 credits**

Enhances students' understanding of how and why consumers purchase (or do not purchase) goods and services. It will combine both the theoretical concepts of consumer behavior and its application for Marketing strategies related to private, public and non-profit sections. This course will explore and identify market identities and various sources of influencing the way consumers think, learn and behave from given market related information. The knowledge gained from this course can be utilized in the market place to make rational decisions to satisfy consumer needs and wants and remain loyal to products, services and the company itself. Fall. Prerequisite: MRKT 1315.



### **NURL2103 Health Assessment Lab**

**1 credit**

Practice history taking, physical examination techniques and risk identification on peers during supervised campus laboratory sessions. Application of skills and techniques acquired to intervene and reduce risks and/or promote health with individual clients during clinical laboratory. Prerequisite: Department permission required. Co-requisite: NURT2302. Fall

**NURL2309 Foundations of Nursing Practice Lab****3 credits**

Clinical experiences provide opportunities to acquire basic nursing skills in simulated and actual clinical settings. Emphasis is on interpersonal communication, safety, documentation, and selected basic nursing interventions required for clients with acute and chronic health problems. Prerequisite: NURT2301; NURT2302; NURL2103; NURT2304. Co-requisite: NURT2305; NURT2308. Spring.

**NURL3212 Mental Health Nursing Lab****2 credits**

Experiences provide opportunities to develop interpersonal communication skills and therapeutic use of self. Emphasis on development of the role of the nurse as provider, designer, and coordinator of care for individuals, families, and community groups with mental health care needs. Prerequisite: PSYC1301; NURT2308; NURL2309. Co-requisite: NURT3211. Fall.

**NURL3216 Reproductive Health Nursing Lab****2 credits**

Focuses on integration and application of the nursing process in providing care for multicultural women, neonates, and their families. Emphasis on development of the role of the nurse as provider, designer, and coordinator of care for women across the lifespan. Prerequisite: NURT3211; NURL3212; NURT3313; NURL3314. Co-requisite: NURT3315. Spring.

**NURL3218 Child Health Nursing Lab****2 credits**

Applies the dimensions of health, health care, and nursing in addressing the health care needs of infants, children and adolescents with a focus on health promotion, risk reduction, and disease prevention. Clinical experiences occur in pediatric and community health settings. Prerequisite: NURT3211; NURL3212; NURT3313; NURL3314. Co-requisite: NURT3217. Spring

**NURL3314 Management of the Medical-Surgical Adult & Older Adult Clients Lab****3 credits**

Clinical experiences provide opportunities to practice advanced nursing skills in simulated and actual clinical settings. This course emphasizes further development of the nursing role in providing and coordinating care for

adult and older adult clients with acute and chronic medical-surgical health alterations. Prerequisite: NURT2308; NURL2309. Co-requisite: NURT3313. Fall.

**NURL4220 Leadership/Management in Professional Nursing Lab** **2 credits**

Theories and principles of leadership and management are synthesized in a selected clinical area within the health care system. Emphasizes decision-making, critical thinking, client advocacy, collaboration, leadership, and functioning as a team member within the health care setting. Prerequisite: NURT3315; NURL3216; NURT3217; NURL3218. Co-requisite: NURT4319. Fall.

**NURL4225 Community and Population Health Nursing Lab** **2 credits**

This course is designed to provide a synthesis of community/population nursing experiences that allow the student to apply the knowledge and skills from professional nursing practice and public health concepts. The clinical venues will provide students with opportunities to expand their understanding of community health nursing practice and the activities that focus upon health care promotion and disease prevention in culturally/socially diverse populations at the level of whole or aggregate communities both domestically and internationally. Prerequisite: NURT4319; NURL4220; NURT4321; NURL4322. Co-requisite: NURT4324. Spring.

**NURL4322 Management of the Adult with Complex Health Alterations Lab** **3 credits**

Experiences provide opportunities to design and coordinate advanced medical-surgical nursing care for adult and older adult clients with complex health alterations; applies concepts of advanced medical-surgical and critical care nursing. Critical thinking, organization, leadership, and time management skills are emphasized. Prerequisite: NURT3315; NURL3216; NURT3217; NURL3218. Co-requisite: NURT4321. Fall.

**NURL4427 Nursing Capstone Clinical** **4 credits**

Supervised practicum experience with focus on application of theory and nursing process for purpose of planning, implementing, and evaluating care delivery for patients, both as individuals and cohorts. This practicum course will build on the concepts and knowledge gained from previous nursing courses allowing for the application

of theories and concepts associated with nursing leadership, nursing research, and management of care. Prerequisite: NURT4321; NURL4322. Co-requisite: NURT4126. Spring.

### **NURT2110 Human Diversity**

**1 credit**

This course is designed as a role development course, students will examine the skills used to be culturally competent and sensitive to human diversity. Nursing students will begin by gaining an understanding of the principles of delivering culturally sensitive care. The course requires that students open their minds and examine their own cultural and humanistic beliefs and values and explore the impact of those beliefs and values on clinical practice as a health care professional. Students will also explore strategies for successful patient-nurse relationships when the patients' culture, race/ethnicity, prejudice and lifestyle beliefs conflict with the health models used in nursing science. Prerequisite: NURT2301. Spring.

### **NURT2206 Nutrition and Health**

**2 credits**

This course focuses on the foundations of nutrition in the prevention of chronic disease. Evidence-based nutrition care for gastrointestinal diseases, cardiovascular diseases, diabetes, metabolic syndrome, energy balance and weight control, bone disease, and renal disease are addressed. Pathophysiology of various disease states and appropriate medical nutrition therapy are understood. Nursing's role in nutrition assessment is appreciated with respect to patient weight change, intake adequacy, gastrointestinal symptoms affecting nutrient absorption, and activities of daily living. Coverage of alternate feeding methods and issues surrounding drug-nutrient interactions are included. Opportunities to present prevention of disease through nutrition education in the community are offered. Prerequisite: NURT2304. Spring.

### **NURT2301 Concepts of Professional Nursing**

**3 credits**

Designed to introduce and transition the freshman nursing student to the language of nursing. Provides an overview of professional nursing role within the health care environment, including historical and theoretical aspects of nursing, critical thinking, clinical judgment, ethical-legal, evidenced-based practice, patient-centered care, professionalism, safety, and team/collaboration and interpersonal communication. Highlights the influence of culture and professional values on the role of the professional nurse. This course provides students with the opportunity to expand their knowledge, values, and meaning in areas of nursing practice utilizing the model

of QSEN (Quality and Safety Education for Nurses) and developing their own nursing framework. Prerequisite: Department permission required. Fall.

### **NURT2302 Health Assessment**

**3 credits**

This course presents a systematic, holistic approach to in-depth health history taking and physical assessment of clients of all ages. The course emphasizes developmental and culturally competent assessment skills and ability to recognize deviations from normal. Concepts learned in the lecture will be practiced in the laboratory. Students will practice these techniques on their peers and designated volunteers during supervised campus laboratory sessions. Students will apply lecture concepts to improve their skills and the techniques necessary to intervene and reduce patients' risks and promote patients' health. Prerequisite: Department permission required. Co-requisite: NURL2103. Fall.

### **NURT2304 Alterations in Health and Wellness**

**3 credits**

This course focuses on the pathophysiological basis for alterations in health. Theories of disease causation will be explored. Issues of genetics and biochemical alterations in health will be presented with an emphasis on etiology, health disparities, systemic pathophysiological responses, and clinical manifestations. Issues of wellness will also be explored. Prerequisite: Department permission required. Fall.

### **NURT2305 Pharmacology**

**3 credits**

This course focuses on the basic drug classification, concepts and principles of pharmacology. Emphasis is on the principles of pharmacokinetics, pharmacodynamics and pharmacogenetics in the treatment of illnesses with special consideration for the nursing role in developing a comprehensive approach to the clinical application of drug therapy using the nursing process. Nursing implications relative to the utilization of drug therapy are examined. Safe administration and monitoring the effects of pharmacotherapeutic agents are discussed. Dosage calculations are evaluated for competency. Prerequisite: NURT2304. Co-requisite: NURT2308; NURL2309 Spring.

### **NURT2307 Evidence Based Practice Nursing and Informatics**

**3 credits**

This course explores assessing evidenced-based nursing into professional nursing practice. Scientific methodologies of research are used as a focus. Utilization of evidence and informatics will be used to implementation and evaluate current nursing practice. Identification and collaboration with the healthcare team will lead to a final project that implements practice change. Prerequisite: NURT2301. Spring.

### **NURT2308 Foundations of Nursing Practice**

**3 credits**

Concepts of physiological integrity, psychosocial integrity, safe, effective care environments, and health promotion/maintenance are examined. Focuses on beginning competencies required for care of adult and older adult clients with acute and chronic health problems across a variety of practice settings. Prerequisite: NURT2301; NURT2302; NURL2103; NURT2304. Co-requisite: NURT2305; NURL2309. Spring.

### **NURT3211 Mental Health Nursing**

**2 credits**

Integrates theory from nursing, related fields, communication, and critical thinking in providing nursing care for multicultural individuals, families, groups, and specific populations with mental illness, focuses on providing professional nursing care that promotes mental health and adaptation to mental illness. Prerequisite: PSYC1301; NURT2308; NURL2309. Co-requisite: NURL3212. Fall.

### **NURT3217 Child Health Nursing**

**2 credits**

Integrating and applying nursing process in providing age-appropriate care and advocating for infants, children and adolescents. Collaboration with the child, family and other members of the health care team to promote health and adapt to illness. Prerequisite: NURT3211; NURL3212; NURT3313; NURL3314. Co-requisite: NURL3218. Spring.

### **NURT3313 Management of the Medical-Surgical Adult & Older Adult Clients**

**3 credits**

Provides nursing theory for care of adult and older adult clients with medical-surgical health alterations. The course includes diagnostic and therapeutic nursing interventions relevant to medical-surgical health alterations.

The course emphasizes the nursing process and critical thinking to manage acute and chronic medical-surgical problems. Prerequisite: NURT2308; NURL2309. Co-requisite: NURL3314. Fall.

### **NURT3315 Reproductive Health Nursing**

**3 credits**

Provides nursing theory for the care of diverse and multicultural women, newborns, and families. Emphasis on integration and application of theory from nursing and related fields, standards of clinical practice, evidence-based practice, communication, and critical thinking with the nursing process. Prerequisite: NURT3211; NURL3212; NURT3313; NURL3314. Co-requisite: NURL3216. Spring.

### **NURT4123 Interprofessional Collaboration and Outcome Management of Health Care**

**1 credit**

This course focuses on a collaborative approach to patient centered care. The emphasis is on the values and ethics of interprofessional practice, roles and responsibilities, interprofessional communication skills and team work to manage outcomes to improve quality. This course incorporates the Core Competencies for Interprofessional Collaboration for Health Care into principles and concepts of continuous quality improvement in health care for outcomes management. Prerequisite: NURT4319; NURL4220. Spring.

### **NURT4126 Nursing Capstone**

**1 credit**

Synthesis of knowledge acquired in the BSN curriculum toward the development of the Professional Nursing role. Focus on application of theory and nursing process for purpose of planning, implementing, and evaluating care delivery for patients, both as individuals and cohorts. Integrated content expectations are evolving issues, lifelong learning, impact of cultural issues, and promotion of the nursing profession. Prerequisite: NURT4321; NURL4322. Co-requisite: NURL4427. Spring.

### **NURT4319 Leadership/Management in Professional Nursing**

**3 credits**

Theory in this course is designed to analyze leadership and management principles and illustrate how these concepts reflect professional nursing practice for the practicing professional nurse. The health care delivery environment will be discussed with an emphasis on the current and future trends in the management of nursing

resources and personnel. In addition, health care policy and change theory will be further introduced as it relates to system analysis today which will be used to evaluate individuals, policy, and organizations. Emphasis will be placed on how one makes decisions, collaborates and works within the new health care team of the future. Prerequisite: NURT3315; NURL3216; NURT3217; NURL3218. Co-requisite: NURL4220. Fall.

### **NURT4321 Management of the Adult with Complex Health Alterations**

**3 credits**

Provides nursing theory for the care of adult and older adult clients with complex health alterations; includes diagnostic and therapeutic nursing interventions relevant to advanced medical-surgical health alterations. Emphasizes the nursing process and critical thinking to manage and coordinate care. Prerequisite: NURT3315; NURL3216; NURT3217; NURL3218. Co-requisite: NURL4322. Fall.

### **NURT4324 Community and Population Health Nursing**

**3 credits**

This course introduces theories of public health nursing practice related to assessing the health of a population and applying nursing interventions to improve population health at the individual, family, community, and systems level. Content stresses community health nursing roles in prevention and health promotion with culturally diverse families and populations in a variety of community settings. Emphasis is given to identifying risk and to using the nursing process with populations at risk. Morbidity and mortality data will also be analyzed along with relevant socio-environmental factors to prepare students to practice evidence-based nursing care. Prerequisite: NURT4319; NURL4220; NURT4321; NURL4322. Co-requisite: NURL4225. Spring.



### **OGMT3324 Introduction to Oil and Gas Management**

**3 credits**

Offers students with the knowledge and fundamentals of the oil and gas management which include conceptual background understanding of the oil and gas industry, original or oil and gas, including formation of oil and gas, history of the oil production, various stages in oil and gas development as well activities in the onshore and offshore, development of unconventional oil and gas and oil and gas reserves. Thus, students benefit from a broad knowledge of the oil and gas industry, basic knowledge on all aspects of the industry and be familiar with common industry terminologies. Fall. Prerequisite: MGMT 1314.



### **OGMT3328 Supply Chain Management in the Oil and Gas Industry**

**3 credits**

Conceptualizes supply chain management product and services from the point of origin to product end users. It includes supply chain designs, logistic networks, inventory management, supply chain contracts, information integration and alternative information sharing, strategic alliance, implementation process for partnerships, outsourcing decision and e-procurement strategies. This course analyzes the strategies and practices, including digital coordination of decisions and resources, inventory and risk management, efficient distribution of petroleum products, procurement and supply contracting, information technology, product and process design and revenue flow and management. Spring. Prerequisites: OGMT 3324.

### **OGMT4331 International Oil and Gas Trading**

**3 credits**

Equips students with crude oil and natural gas supply and demand fundamentals, nature of oil and gas trading, analyses and trends in prices of crude oil, petroleum products, natural gas, its impact on oil companies/consumers and policy making decision. The course also covers futures, forwards, hedging methods, speculations, swap, and option contracts, spot market, and how trading instruments grow. Finally, the course covers oil and gas trading administration, including delivery, nominations, carriage, bill of lading, quality and quantity determination, oil cargo insurance etc. which are the essential backroom activities around which the industry revolves. Fall. Prerequisite: OGMT 3324.

### **OGMT4332 Petroleum Contracts and Economics**

**3 credits**

Provides theoretical background of petroleum contracts, the awarding process, production sharing contracts, development and technical service contracts, concessions, industry security, commercial contracts in the oil and gas industry, and foreign direct investment. This course helps students understand crude oil and gas sales contracts in the context of global politics, fiscal/tax regimes, how to maximize government benefits from oil and gas sales, the oil and gas sales transportation agreement, political risk, and security of investment in the oil and gas industry. Thus, students get practical skills in developing petroleum contracts/agreements, contractual obligation, management and ethical responsibility. Fall. Prerequisite: OGMT 3324

### **OGMT4333 Project and Quality Management in the Oil and Gas Industry**

**3 credits**

Employs the students with general introduction to project management, ranging from process and integrated approach to project management for oil and gas projects. From basic knowledge of projects, life cycle, project characteristics, and resource recruiting to a more integrated approach that covers oil and gas project management tools, techniques, and quality risk management and analysis. This course covers practical risk management, project planning tools, project economic analysis, project cost, and project managers in the oil and gas industry. Fall. Prerequisite: OGMT 3324

### **OGMT4334 Legislation in Oil and Gas Industry**

**3 credits**

Covers environmental protection law, environmental legislation principles, and production sharing contract agreements in the oil and gas business. Health, safety, and the environment are vital to oil and gas activities, thus this course investigated national, regional, and worldwide regulatory/environmental laws. It further reviews the Iraq constitution on hydrocarbon policy, environmental protection law/regulation, hydrocarbon preservation law and regulation, and the economic, political, and social impact of Iraqi/Kurdistan oil and gas industry to determine the rights and responsibilities of oil companies in their host communities to ensure they comply with international standards. Fall. Prerequisite: OGMT 3324.

### **OGMT4335 Environment Management in Oil and Gas Industry**

**3 credits**

Implies the optimal use, management of environmental problems and the preservation of environmental quality for the benefits and growth of society. The course guides students through environmental issues such oil spills, gas flaring, waste disposal, drilling muds/fluids, and other contaminants that threaten the environment and host populations. This course also covers environmental tools like EIA, audit, policy, life cycle analysis, labelling, performance evaluation, national, regional, and international laws and regulations, regulatory framework, environmental management system, and legal compliance. It teaches kids about environmental standards and pollution control. Spring. Prerequisites: OGMT3324.

### **OGMT4336 Oil and Gas Business Development**

**3 credits**

Grants students with the theoretical background knowledge of the oil and gas business development in relation to the structure of the oil and gas industry including key players in the oil and gas, value chain, local content policy and its essential linkages to the rest of the economy. It also covers resource governance and resource curse/

rentier economy phenomenon of the oil and gas industry. Essentially, it covers corporate social responsibility, oil and gas industry project, (EITI), the future of the global oil and gas industry, emerging issues and the political economy of oil and gas. Spring. Prerequisite: OGMT 3324

### **OGMT4337 Health, Safety and Environment in the Oil and Gas Industry**

**3 credits**

Presents students with deep knowledge and understanding of health, safety, and environmental management issues, conceptualize the hazardous nature of the oil and gas industry and how it can be effectively managed through regulation, and demonstrate critical awareness of key environmental issues in the oil and gas industry, employee safety, past accidents, workplace safety and productivity. It also incorporates risk and hazard identification and oil and gas sector safety solutions. This course also teaches students how to undertake an Environmental Impact Assessment (EIA) of oil and gas developments. Spring. Prerequisite: OGMT3324



### **PBPY3301 Introduction to Public Policy and Administration**

**3 credits**

Introduction to Public Policy and Administration provides an introductory overview of the major themes, theories, concepts and processes involved in public policy and administration. The course will enable students to identify theoretical frameworks that have been used to understand public policy and to examine the processes involved in formulating, implementing and evaluating public policy. The course will cover how policies are made, how it changes, and how policies become institutionalized. Students will also learn how public administrations functions by examining the structure, role and functions of bureaucratic apparatus of state. Fall.

### **PBPY3302 Public Budgeting and Finance**

**3 credits**

This course is designed to provide students with a comprehensive overview of the processes and implementation of public budgeting and financial management. The course draws heavily upon real-world and fictitious case studies to provide students with a chance to develop their practical understanding of the financial expectations and challenges involved in government projects at the local and national level. The course covers a variety of topics including basic management of public funds, preparation of budgets, revenue projection and expenditure

controls, issues of fiscal policy, and the setting of priorities through budgeting and financial management. Spring. Prerequisite: PBPY3301.

### **PBPY4303 Sustainable Development and Environmental Policy**

**3 credits**

Sustainable Development describes the process that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. An increasingly globalized world has brought new challenges and opportunities for the environment and for development. Transnational corporations, civil society organizations, and new technologies now shape outcomes in resource development and environmental management. This course, therefore, examines the environmental, economic, and social dimensions of sustainable development by focusing on changing patterns of consumption, production, and distribution of resources. We will further illustrate the ways to incorporate sustainable development initiatives into manageable and effective environmental policies. Fall. Prerequisites: PBPY3301, ECON2320.

### **PBPY4304 Comparative Public Policy**

**3 credits**

Different countries and even different jurisdictions within the same country can have markedly different ways for setting and implementing public policies. This course will explore a range of different approaches to public policy in areas including social welfare, education, and healthcare by comparing various state institutions, cultural backgrounds, historical backgrounds. Students will be encouraged to compare and critique different policy tools employed and formulate their own proposals to respond to contemporary challenges. Fall. Prerequisite: PBPY3301.

### **PBPY4305 Land-Use, Urban and Regional Planning**

**3 credits**

The spatial planning of human communities is a vital component on any comprehensive public policy. This course examines the different perspectives on land-use at the urban and regional level introducing students to spatial planning tools and methods. In particular, the course deals with challenges posed by urban settlement including population growth, poverty, affordable housing and infrastructure maintenance. Spring. Prerequisites: PBPY4303.

### **PENG1204 Introduction to Petroleum Engineering**

**2 credits**

This course introduces students to petroleum engineering industry. It covers basic petroleum geology and different geophysical methods for oil and gas exploration and general view on local, regional and global petroleum reserves. It introduces students to essentials well drilling and reservoir descriptions, well production operations and oil and gas storage and transportation. Fall

### **PENG1205 Physical Geology**

**2 credits**

This course introduces the science of geology together with an overview of its basic principles. It involves the study of the earth materials and processes that occur in earth's interior as well as on its surface, furthermore, the utilization of geological knowledge in the applied science, environmental and engineering arenas. The topics that are explored in this course include the study of minerals and rocks, weathering and erosion processes, sedimentation, geological time, stratigraphic principles, landform types, stresses involved in mountain building and shaping geological structures. In addition, the study of geological structures and stratigraphic setups is crucial for petroleum exploration and the search for oil traps. The study of geology cannot be complete without understanding all these phenomena in the context of geological processes in the oceans and continents under the unifying concept of plate tectonics. Part of this course covers the practical approach of identification of minerals and rocks, geologic maps and demonstration in the field of local stratigraphic successions and geological structures. Fall

### **PENG1310 Petroleum Exploration Engineering**

**3 credits**

This course cover basics of petroleum geology, it focusses on reservoir pore spaces, occurrence, petroleum origin, migration & accumulation, oil traps. The course introduces different geophysical methods for oil and gas exploration. It covers petroleum geology and exploration activities in Kurdistan. Subsurface mapping and geological cross-section and geological correlation for oil and gas Kurdistan fields are provided to good understanding of oil fields and petroleum potential reserve in Kurdistan. Prerequisite: PENG1205. Spring.

### **PENG2310 Drilling Systems- I**

**3 credits**

This course covers rotary drilling systems and operations, drill bits' specifications, principles and practices of petroleum well drilling, drilling fluids, well planning, and drilling techniques and equipment and optimization of the drilling process, components of rotary drilling rig, drilling hydraulics, drilling bits, factors affecting rate of penetration. Prerequisite: PENG1205.Spring

### **PENG2409 Reservoir Fluids and Rock Properties**

**4 credits**

The course covers the basic petrophysical properties of reservoir rocks including porosity, permeability, fluid saturation, capillary pressure, wettability and interfacial tension. Laboratory measurement of the reservoir rock characteristics mentioned above. This course focuses also different reservoir fluids (gas, oil and water) properties and the phase behavior of hydrocarbon systems as related to petroleum recovery. Ideal and real gas behavior, single and multicomponent two-phase systems, properties of reservoir fluids under various conditions of pressure and temperature. Laboratory tests on reservoir fluids. Prerequisites CHEM2205, PEN1205. Spring

### **PENG3205 Thermodynamics for Petroleum Engineers**

**2 credits**

Thermodynamics explores the fundamental principles and concepts governing energy, heat, and their transformations in various systems. This course serves as a cornerstone for students pursuing studies in engineering, physics, and chemistry. By studying thermodynamics, students develop deep understanding of four laws of thermodynamics and gain essential problem-solving skills applicable to real-world scenarios. Prerequisite: MATH1321 & PHYS2303. As a lecture-based course, it's only offered dependent on student availability.

### **PENG3206 Statistical Applications for Petroleum Engineers**

**2 credits**

This course focuses on the application of statistics and probability theories in solving and analysis of different petroleum engineering problems. This includes the different petroleum engineering areas: probabilistic analysis of new hydrocarbon discoveries, evaluation of reservoir rocks properties mainly porosity, permeability, water saturation and hydrocarbon reserve, well production operations and well and reservoir performance problems. Prerequisites: MATH1311, PENG2409.Fall.

### **PENG3207 Fluid Mechanics**

**2 credits**

This course provides the essentials of fluid mechanics for petroleum engineers. It covers flow properties of fluids. Fluid kinematics and dimensional analysis, Balance equations, Perfect fluid flow and types of single flow and flow of multiphase mixtures. Prerequisite: PHYS2303. Fall.

### **PENG3304 Fundamentals of Reservoir Engineering**

**3 credits**

This course covers the concepts and elements of reservoir engineering and applies these in maximizing oil and gas recovery basic derivation of the general material balance equation. Estimation of water influx using steady and unsteady-state models. Application of the general material balance equation for determining initial oil in place and gas cap size and water influx constant under different drive mechanisms. Prerequisites: PENG2409. Fall.

### **PENG3308 Processes in Petroleum Production**

**3 credits**

This course covers subsurface operations concerning preparing the well for production after being drilled and cased. It focuses on well performance calculations necessary for the design and analysis of naturally flowing and artificially lifted wells. Topics include well completion, Inflow Performance Relationship (IPR), Vertical Lift Performance Relationship (VLP), and Wellhead Performance Relation. Prerequisites: PENG2409. Spring.

### **PENG3311 Drilling Systems-II**

**3 credits**

This course covers optimization of drilling parameters, mud fluids and rig hydraulics. Cementing types and cementing job planning and casing design. Laboratory sessions cover drilling fluids and cement formulation and testing. Simulation of drilling operations and control. Prerequisite: PENG2310. Spring.

### **PENG3288 Internship for Petroleum Engineers**

**2 credits**

This course covers the practical aspects through Six weeks' summer training of students in Oil Company in the different oil industry segments such as drilling, reservoir, production, petrochemical and oil & gas exploration. This course evaluation is based on industry advisor assessment, technical report and oral presentation. Summer.

### **PENG3409 Formation Evaluation**

**4 credits**

This course covers wire line logging tools and techniques. Then, the course discusses on the practical understanding of the interpretation of open and some cased hole log analysis methods for the determination of lithology, porosity, fluid content, movement and net pay. Qualitative (Quick Look) and quantitative analyses methods are covered for open and cased hole formation evaluation logging jobs. Prerequisite: PENG2409. Spring.

### **PENG4202 Drilling Engineering**

**2 credits**

This course covers basics of geomechanics, geosteering and drilling operations, deviation & multilateral drilling and horizontal well design. Drilling in high temperature high pressure reservoirs, deep water drilling. Drilling operations 'problems e.g. kick off, fishing problems and mud loss circulation. Prerequisite: PENG 2310. Fall.

### **PENG4205 Well Testing**

**2 credits**

This course covers theory of well testing and its applications and emphasizes the importance of well testing as a tool for reservoir description, derivation of the diffusivity equation for slightly compressible fluid. Solution of the diffusivity equation using Boltzmann transformation. Pressure drawdown, buildup tests. Injection and fall-off tests. Average reservoir pressure. Reservoir limits tests. Type curve matching. Interference and pulse testing. Test design and instrumentation. Prerequisites: PENG 3304, PENG3308. Fall.

### **PENG4206 Petroleum Production Systems**

**2 credits**

This course covers geological conditions in production operations and inflow performance relations. Primary cementing and squeezed cementing- remedial cementing, perforating oil and gas well, sand control and scale deposits. Formation damage, sandstone acidizing, carbonate acidizing and hydraulic fracturing. This course provides foundation knowledge, skills and their application for well performance and production operations. Prerequisite: PENG 3308. Fall.



**PENG4211 Artificial Lift****2 credits**

The course covers basic aspects of well control using different kinds of artificial Lift techniques. Review of well performance problems (Diagnosis and reasons). Review of fluid properties, multiphase flow regimes and all lifting methods: rod pumps, progressive cavity pumps (PCP), gas lift and electrical submersible pumps (ESP). A unified engineering concept of artificial lift based on Nodal System analysis approach and. The differences amongst the various artificial lift systems and their applications. Artificial lift design, troubleshooting, evaluation, economic analysis and maintenance of the artificial lift systems. Prerequisite: PENG 3308. Spring.

**PENG4304 Reservoir Simulation****3 credits**

This course covers basic theory and practices in reservoir simulation. Formulation of equations governing single phase and multi-phase flow in porous media. Introduction to finite difference methods and solution techniques. Solution of systems of linear equations. Applications using a black oil simulator. Prerequisite: PENG3304. Fall.

**PENG4307 Enhanced Oil Recovery****3 credits**

This course covers basic theoretical and design aspects of water flooding processes, Introduction to current techniques of improved oil recovery. Chemical and thermal method of EOR. Specific topics include interfacial tension, entrapment, and mobilization of oil in porous media, residual oil, miscibility, adsorption at solid/liquid interfaces, surfactants and micro-emulsions, miscible gas flooding, polymer flooding, thermal methods, and the effect of reservoir heterogeneity. Prerequisite: PENG 3304. Spring.

**PENG4309 Integrated Reservoir Modelling****3 credits**

This course covers the basic techniques used in modern reservoir management by asset management teams. Data acquisition, analysis, and modeling will be covered. The reservoir model, production operations, and reservoir management economics will also be discussed. This is intended to expose students to the entire process of integrated reservoir description and the geostatistical tools that can be used to achieve the goals. The course will develop improved appreciation of the other disciplines' needs as well as the necessity of the feedback during the integration process. Prerequisites: PENG 4304. Spring.

### **PENG4312 Natural Gas Engineering**

**3 credits**

This is a comprehensive course on both reservoir and production engineering aspects of natural gas engineering. Topics include properties of natural gases, gas and gas condensate reservoir engineering, deliverability testing, pressure transient testing, well-bore flow mechanisms, gas gathering and transportation, rate measurements, gas compression and field handling o. natural gas. Gas field development. Storage of natural gas. Prerequisite: PENG 3304

### **PENG4313 Reservoir Geophysics**

**3 credits**

This course aims to introduce the different geophysical methods for reservoir description and assessment. Different petroleum exploration methods mainly geochemistry, gravity, radioactivity and seismic are covered. Structural and stratigraphic analysis of geophysical data. Development of reservoir static model and assessment of initial oil and gas reserve based on geological and geophysical data. Prerequisite: PENG3409.

### **PENG4314 Production Logging**

**3 credits**

The course aims to develop the student's skills to identify undesired changes in well performance and to propose suitable solutions. The course covers production logging techniques and tools (Flowmeter, Gradiomanometer, cement evaluation, noise & temperature) and cased-hole logging techniques and tools (thermal decay time, reservoir saturation, formation resistivity). Field examples in vertical and horizontal wells are discussed. Prerequisite: PENG 3409.

### **PENG4315 Shale Gas Reservoir**

**3 credits**

This course provides students with focused instruction on the geological, geophysical and petrophysical attributes of shale reservoirs, including the origin and accumulation of natural gas and liquids. Participants will be exposed to the methods and workflows for identifying and characterizing shale reservoirs. They will build on this foundation to learn about the engineering aspects of shale hydrocarbons exploitation. Participants will gain an understanding of methods and workflows for developing shale hydrocarbons resources including horizontal well architecture & placement, completions, hydraulic fracturing and production. Prerequisite: PENG 3304.

### **PENG4316 Reservoir Rock mechanics**

**3 credits**

Introduction to rock mechanics as an essential tool in petroleum engineering. Mechanical properties of rocks and their laboratory determination. Acoustics in rock mechanics. In-situ stress conditions and their determination. Failure of rocks. Stresses in boreholes; Borehole failure mechanisms. Sand production, introduction to hydraulic fracturing, reservoir compaction and surface subsidence. Prerequisite: PENG 2310.

### **PENG4317 Petroleum Economic and Legislation**

**3 credits**

Introduction to the standards and practices of economic analysis in the petroleum industry. Brief review of the principles of economic evaluation, typical decision making situations including risk analysis, alternative reservoir depletion schemes utilizing decline curve analysis, secondary stage development options, and various improved oil recovery methods. Analysis involves reserve estimation and forecasting of capital investment, operating cost, and manpower requirement. Different kinds of oil contracts and legislations in Kurdistan. Prerequisite: MGMT 1314

### **PENG4318 High Temperature High Pressure Reservoirs**

**3 credits**

The course introduces the students to the unique aspects and issues surrounding drilling and completion of a HPHT development. HPHT fields are increasing in relevance every year in different areas of the world. Conventional fields have represented the vast majority of application during the last years. However, unconventional fields, which require in some cases very high pressures to achieve the required fracture gradients and extend the flow area, are becoming a very common area of application for HPHT well completion designs. Prerequisite: PENG3308, PENG2310.

### **PENG4319 Advanced Well Test**

**3 credits**

This course will stress the practical application of modern techniques in well test analysis, with a special emphasis on the pressure derivative. Various pressure analysis techniques will be used to analyze flow tests, buildup tests with or without phase redistribution, multi-rate tests, interference tests, and pulse tests. Interpretation of pressure tests under multiphase flow conditions, hydraulically fractured wells, naturally fractured reservoirs, slanted wells, and horizontal wells will be discussed in great detail. Prerequisite: PENG 4205

### **PENG4320 Unconventional Energy Resources**

**3 credits**

This course covers the basics of unconventional oil and gas resources which is differentiated from conventional hydrocarbon resources based on the state of the hydrocarbon, nature of the geologic reservoirs and the types of technologies required to extract the hydrocarbon. Unconventional hydrocarbon deposits are very diverse and difficult to characterize overall, but in general are often lower in resource concentration, dispersed over large areas, and require well stimulation or additional extraction or conversion technology. They also are often more expensive to develop per unit of energy and require a higher price to be economic. Unconventional natural gas can be of several types; tight gas, coalbed methane, and shale gas contribute significantly to natural gas production and gas hydrates, ice-like solids that traps methane represents an extremely large natural gas resource. Unconventional natural gas resources represent an extremely large gas-in-place volume.

### **PENG4321 Surface Production Facilities**

**3 credits**

The purpose of this course is to introduce the students with the design of separator, treatment of oil and gas, as well as the produced water treatment process. Upon completion this course, the students will be able to design two phase and three phase separator, emulsion treatment and waste treatment process and gas handling facilities. Prerequisite: PENG 3308.

### **PENG4322 Offshore Drilling and Production Systems**

**3 credits**

This course covers the basics of offshore petroleum construction. It provides students with an overview of the phases, operations, and terminology used in the drilling and completion of an offshore oil or gas well. The course will provide students with a better understanding of the issues faced in all aspects of drilling operations, with a particular focus on the unique aspects of offshore operations. Flow assurance is a critical component in the design and operation of offshore production facilities; this is particularly true as the industry goes to deeper water, longer tiebacks, deeper wells, and higher temperature and pressure reservoirs. It focuses on how subsea hardware, pipelines, riser systems, and other equipment relate to design philosophies and how to establish a basis for subsea production system design Prerequisite: PENG 3308, PENG 2310.

### **PENG4323 Well Stimulation**

**3 credits**

This course covers the most aspects of well stimulation technologies whose main objective is to repair formation harm so as to revive / increase production. This course will highlight: Formation Damage (Definition, mechanism, counter measures, etc.); Acidizing (Matrix Acidizing, Acid fracturing, etc.); Hydraulic Fracturing Overview and HSE and Stimulation. Prerequisite: PENG 3308.

### **PENG4324 Advanced Simulation**

**3 credits**

This course provides students with various algorithms, concepts and the possible uses of reservoir simulators in creating dynamic reservoir models. These are used to investigate reservoir behavior, optimize reservoir performance, design complex wells, estimate uncertainties and form the basis for risk assessment. Students will be capable to understand artefacts and the benefits of reservoir simulation, different gridding technologies, their advantages and disadvantages „How to perform data quality checks on input data and resulting simulation model, different history matching approaches Black-oil vs. compositional simulation and Formulation details in dual porosity / dual permeability models and their consequences. Prerequisite: PENG 4304

### **PENG4325 Reservoir Management**

**3 credits**

This course covers the basic techniques used in modern reservoir management by asset management teams. Data acquisition, analysis, and modeling will be covered. The reservoir model, production operations, and reservoir management economics will also be discussed. This is intended to expose students to the entire process of integrated reservoir description and the geostatistical tools that can be used to achieve the goals. The course will develop improved appreciation of the other disciplines' needs as well as the necessity of the feedback during the integration process. Prerequisite: PENG 4309.

### **PENG4326 Petroleum Transportation and Storage**

**3 credits**

This course cover the basics of pipe line transport, pipe line design, calculation of the pressure drop through the pipes, fittings, valves, and bends, pipe line construction, pumping and boosting stations, gas transmission lines, metering, pipe line automation, tanker and railroad transportation, pipeline safety, regulations, specifications of the pipeline for onshore and offshore networks, examples of international pipelines, pipeline operations and

maintenance, crude oil storage type, temporary storage of crude oil, crude oil stock calculations. Prerequisite: PENG 3308

### **PENG4327 Gas Condensate Reservoir Engineering**

**3 credits**

The aim of this module is to provide students required basics of different types of gas condensate reservoirs and concepts from P-T diagrams and retrograde effect will be used to classify gas condensate. In addition, simple concepts (including residual gas saturation) will be introduced to study water-drive gas reservoirs. The module covers the recovery of liquid condensate dropout in rich-gas condensate reservoirs and the well deliverability in gas condensate reservoirs. Prerequisite: PENG3304

### **PENG4328 Artificial Intelligence Applications in Reservoir Characterization**

**3 credits**

The course attempt to answer the question: How will A.I. change the way we work in the Oil and Gas industry in the coming years? Looking at what is underway in other industries and guessing what type of projects are under development in R&D departments in oil industry will help answer that question. Reservoir characterization is an important issue in oil and gas industry. Oil and Gas examples will be presented corresponding to each of the terms A.I., Machine Learning, and Deep Learning, allowing students to reach a clear understanding on how they differ w.r.t conventional reservoir characterization techniques. Prerequisite: PENG 3206

### **PENG4329 Corrosion in oil and gas industry**

**3 credits**

The aim of this module is for students to understand the engineering principles pertaining to corrosion in the oil and gas industry and to be able to formulate strategies to deal with corrosion problems which present a severe challenge to the petroleum production operations. In addition, the risk of pollution and hazards to safety are often important reasons for adequate corrosion engineering. The student will be able to propose preventive and/or remedial actions applicable to real world scenarios. Prerequisite: CHEM2205

### **PENG4330 Horizontal Well Technology**

**3 credits**

This course covers the basics of geo-steering and geo-mechanical properties of reservoir rocks. It addresses mostly reasons of directional and horizontal well, design, formation evaluation and stimulation techniques in horizontal sections and economic aspects of horizontal well technology applications. Prerequisite: PENG4202.

### **PENG4390 Capstone Project I**

**3 credits**

This course covers principles and techniques of petroleum reservoir modeling based on reservoir characterization and reserve estimation approach. Steady and unsteady fluid flow equations. Application of the general material balance equation for determining initial oil in place and gas cap size and water influx constant under different drive mechanisms. Application of the general material balance equation for determining the initial gas in place for a conventional gas reservoir and decline curve analysis for buildup dynamic reservoir model. Prerequisites: PENG3304, PENG3308, PENG 3311. Fall

### **PENG4391 Capstone Project II**

**3 credits**

The course covers principles and techniques of petroleum reservoir modeling based on reservoir characterization and reserve estimation approach to reach complete scenario of reservoir management and appraisal. Prerequisite: PENG4390. Spring.

### **PHIL1310 Introduction to Philosophy**

**3 credits**

This class introduces students to Western philosophy through a historical analysis of basic concepts and ideas, including theories on the reason for existence, the purpose of life, the meaning of happiness, the existence or non-existence of free will, how one should live, and does the individual have an obligation to society and the greater good. Beginning with ancient Greece and Rome and the works of Socrates, Plato, the Stoic philosophers, Aristotle, Marcus Aurelius, and others, the course will trace the development of modern philosophical through the Middle Ages, the Renaissance, the Enlightenment, and the modern period, including the ideas of Saint Augustine, Montaigne, Descartes, Hume, Kant, Thoreau, Nietzsche, Sartre, Beauvoir, Gandhi and Martin Luther King Jr.

### **PHIL1311 Ethics and Social Responsibility**

**3 credits**

This course is an introduction to moral philosophy and is intended for students who have had little or no prior exposure to philosophy. It provides a broad examination of central issues in moral philosophy and considers how knowledge gained from these examinations can be applied to contemporary moral problems. Students will learn about some of the most important theories and figures of moral philosophy in order to develop a clear understanding of questions that recur in ethical debates. Students are encouraged to think about these questions in terms of what is morally right, and individual duties and responsibilities to society and to other people in order to allow students to develop reasoned positions on social and ethical issues. The course also examines contemporary issues related to ethics and students debate such issues by applying relevant ethical philosophies. Fall.

### **PHYS1401 Physics & Lab**

**4 credits**

This course explores basic physics theories, applications, and concepts, including kinematics, dynamics, Newton' laws of motion, force, gravitation, energy forms and their sources, torque, momentum, conservation laws of momentum and energy, and collision. Students will also study the basics of electricity and magnetism, waves, optics, and heat and will complete experiments in various areas of physics such as mechanics, optics, electricity and magnetism. Students will become familiarized with the process of scientific methods in carrying out experiments. Fall.

### **PHYS2302 Statics**

**3 credits**

Statics is an introductory course that explores the basic principles and concepts governing the behavior of stationary objects and systems under the influence of forces. This course serves as a foundational stepping stone for students pursuing engineering, physics, or other disciplines related to mechanics and structures. By studying statics, students develop a solid understanding of the equilibrium of bodies and gain essential problem-solving skills that can be applied to real-world scenarios. The prerequisite for this course is basic algebra and trigonometry. As a lecture-based course, it's offered in both spring and fall semesters.



### **PHYS2303 Dynamics**

**3 credits**

Dynamics is an introductory course that explores the fundamental principles and concepts governing the motion and forces acting on objects. This course serves as a continuation of the study of mechanics, building upon the foundation established in statics. After taking dynamics, students develop a deeper understanding of how objects move and interact under the influence of forces, gaining essential problem-solving skills that can be applied to real-world scenarios. The prerequisite for this course are MATH1321 Calculus I and PHYS2302 Statics. As a lecture-based course, it's offered in spring semester.

### **PSYC1301 Introduction to Psychology**

**3 credits**

This course is a broad introduction to the science and methodology of psychology. Students will explore the historical development of psychology and the various theoretical perspectives and research that underlie the major areas of psychology today. Also, students will learn about research methods used in psychology to study the origins and variations in human behavior. Spring.

### **PSYC2310 Human Growth and Development**

**3 credits**

This course studies the physical, cognitive, emotional, and social factors in human development from conception through the end of life, including human lifespan and developmental influences and emphasizing individual application. It gives weight to understanding people at various ages of development, providing theories and factual content underlying current thinking and research. Fall, even-numbered years. Prerequisite PSYC1301.



### **SCST3301 Introduction to Security Studies**

**3 credits**

This course is designed as an introduction to Security Studies. Since the late 1980s, there has been a remarkable change in the way security is conceived, studied and practiced. The Globalized world, characterized by the ever-increasing flows of information, capital, goods, services, commerce, people and violence penetrate our local communities and present challenges that may threaten the safety and security of people and institutions. The

main aim of this course is to introduce students to old and new thinking about Security Studies. It traces the evolution of Security Studies from the study of war and strategy to concerns with individual, societal and global security. The course will focus on the basic concepts central to Security Studies and allow students to gain an introductory overview of the field of Security Studies. Fall.

### **SCST3302 Intelligence Analysis and Critical Thinking**

**3 credits**

The ability to accurately analyze intelligence from a variety of sources is a key skill for anyone intending to pursue a career in the security sector. This course trains students to apply their critical thinking skills to analysis security threats and formulate appropriate policy recommendations. At the end of the course students should be able to independently prepare and analyze a comprehensive intelligence report. Spring. Prerequisite: SCST3301

### **SCST4303 Critical Security Studies**

**3 credits**

Insecurity, shock, trauma, despair, perceptions of broken communities, threats to identity, migration, and feelings of being unwanted and misplaced; genocide, civil war and marauding militias in countries of the so-called global South, and economic uncertainty, a migration crisis and terrorist attacks in the industrialized North are subjects of the course of Critical Security Studies. The course is concerned with these phenomena and how people react to, make sense of, and live with them. Its focus on people and everyday life and its concern with voices that are not normally heard, differentiates critical security studies from traditional security studies, which understands the state as the main actor and unit of analysis. In this course, we examine how the 'critical turn' in International Relations has changed our thinking about security. In turning away from the state and the military as the conventional actors in security studies, critical security studies look at how women, people of color, and non-elites are affected by policy decisions, bureaucratic procedures, and media representations. Fall. Prerequisite: SCST3302.

### **SCST4304 Terrorism, Insurgency and Counterinsurgency**

**3 credits**

This course examines the historic development, contemporary conceptions, definitions and scope of terrorism, insurgency and counter-insurgency. The course will investigate these forms of violent conflict and focus on how both state and non-state actors engage with and employ terrorism, insurgency and counter-insurgency in order to achieve political goals. The course will compare different theories of terrorism, insurgency and counter-

insurgency and explore why, how and when actors engage in these activities. It aims to help students investigate the causes and consequences of these forms of conflict, and to identify and analyze the motivations, objectives and strategies of terrorists, insurgents and counterinsurgents. Fall. Prerequisite: SCST3302.

### **SCST4305 Trending Issues in Cyber Security**

**3 credits**

Cyberwarfare is increasingly recognized as the new frontier in international conflict. Cyberattacks can include the shutting down of key governmental services, the theft of confidential information and the spread of false information all with the potential to have devastating consequences on states ability to function. This course examines the types of security threats and how to respond to them. Spring. Prerequisite: SCST4303.

### **SCST4306 Conflict Resolution and Reconciliation**

**3 credits**

The course explores the fundamentals of the process of conflict resolution and the key role reconciliation plays in securing a durable peace. It provides students with an introduction to the theoretical underpinnings of the processes of conflict resolution and reconciliation, while also providing them practical insights and immersive case study analysis illustrating how theory can be applied to the real world. Particular attention is given to the challenges that can arise in both processes and ways these can be overcome. Spring. Prerequisite: INTS4317.

### **SOCI1301 Introduction to Sociology**

**3 credits**

This course introduces students to the science of sociology, including social theory and using empirical studies through which students acquire the ability to connect individual experience to large social structures. The course introduces students to the writings of Marx, Durkheim, Weber, Simmel, and contemporary figures. It examines common-sense assumptions about culture, politics, history, and psychology, and empowers students to replace them with evidence-based reasoning. By emphasizing reading, writing, and critical thinking skills, this course helps students build the foundation for a deeper understanding of sociology theory and methods. Spring.

## **SOCI2310 Culture, Diversity, and Multiculturalism**

**3 credits**

During the course, students will gain an in-depth understanding of the main theoretical streams involved in culture, diversity, and multiculturalism. Students will explore the meaning of cultural diversity and multiculturalism, the difference between the concept of the melting pot and mosaic models of multiculturalism, how languages, races, ethnicities, and religions can coexist, and how and why cultures should engage with, learn about, and empathize with each other. Furthermore, students will explore how the cultural attributes of small groups and large communities fit into the general global and regional political landscapes. Fall, odd-numbered years.



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