

Bachelor of Computer and Networking Engineering Technology -Course Description

LNG 171 English 1

LNG 171 exposes students to academic reading and writing skills. It provides instruction and practice in academic reading skills, and requires students to implement writing strategies and participate in classroom discussions. Students will also demonstrate reading comprehension through summarizing and paraphrasing key passages and acquire the skills necessary for success in the first year courses in their major programs. **Pre-requisite None**

LNG 172 English 2

The course focuses on the refinement of reading and writing skills for increased success in the students' major programs of study. It is designed to familiarize students with the critical reading and analytical writing skills through the use of a variety of rhetorical devices, purpose, tone and style to develop critical reading and thinking skills. **Pre-requisite LNG-171**

LNG 173 English II for Engineering & Computing

LNG 173 is an advanced-level English course that explores the written tasks encountered in the professional and academic context within the specialized field of study. In the process of analyzing and composing a research project, students will also develop critical thinking skills and research skills that will help them become effective and successful professionals in their fields. **Prerequisite:** LNG-172

GED 198 Islamic Culture

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

GED 196 Communication Skills in Arabic 1

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

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

- 1- قراءات في مجال الاتصال والتواصل الإنساني .
- 2- قراءات في الثقافة الأدبية : يتناول مجموعة من المقالات والدراسات المتقدمة التي تطرح إشكاليات وقضايا تتلاءم مع أهداف التنمية العلمية والفكرية والثقافية والاقتصادية التي تسعى الجامعة إلى تحقيقها على مستوى الفرد والمجتمع .
- 3- أنشطة البحث العلمي : وتتناول البحث الصفي ومجالاته المختلفة ، اختيار نقطة بحثية وإجراءات معالجتها بدءاً من صياغة

عنوان البحث ، و طرق جمع مادته و كيفية تدوينها و توثيقها ، و صوغ أفكاره وإخراجه في صورته النهائية

Pre-requisite None

GED 199E UAE Society

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

ENT 141 Fundamentals in Innovation and Entrepreneurship 1

This course is developed for the UAE based on decades of practices and experiences of teaching innovation and entrepreneurship at Stanford University that has fueled innovation and high growth in Silicon Valley. The goal of the course is to equip the next generation of leaders in the UAE with an innovative and entrepreneurial mindset and its related core skills. Most sessions include a mix of components: lecture, discussion, interactive activities in class, and open Q & A if an appropriate expert or guest speaker is available. The session descriptions below contain a summary of the session, a list of materials to read and videos to watch before the session, and a set of study questions to contemplate beforehand and to be used in class discussion. You will focus on the principles of design thinking. ***Pre-requisite None***

ENT 142 Fundamentals in Innovation and Entrepreneurship 2

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

ENT 241 Entrepreneurship I

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

ENT 242 Entrepreneurship II

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

GED 110E Modern Art Appreciation

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

GED 111 Music Appreciation and Communication

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

GED 112 Using Positive Psychology at Work

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

GED 252E Critical Thinking

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

GED 205E Psychology in Every Day Life

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

GED 272E Fundamentals of Public Speaking

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

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

GED 324E Ethical Reasoning for Today's World

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

MTH-130 Probability and Statistics

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

MTH-120 Discrete Mathematics 1

The course introduces students to the foundational concepts in mathematics used computer science. Students are exposed to the principles of logic, set theory, combinatorics, proofs, algorithms, tree structures, LCM and GCD. Applications to computer science and computing are presented. **Pre-requisite pass Math Placement test or MTH 012**

NET-112 Computer Architecture

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

SWS 110 Programming I

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

SWS 316 Programming II

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

NET 101 Digital Logic

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

BUS 310 Project Management

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

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

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

EBU 200 e-Business Fundamentals

This course defines the formulating business strategy in e-business, providing students with the theoretical and practical foundations necessary for understanding e-Business, the fundamentals of e-Business, its terminologies, concepts, and its infrastructure. Topics include: Concepts and Essentials differences between e-Business as compared to e-Commerce, IS/IT e-Business infrastructure and importantly e-commerce fundamental including its various business models. Introduction to e-business strategies with emphasis on integrated enterprise business operations including supply-chain management, e-procurement, e-marketing and customer relationship management. Legal issues and privacy relating to virtual communities it supporting network infrastructure, performance issues related to e-Business systems. **Prerequisite: None**

MKT 201 Principles of Marketing

This course sets the foundations in the field of marketing to provide an understanding of the analytical techniques required to develop successful marketing strategies. Theoretical and conceptual issues in marketing are discussed, along with their implications in formulating marketing strategies, as well as examining the managerial focus on the external environments and decision elements of the marketing mix (Product, price, place and promotion) faced by marketers at the corporate and entrepreneurial levels of business. **Prerequisite: None**

ENG 320 Internship

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

ENG 400 Graduation Project-1

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

ENG 401 Graduation Project-2

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

MKT 360 Customer Relationship Management

Organizations of all sizes endeavor to leverage customer Relationship Management (CRM) in order to optimize the identification, procurement, growth and retention of desired customers to gain sustained strategic competitive position and to enhance market or wallet share. This course examines CRM philosophies, the fundamental principles that established CRM as a marketing philosophy, its application in supply chain, e-business, marketing, sales, and customer service, and the imperatives of technology in CRM strategies. In addition, various

approaches for managing a wide range of customer lifecycle, customer identification, differentiation, data mining and data warehouse, data integration and decision support systems, and how organizations integrate major business functions to meet and exceed customer value expectations will be discussed. In particular, both the conceptual knowledge and hands-on learning using leading CRM software will be emphasized. **Prerequisite: MKT-201**

EBU 450 e-Business Consulting Project

This course allows the student to synthesize the various skills learned by developing and/or implementing a "real world" e-business project such as developing an e-commerce website, from design, development, to implementation and final review. Each team should develop and monitor its own project plan, prepare a business case or business plan to support the proposal and implement a solution. The students should work with faculty advisors to determine an appropriate 'real-world' project that can be completed during the term.

Prerequisite: Final Semester

COM 425 Coding and Information Theory

This course introduces the theory and practice of coding and information theory for applications in the communication field. Topics include: Discrete Sources, Channels and Channel Capacity, Shannon's Coding Theorems, Run-Length-Limited Codes, Linear Block Codes, Cyclic Codes, Convolutional Codes, Trellis Coded Modulation, Bit Interleaved Coded Modulation, Turbo Codes, Low Density Parity Check Codes, and Coding for the Fading Channels. **Pre-Requisite: COM-412**

NET 110 Computer Network Fundamentals

Introduction to data communication systems; Local Area Networks and OSI layer model, with emphasis on data link and physical layers; Analog and digital communication systems; Multiplexing, bandwidth and throughput; Modulation techniques; Transmission lines; Switching and routing; Ethernet technologies; Internet Protocol **Prerequisite: None**

NET 111 Operating Systems Fundamentals

Evolution of computer systems: batch processing, multiprogramming, multi-processing, real-time, time-sharing, distributive systems; Process allocation; Process communication and synchronization; Memory management; Virtual memory system; Resource allocation algorithms; File system implementation; Security and protection; Strategies for system implementation. **Prerequisite: NET-112**

NET 120 LAN Switching and Routing

This course handles the theory and implementation of routing, switching and their associated protocols and algorithms which are the main elements in internetworking technologies. Topics include: Review of class full IP addressing and sub netting, Bridges, Switches, and Routers, Variable Length Subnet Masking, Classless Inter domain Routing, Route aggregation; Mechanics of Routing Protocols, RIP v1 and RIP v2, IGRP and EIGRP; OSPF; IEEE LAN standards, Transparent Bridges; Principles of LAN Switches, Loop Resolution, VLANs Applications, Concepts, and Standards. **Prerequisite: NET-110**

NET 121 Network Operating System

This course provides an introduction to network operating systems and partial preparation for the MCSE exam. Topics include: NT Domain Model, Install and configure NT Server, Primary Domain Controller (PDC), Network Protocols, Plan and implement TCP/IP, Dynamic Host Configuration Protocol (DHCP), Permissions, Recent Server model (2000 or higher), Active Directory, Configure the server environment, Manage accounts and client connectivity, Object Security, Web and FTP server. **Prerequisite: NET-111**

NET 210 WAN Technologies

This course focuses on WAN network technologies such as ATM, ISDN and Frame Relays. Topics include: Guided and unguided transmission, Integrated Services Digital Network, Multiplexing, ADSL, xDSL techniques, Soft switch Architecture, Packet Switching Principles, X.25, ISDN Architecture, Asynchronous Transfer Mode, Web site reading, Routing in WAN Circuit-Switch, and Packet-Switching Network, Least-Cost Algorithm, Congestion Control in Switched Data Network, Effect of Congestion, Cellular Wireless Network, Principles, First Generation Analog network, Second Generation CDMA, Third Generation Systems.

Prerequisite: NET-120

NET 214 Network Programming

This course provides the student with the basic programming skills to develop distributed applications and application level protocols. Topics include: Java and Socket level programming API, Programming using URL API in Java, Fundamentals of concurrency, Multithreaded in Java, Thread synchronization, Remote Method Invocation (RMI), Creating RMI client and server, Architectural view of CORBA, Interface Definition Language (IDL), Java IDL and CORBA programming, Java servlets, HTTP session management in servlets.

Prerequisites: SWS-213, SWS-316 and NET-110

NET 220 Network Security and Administration

This course introduces security theory and practice. Security models, policies and implementation techniques are explained and evaluated. Topics include: Access Control Matrix model, Protection States Transition, Attenuation of Privilege, Generic algorithm for securing computer system, Take-grant protection model and interpretation, Security Policy, Roles of Trust, Hash message authentication code (HMAC), Simple Network Management Protocol (SNMP), Key exchange and authentication, Key generation, Certificate Signature, Cipher Techniques, Stream, Networks and Cryptography, Analysis Network Infrastructure, DMZ, Network Flooding. **Prerequisite: NET-120**

NET 221 Communication Technology

This course provides fundamental concepts in communication technology especially wireless communications. Wireless propagation characteristics have a profound impact on layers 1, 2, 3, and 4 protocols and services. Therefore, the focus of the course is on understanding the TCP/IP Protocols in Wireless Networks with most emphasis on the physical layer. As part of the discussion on the application layer, an introduction of Wireless Internet and WAP is given.

Prerequisite: NET-120

NET 222 Wireless Networks

This course focuses on modern wireless communication and networking technology, and its application to transmit voice, data and images. Topics include: Radio frequency spectrum, Licensed and unlicensed bands, bandwidth and information rate; Multiple Access methods and Spread Spectrum Techniques (FDMA, FDM, FDM/TDMA and CDMA); Wireless Personal Area Network (Bluetooth, piconet, scatternet, ...); IEEE 802.11 Wireless LAN; Planning and building Wireless LANs; Compose Request for Information and Request for Proposal regarding WLAN; Security in Wireless Networks; Wireless WANs; Cellular, Voice and Data Networks, Cellular Networks, AMPs, GSM, GPRS and CDMA based system, LMDS and MMDS; Wireless and Internet. **Prerequisite: NET-221**

NET 310 Network Management

This course introduces standard networking management principles, practices and technologies. Starting with the Data Communication and Network Management Overview, the basic Standards, Models, and Language of Network Management System are introduced. The course leads up to the management technologies such as SNMP (simple network management protocol), RMON (remote monitoring) and Web-based Management. **Prerequisites: NET-120 & SWS-316**

NET 320 Advanced Switching and Routing

IP protocol; Delivery and routing of IP packets; IP Multicasting; Routing protocols: RIP, OSPF, BGP and multi-protocol label switching & GMPLS; Quality of Service (QoS); Advances Switching and VLAN; Spanning Tree Protocol (STP). **Prerequisite: NET-210**

NET 323 Voice and IP Convergence

This course covers: Concepts of IP-based packet networks; Characteristics of the Internet and IP; The VoIP Model; Voice Coders; Performance Considerations and Traffic Engineering; trade-offs of packet size, packet loss, and packet latency; RTP, RTCP, RTSP, translators and mixers; signaling, Session Initiation Protocol (SIP), Session Description Protocol (SDP); VoIP Gateways and IP Call Processing Protocols; Internetworking SS7 and Internet Call Processing; Quality of Service (QoS). **Prerequisite: NET-110**

NET 410 Enterprise Network Design

In this course, the student investigates and designs a variety of enterprise network configurations. The course enhances the student's consulting skills through the process of customer requirement analysis, network design, product specifications and price quotation. Topics include: Top-Down Network Design, Characterizing Network Traffic, Logical Network Design, Designing Models for Addressing and Naming Guidelines, Selecting Switching and Routing Protocols, Developing Network Management Strategies, Physical Network Design, Selecting Technologies and Devices for Enterprise Networks, Testing and optimizing Network Design, Documenting Network Design. **Prerequisites: NET-222**

NET 411 Network Design Project

This course enables the student to further enhance the design and project planning skills acquired in earlier courses. Students shall apply their consulting skills through the process of the requirement analysis of a real life design problem. This initial client need analysis will be followed by a proposed solution (network design), installations, and thorough testing using the latest network performance evaluation tools. A final network solution will be presented to the multi-disciplinary audience. The instructions on how to use it for the specified application will be given in both writing and documentation. The technology with all documentation will be transferred to the client. **Prerequisite: NET-310**

NET 412 Applied Research Project

The project illustrates research as the systematic process of collecting and analyzing information to increase our understanding of the phenomenon under study. The course studies the relationship and applicability of theories or principles to the solution of a problem. It offers to the student tackling basic research methodology as well as formulating a research problem or topic. The student should conduct a project in researching the proper explanations or understanding of the issue or topic under investigation. **Prerequisites: MTH-130 and SWS-320**

SWS 421 Cryptographic Algorithms and Protocols

Security protocol modules; Basic cryptography objectives namely confidentiality, integrity, authentication, freshness, and non-repudiation; Security tools; Symmetric (secret-key) mechanisms; Asymmetric (public-key) mechanisms; Encryption for confidentiality and authentication; Key management and key generation; Implementation of algorithms.

Prerequisites: *NET-222*

NET 420 Advanced Network Troubleshooting

This course provides a study into the latest troubleshooting strategies. These strategies focus on bottom-up methodology that examines in detail each network layer-physical, data link, network, transport, session, presentation, and application revealing the problem and solutions specific to each layer. Topics include: Analyzing and Troubleshooting the 1. Physical Layer (ATM), 2. Data Link Layer, 3. Network Layer (Internet Protocol: IP), 4. Transport Layer (Transport Control Protocol: TCP), 5. Session and Presentation Layers, and 6. Application Layer, Asynchronous Transfer Mode (ATM), Measuring and Analyzing Throughput and Latency. **Prerequisites:** *NET-222*

NET 433 Broadband Communication

This course provides a detailed analysis of broadband infrastructure, technologies and services. It addresses industry standards and global services. Topics include: Internet Services, Traffic Modeling, Internet Traffic Control, Billing, Pricing and Admission Policy, Mobile Network Performance, Bandwidth Allocation, Switching Systems, Traffic Flow Control Routing, Congestion and Admission Control, Multicast Protocols, Network Management, Quality of Service. **Prerequisite:** *NET-120*

BUS 120 Financial Analysis

This course covers the financial and managerial techniques used to budget, monitor, and evaluate projects, departments, and organizations. The course focuses on how internal stakeholders use financial information within an organization to plan, monitor and evaluate activities. Cost behaviors and reporting techniques will be examined for their influence on managerial decision-making. Analysis templates will be developed using spreadsheet software. Common decision making metrics will be examined for their underlying assumptions and limitations and will be applied to appropriate types of planning and operational decisions.

Prerequisite: *None*

BUS 410 Entrepreneurship in the New Economy

This course provides the participant with knowledge of the current economy that influences business models and the role of the entrepreneur. Topics include: Entrepreneurship And Small Business, Small Business Decision, Evaluation of a Business Opportunity, Business Plan, Buying a Business, Financing The Small Business, Marketing Management Project, Small Business and Electronic Commerce, Financial Management Project, Operations Project, Human Resources Management Project, Tax Management Project, Managing the Transfer of The Business. **Prerequisite:** *None*

SWS 320 Operational Research

The course begins with a brief review of Linear Algebra before proceeding to the discipline of Operations Research. Operations Research is a scientific approach to decision making that seeks the optimal design and operation of a system under conditions requiring the allocation of limited resources. This involves an introduction to Model Building, Linear Programming, The Simplex Algorithm, sensitivity analysis and duality. Additional Topics/Contents include The Transportation Problem, The Assignment and Transshipment Problems, Network Models and Integer Programming. **Prerequisite:** *MTH-120*

SWS 213 Database Design

This course teaches the students the core concepts related to relational databases, including the general architecture, conceptual, logical and physical design, querying techniques, and security features. Topics include: Introduction to Databases, Relational Model, Relational Algebra, Data Manipulation Using SQL, Data Definition Using SQL, Queries Using QBE, Database Analysis and Design Techniques, Entity-Relationship Modeling, Normalization, Conceptual and Logical Database Design, Physical Database Design, Monitoring, and Tuning, Database Security. **Prerequisite: None**

SWS 211 System Analysis and Design

This course examines best practices in business processes for a variety of business models. Critical risks and compensating controls are identified in each of the major operating cycles of the business. The principles of systems analysis and design are identified and applied to operations in the planning and analysis phases of the systems development life cycle. Process mapping techniques are developed through the use of commercial mapping software. Students explore object-oriented analysis and design (OOA & OOD) models using industry standard UML techniques. **Prerequisites: SWS-316**