King Hussein School of Computing Sciences
كليـــة الملك الحسين لعلـــوم الحوسبـــة

Course Description in Curriculum 2021/2022

Course No.	20132
Course Name	Calculus (1)
Credit Hours	3
Prerequisite	--
Co-requisite	--
Functions, limits and continuity. Derivatives. Differentiation. Inverse functions. Trigonometric functions. Logarithmic and exponential functions. Hyperbolic functions. Integrals	

Course No.	20133
Course Name	Calculus (2)
Credit Hours	3
Prerequisite	20132
Co-requisite	--
Methods of integration. Applications of integration. Plane analytic geometry including polar coordinates. Sequences and series, including power series	

Course No.	20134
Course Name	Discrete Mathematics
Credit Hours	3
Prerequisite	--
Co-requisite	--
Mathematical models. Proof methods. Program correction methods. Sets and operations. Relations and types. Charts and branches. Searching methods. Dividing. Functions and types. Algorithms. Counting methods.	

Course No.	20135
Course Name	Discrete Math (2)
Credit Hours	3
Prerequisite	20134
Co-requisite	**--**
Application of Number Theory, The Basis of Counting, The Pigeonhole Principle, Permutations and Combinations, Binomial Coefficients, Representing Relations, Closures of Relations, Equivalence Relations and Partitions, Representing Graphs, GraphsIsomorphism, Connectivity, Euler and Hamilto	

Course No.	20141
Course Name	Physics (1)
Credit Hours	3
Prerequisite	--
Co-requisite	**--**
Units and measurements. Vector algebra. Kinematics. Projectile and circular motions. Newton's laws of motion. Forces of nature. Applications of Newton's laws on rectilinear and circular motions. Work and energy. Law of conservation of mechanical energy. Laws of conservation of linear and angular moment.	

Course No.	20142
Course Name	Physics (2)
Credit Hours	3
Prerequisite	20141
Co-requisite	**--**
Electric Fields. Gauss'sLaw. Electric Potential. Capacitance and Dielectrics. Current and Resistance. Direct Current Circuits. Magnetic Fields. Source of Magnetic Fields. Faraday's Law. Inductance. Alternating Current Circuits. Electromagnetic Waves.	

Course No.	20233
Course Name	Statistical Methods
Credit Hours	3
Prerequisite	--
Co-requisite	**--**
Introduction to statistics. Elements of probability. Probability distributions (e.g., binomial, Poisson, geometric, hyper geometric, normal, t, F, and λ 2). Sampling. Simple linear regression. Correlation. Test of hypotheses. Analysis of variance.	

Course No.	20234
Course Name	Linear Algebra
Credit Hours	**3**
Prerequisite	20133
Co-requisite	**--**
System of Linear Equations: Row-echelon Form, Gaussian Elimination, Gauss Jordan Method. Matrices: Operations, Properties of Matrix Arithmetic, Matrix Transpose, Special Matrices. Determinants: Properties of Determinants, The Method of Cofactors, Adjoint Matrix and Inverse of a Matrix, Cramer's Rule. Euclidean n-space: Vectors, Dot Product, Cross Product, Euclidean n-space, Linear Transformations. Vector Spaces: Vector Spaces, Subspaces, Span, Basis and Dimensions, Fundamental Subspaces, Inner Product Spaces, Orthogonal and Orthonormal Basis, Least Squares, QR- decomposition, Orthogonal Matrices. Eigenvalues and Eigenvectors: Eigenvalues and Eigenvectors, Diagonalization	

Course No.	20325
Course Name	Project Management
Credit Hours	3
Prerequisite	80 credit hours
Co-requisite	**--**
Introduction to public management. Introduction to Project Management and Control. Project Life Cycle (Investigation, Planning, Development, Testing, Implementation, and Documentation). Introduction to Project Planning Elements (Budgeting, Scheduling, Staffing, Management, and Control). Network Design and Application of Project Management Techniques (Critical Path Method" CPM", Project Evaluation and Review Technique "PERT"). Project Management Information Systems: Selection Criteria and Use.	

Course No.	20332
Course Name	Operations Research
Credit Hours	**3**
Prerequisite	20133
Co-requisite	**--**
This course aims to develop learners' ability to use computers in various aspects of their lives. The course introduces the primary concepts of computers, and the basics of using a GUI-based desktop operating system and office productivity tools including word processing, spreadsheets, and presentation applications, in addition to basics of to using emails and navigating through the world wide web. At the end of this course, the students are expected to be able to use desktop computer for everyday tasks.	

Course No.	20333
Course Name	Numerical Analysis
Credit Hours	**3**
Prerequisite	20133,20234
Co-requisite	**--**
Vectors and matrices. Determinants. System of linear algebraic equations. Cramer's rule and characteristics-value problem. Error analysis. Iterative methods for solving linear and nonlinear systems of equations. Interpolation and approximation. Introduction to numerical differentiation and integration.	

Course No.	20334
Course Name	Applied Probability
Credit Hours	**3**
Prerequisite	20232
Co-requisite	**--**
Distributions of Random Variables; Conditional Probability and Stochastic Independence; Some Special Distributions (Discrete and Continuous Distributions); Univariate, Bivariate and Multivariate Distributions; Distributions of Functions of Random Variables (Distribution Function Method, Moment Generating Function Method, and the Jacobian Transformation Method); Limiting Distributions.	

Course No.	31010
Course Name	Arabic Language placement test
Credit Hours	**0**
Prerequisite	**--**
Co-requisite	**--**
Testing basic grammars in Arabic.	

Course No.	31019
Course Name	Arabic Language (Remedial)
Credit Hours	**0**
Prerequisite	**--**
Co-requisite	**--**
The verb and noun. Grammars. Punctuation. Al Hamza. Applications.	

Course No.	31020
Course Name	English placement test
Credit Hours	**0**
Prerequisite	**--**
Co-requisite	**--**
Testing basic grammars in English.	

Course No.	31029
Course Name	English Language (Remedial)
Credit Hours	**0**
Prerequisite	**--**
Co-requisite	**--**
Reading. Writing. Speaking. Listening. Application.	

Course No.	31111
Course Name	Arabic Language
Credit Hours	**3**
Prerequisite	31019
Co-requisite	**--**
Summarization. Punctuation. Spelling. Deletion. Displacement. Construction and inflection. Derivation. Substitution and the vowel system. Number. Indescribability. Sentence. Clause. Rhetoric issues and various applications	

Course No.	31121
Course Name	English Language
Credit Hours	**3**
Prerequisite	31029
Co-requisite	**--**
Advanced reading. Advanced writing. Grammar. Speech and Translation.	

Course No.	31151
Course Name	Jordan: History and Culture
Credit Hours	**3**
Prerequisite	**--**
Co-requisite	**--**
Jordan: the land and the people. Jordan: our homeland. The Arab Nation. History of Jordan. Political system in Jordan. Jordanian Society. Major national institutions. Internal and external challenges facing Jordan. The role of local institutions in achieving development in national awareness. The family, childhood and woman and its role in society.	

Course No.	31152
Course Name	Arabic and Islamic Civilization
Credit Hours	**3**
Prerequisite	**--**
Co-requisite	**--**
Concept of Civilization. Stages of Development of Arabic Islamic Civilization. Principles and Grounds of Arabic Islamic Civilization. Areas of cultural creativity in Arabic Islamic Civilization. Linguistics, Theology, Islamic Jurisprudence, Philosophy, Natural and Social Sciences, Islamic Art and Music. Unity of the Arab and Islamic worlds.	

Course No.	31161
Course Name	Introduction to Library Science
Credit Hours	**3**
Prerequisite	**--**
Co-requisite	**--**
Information sources. Types of Cataloging. Types of Catalogs. Types of Classification. Information and Knowledge. Information Society. Information Services. Information Technology. Information Storage. Information Retrieval and Dissemination. Information and Internet.	

Course No.	31171
Course Name	History of Science
Credit Hours	**3**
Prerequisite	**--**
Co-requisite	**--**
Importance of understanding science as a socio – historic phenomenon. Science as industry. Science and development. Cognitive conditions of scientific production. Examples: Kepler and Planck. Science as social production. Socio – historic determinants of the social production of science. Main epochs of the history of natural science. Greek science. Hellenistic science Roman science. Arabic Islamic science. Modern European science. Science in the contemporary Arab world. Epistemological periodization of natural science. Roots of the philosophy of nature. The Ionians. Platonic project in astronomy. Aristotle. Ptolemy. Arabic Islamic astronomy. The 17th century Scientific Revolution	

Course No.	31211
Course Name	Arabic literature
Credit Hours	**3**
Prerequisite	31111
Co-requisite	**--**
Developing students' taste of Arabic literature through the reading of literature essays. Analyzing. Introducing some literature aspects from different eras.	

Course No.	31251
Course Name	Military Science
Credit Hours	**3**
Prerequisite	**--**
Co-requisite	**--**
Grade: Pass / Fail (for Jordanians only) History of the Jordanian Army. Jordanian peace forces. Preparing the Nation for defense and liberation. Genesis and development of the Hashemite Kingdom of Jordan.	

Course No.	31261
Course Name	Introduction of politics and economy
Credit Hours	**3**
Prerequisite	**--**
Co-requisite	**--**
The nature of Political Economy. The Issues of political Economy. The importance of the market. Market effects and political Economy. Three Ideologies of political Economy. The Dynamics of the international political Economy. The political Economy of Structural changes. Long-Term variations of Economic Growth and the effect of political hegemonic. The politics of International Trade. The political Economy of international Finance.	

Course No.	31262
Course Name	Introduction to Educational Science
Credit Hours	**3**
Prerequisite	**--**
Co-requisite	**--**
Education: Principles and Philosophy. Education and individuals. Education and Learning. Education and Society. Education and development. Educational courses and methods. Educational institutions and educational assessments. Education in the Arab and Islamic world.	

Course No.	31263
Course Name	Technical Writing Communication Skills
Credit Hours	**3**
Prerequisite	31111, 31121
Co-requisite	**--**
Organization of the technical report. Layout and organization of the front page. Arrangement of information. Organization and layout of headings and sub-headings. Numbering systems. Order of arrangements of results and recommendations. How to prepare an un detailed proposal on any technical and scientific work.	

Course No.	31271
Course Name	Environmental Science
Credit Hours	**3**
Prerequisite	--
Co-requisite	**--**
The earth and natural hazards. Ecosystems. Biogeochemical Cycles. Man and the Environment. The Natural Resources in the Solid Earth System. Air Pollution. Water Resources. Management and Pollution. Solid Waste. Food and Health. Environmental Impact Assessment.	

Course No.	31351
Course Name	Current Issues in the Arab World
Credit Hours	**3**
Prerequisite	--
Co-requisite	**--**
Social and national fragmentation in the Arab East: Features and Roots. The ArabIsraeli conflict. Democracy and Civil Society in the Arab world. Pan- Arabism and Islam. The self and the other. Secularism. The Arabs and globalization. Human security in the Arab world.	

Course No.	31352
Course Name	Al-Quds History and Facts
Credit Hours	**3**
Prerequisite	**--**
Co-requisite	**--**
The geographic borders of AL- Quds through the history. A glance at the historical discoverers in AL-Quds. AL-Quds and the British occupation. The establishment of Israil . The Israili plans to Jadeite AL-Quds. Importance of AL-Quds from the religion point of view. The infringement of AL-Aqsa mosque since 1967 by Israil.	

Course No.	31361
Course Name	Introduction to Psychology
Credit Hours	**3**
Prerequisite	**--**
Co-requisite	**--**
Definition of Philosophy. The relation between Philosophy and Science. The science-based and religion-based thoughts. A historical review of Philosophy and Science. A discussion of the most important fields in Philosophy.	

Course No.	31371
Course Name	Health education
Credit Hours	**3**
Prerequisite	**--**
Co-requisite	**--**
Understanding the responsibility we have for our own health. Skills for dealing with emergency cases. Personal safety and accident prevention. Mental health, mental illness, stress and mental health.	

Course No.	31372
Course Name	Business skills
Credit Hours	**0**
Prerequisite	60 credit hours
Co-requisite	**--**

Course No.	**11100**
Course Name	**Computer Skills Placement Test**
Credit Hours	**0**
Pre-requisite	**--**
Co-requisite	**--**
The test MUST include all topics mentioned in 11100: Computer skills (Remedial) . Student MUST pass this test to be able to go directly to 2103 (old) / 11103 (new): Structured Programming. If the student fails in the test then she/he MUST (mandatory) take 11100 before she/he can take 11103.	

Course No.	11100
Course Name	Computer Skills (Remedial)
Credit Hours	0
Prerequisite	--
Co-requisite	--
This course aims to develop learners' ability to use computers in various aspects of their lives. The course introduces the primary concepts of computers, and the basics of using a GUI-based desktop operating system and office productivity tools including word processing, spreadsheets, and presentation applications, in addition to basics of to using emails and navigating through the world wide web. At the end of this course, the students are expected to be able to use desktop computer for everyday tasks.	

Course No.	11102
Course Name	Introduction to Computer Science
Credit Hours	3
Pre-requisite	--
Co-requisite	--
Introduction to Computer Science. Components of PC and data representation. Low level data representations (Binary, hexa, octal, conversions, binary arithmetic). Computer Networks and Internet, Software Engineering, Security, Introduction to programming computers. Evolution of programming languages and techniques. Problem solving using computers. Flowcharts. Problem solving through analysis and then through an introduction to programming language (Basic program structure, main function, I/O control structures, loop).	

Course No.	11103
Course Name	Structured Programming
Credit Hours	3
Pre-requisite	11102 (Introduction to Computer Science)
Co-requisite	
This course aims to introduce the fundamentals of structured programming using a high-level programming language. Topics include concepts of structured programming, program design, development, running, and testing, and debugging programs. Syntax and semantics of the presently adopted language so that students will develop the ability to program in the language. Basic elements of the language: variables, constants, and data types. Basic input/output functions. Conditional and iterative control structures. Functions (or methods) and parameter passing. Recursive functions (or methods). References and dynamic variables. Basic data structures: one and two-dimensional arrays, string manipulation, structures. At the end of this course, students are expected to be able to analyze a computing problem, design, and implement a solution using a high-level programming language.	

Course No.	**11151**
Course Name	**Structured Programming Lab**
Credit Hours	1
Pre-requisite	**-**
Co-requisite	**11103 (Structured Programming)**
This course aims to build practical skills for structured programming using a high-level programming language. At the end of this course, students are expected to be able to analyze a computing problem, design, and implement a solution using a high-level programming language.	

Course No.	**11206**
Course Name	**Object Oriented Programming**
Credit Hours	**3**
Pre-requisite	**CS11103** (**Structured Programming**)
Co-requisite	
The course aims to introduce object-oriented programming concepts and paradigms. Topics include: Data abstraction, encapsulation and information hiding, classes attributes and methods, inheritance, polymorphism, and operator overloading. At the end of the course, students expected to be able to solve computing problems using object-oriented principles including information hiding, inheritance, and polymorphism.	

Course No.	12343
Course Name	Visual Programming
Credit Hours	**3**
Pre-requisite	11206
Co-requisite	
This course introduces computer programming using a modern visual programming language with object-oriented programming principles. Emphasis is on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger	

Course No.	**11212**
Course Name	**Data Structure & Introduction to algorithm**
Credit Hours	**3**
Pre-requisite	**11206 (Object Oriented Programming (** **20134 (Discrete Math-1)**
Co-requisite	
The purpose of this course is to introduce the students to the complexity analysis of algorithms, the fundamental methods for representing data in memory and the algorithms which access data. Data structures include: lists, stacks, queues, trees, heaps, priority queues and hashing. Algorithms include searching and sorting. The course introduces a library of pre-defined data structures and algorithms (such as the STL). At the end of the course, students will be equipped with the tools that will enable them to write clear and efficient programs.	

Course No.	12242
Course Name	Webpage Design and Internet programming
Credit Hours	**3**
Pre-requisite	11206
Co-requisite	
This course focuses on how to design and maintain interactive and dynamic web sites using HTML, Cascading Style Sheets (CSS) and client–side scripting with JavaScript. The students will also learn basic Web Page design principles. The goal is to develop effective, pleasing and useful Web sites. In the JavaScript part of the course students will develop real-world projects to learn JavaScript programming, the JavaScript Object Model, JavaScript event handlers, and how to integrate JavaScript programs in a HTML document. Other client-side technologies (Ajax and XML) will be introduced.	

Course No.	12243
Course Name	Webpage Design and Internet programming Lab
Credit Hours	**1**
Pre-requisite	11206
Co-requisite	12242
Laboratory sessions on how to design interactive and dynamic Webpages. Programming tools: HTML, JavaScript, Ajax and XML.	

Course No.	**11253**
Course Name	**Object Oriented Programming Lab**
Credit Hours	**1**
Pre-requisite	
Co-requisite	**CS11206 (Object Oriented Programming)**
This course aims to build practical skills for object-oriented programming. Th course includes laboratory sessions on the different aspects and topics of object oriented programming. At the end of this course, students are expected to be able to analyze a computing problem, design, and implement a solution using object-oriented principles.	

Course No.	**11313**
Course Name	**Algorithm Design and Analysis**
Credit Hours	**3**
Pre-requisite	**11212 (Data Structure & Introduction to algorithm)**
Co-requisite	

This course presents fundamental techniques for designing and analyzing computer algorithms. Students learn how to write efficient algorithms to solve various problems and how to estimate their running times before running them. Students also do programming projects in which they implement different algorithms and compare their actual running times with the theoretical estimates. The course covers general problem solving techniques including divide-and-conquer, greedy, dynamic programming, brute-force, branch-and-bound and backtracking. These techniques are applied to set of problems such as sorting, knapsack, matrix chain multiplication, longest common subsequence, activity selection, graph problems, etc. The course also gives an introduction to the theory of NP-Completeness.

Course No.	11316
Course Name	**Theory of computation**
Credit Hours	**3**
Pre-requisite	20134 Discrete Mathematics 11206 Object Oriented Programming
Co-requisite	

This course aims to introduce the student to formalisms studied in computer science and mathematical models of computing machines. The language formalisms: regular, context-free and recursively enumerable languages. The machines: finite-state, pushdown and linear bounded automata and Turing machines. At the end of this course students will: Be able to construct finite state machines and the equivalent regular expressions. Be able to prove the equivalence of languages described by finite state machines and regular expressions. Be able to construct pushdown automata and the equivalent context free grammars. Be able to prove the equivalence of languages described by pushdown automata and context free grammars. Be able to construct Turing machines

Course No.	**11223**
Course Name	**Database Fundamentals**
Credit Hours	**3**
Pre-requisite	**15230 (Programming for Security Professionals)**
Co-requisite	

This course aims to introduce the fundamentals of database systems design and implementation. Topics include basic concepts of databases, DBMS components, transaction management, data modeling, entity relationship diagrams, relational databases, database integrity constraints, relational algebra, query languages, dependencies, schema design normalization and redundancy elimination. By the end of the course, students are expected to be familiar with many of the principles and concepts related to databases and how these are applied in real database systems.

Course No.	**11354**
Course Name	**Database Fundamentals Lab.**
Credit Hours	1
Pre-requisite	
Co-requisite	**11323 (Database Fundamentals)**
This course aims to build practical skills on how to design and implement a complete database application using a modern relational database system: It covers relations, queries, forms, reports, objects, properties, data design, software design, and rapid application development tools.	

Course No.	**11323**
Course Name	**Database Systems**
Credit Hours	**3**
Pre-requisite	**11212 (Data Structure & Int. to Alg.)**
Co-requisite	
This course aims to introduce the fundamental of database systems design and implementation. Topics include basic concepts of databases, DBMS components, transaction managements, data modeling, entity relationships diagrams, relational databases, database integrity constraints, relational algebra, query languages, dependencies, schema designs normalization and redundancy elimination. At the end of the course, students are expected to be familiar with many of the principles and concepts related to databases and how these are applied in real database systems.	

Course No.	**11325**
Course Name	**Database Fundamentals**
Credit Hours	**3**
Pre-requisite	11206+20134
Co-requisite	
This course aims to introduce the fundamentals of database systems design with focus on applications in Engineering Disciplines. Topics include: Database Basics and Applications, DBMS Components, Data Modeling & Entity Relationship Diagrams, Relational vs Modern Databases, incl. OO Databases, Data Integrity & Dependencies, Query Languages, Normalization and Redundancy Elimination, More Applications – Client-Server, Big Data and Cloud Databases. By the end of the course, students are expected to be familiar with many of the principles and concepts related to databases and how these are applied in real applications.	

Course No.	13324
Course Name	System Analysis And Design
Credit Hours	**3**
Pre-requisite	11425
Co-requisite	
Fundamental concepts. Notion of a system. Information system. System life cycle. Approaches to system analysis and design (classical, structured and object-oriented). Preliminary and Detailed Analysis. Workflow and Dataflow Diagrams. Structured English. Decision Tables etc. Criteria for software design and evaluation: module coupling, cohesion, modularity, portability. A project is required.	

Course No.	11335
Course Name	Operating Systems
Credit Hours	3
Pre-requisite	11212, 22342
Co-requisite	

This course aims to introduce the fundamentals of Operating System (OS) design and implementation. In this course, students will explore the importance of the operating system and its functions. Topics include an overview of the modern operating systems, types of operating systems, operating system structures, process management and threads (concepts of, communication, synchronization and deadlock), CPU scheduling, memory management and virtual memory, file systems, I/O systems, security and protection and distributed systems. Some topics in the course are implemented by writing programs to practically know how. By the end of this course, the students are expected to be familiar with many of the principles and concepts related to most of the actual operating systems and how these are applied in real OS.

Course No.	11343
Course Name	Special Topics in Computer Science (1)
Credit Hours	3
Pre-requisite	To be set by the Department
Co-requisite	

This course aims to introduce new topics in computer science and information technology. The department determine the content of the course.

Course No.	11344
Course Name	Advanced Topics in Internet Programming
Credit Hours	3
Pre-requisite	12243
Co-requisite	

This course aims to present advanced methods for creating interactive, dynamic and data driven Internet-based applications and within corporate intranet environments using the current state of stable and accepted technologies and frameworks to develop rich and maintainable applications. Topics include specialized web markup languages, server-side programming, web services, enterprise web development, as well as manipulation and visualization of data from various sources, including robust database management systems. Additional topics include integrating search engines, validation, authentication, web application security, and content management systems.

Course No.	**11347**
Course Name	**E-Business**
Credit Hours	**3**
Pre-requisite	**12243**
Co-requisite	
This course aims to expose students to the advanced use of information technology in the design and implementation of Web-based business applications. Topics include E-Business and E-Commerce terms and concepts, overview of online business models, how to structure an e-business applications, phases of implementing e-business technologies, and critical technologies supporting e-business.	

Course No.	**11354**
Course Name	**Database Systems Lab**
Credit Hours	1
Pre-requisite	
Co-requisite	**11323 (Database Systems)**
This course aims to build practical skills on how to design and implement a complete database application using a modern relational database system: It covers relations, queries, forms, reports, objects, properties, data design, software design, and rapid application development tools.	

Course No.	**11355**
Course Name	**Operating Systems Lab**
Credit Hours	1
Pre-requisite	
Co-requisite	**11335 (** Operating Systems**)**
This course aims to help students understand operating systems and provide them with some practical skills managing an operating system. The students are introduced to the LINUX OS, where they get hands on experience with the most common commands performing necessary OS operations and services. The students learn to use CLI and GUI interfaces, write shell code, write programs that deal with Processes management including synchronization and threading, interact with files and learn some network and socket programming	

Course No.	11391
Course Name	Practical Training
Credit Hours	3
Pre-requisite	90 Cr. Hrs
Co-requisite	**11335 (** Operating Systems**)**
The student is required to do practical training in a well-known software company for a period of (2) months, full-time training, with at least (6) hours per day, or 3 months part-time training with at least (4) hours per day. In addition to training hours, for the part-time training, the student is allowed to register not more than (10) credit hours in the first or the second semester, or (4) credit hours in the summer semester. The student is required to perform tasks that are related to his major, such as writing, developing, or learning some new software	

Course No.	11417
Course Name	Compiler Design and Programming Languages
Credit Hours	**3**
Pre-requisite	11316
Co-requisite	
Theory and practice of compiler design for imperative and object-oriented languages. Phases of compiler writing. Lexical analysis, Parsing and intermediate code generation. A compiler for a subset of particular OO languages. Similar imperative languages will be implemented as part of a term project. Compiler generating tools. Basic concepts of the programming language theory and a comparative study between them.	

Course No.	**11425**
Course Name	**Software Engineering**
Credit Hours	**3**
Pre-requisite	**11323 (Database Systems)**
Co-requisite	
This course aims to introduce the fundamentals of software engineering. Topics include software development 'life cycle' including requirements, design and testing, development strategies, prototyping, formal methods, test case, documentation, program efficiency and debugging, object-oriented analysis and design, software quality assurance, metrics reusability and reliability.	

Course No.	**11428**
Course Name	**Artificial intelligence**
Credit Hours	**3**
Pre-requisite	**11212 (Data Structure & Int. to Alg.)**
Co-requisite	
This course aims to introduce the basic principles, techniques, and applications of Artificial Intelligence. In this course, emphasis will be placed on the teaching of these fundamentals with the appropriate tools and software of implanting them. Assigned projects promote a 'hands-on' approach for understanding, as well as a challenging avenue for exploration and creativity. Topics include a historical perspective of AI and its foundations, problem solving using search, inference, knowledge representation, and learning. AI techniques in intelligent systems, expert systems, artificial neural networks and other machine learning models. AI development tools such as an 'AI language', and/or data mining tool, experiment with a machine learning model for simulation and analysis. At the end of this course, the students are expected to apply basic principles of AI in solutions that require problem solving, demonstrate proficiency in developing AI applications, and applying scientific method of machine learning models, with ability to discuss their limitations and scope.	

Course No.	**11435**
Course Name	**Data Communications and Computer Networks**
Credit Hours	**3**
Pre-requisite	**11335 (operating Systems)**
Co-requisite	

This course aims to introduce the basic principles of Data Communications and computer networks. In this course, the students will learn the basic principles in the design and the operation of computer networks. Additionally, network reference models, interfaces and services, protocols, communication services, synchronization, flow control, error control, socket programming, routing algorithms, network layer, transport layer and application layer protocols are the main topics covered in this course.

At the end of this course, the students are expected to be able to list and define the appropriate network terminology, describe the layered structure of a typical networked architecture and identify the different types of complexity in a network.

Course No.	**11436**
Course Name	**Distributed Systems**
Credit Hours	**3**
Pre-requisite	11435 **(Data Communications and Computer Networks)**
Co-requisite	

The course aims to provide basic knowledge and understanding on how distributed systems operate. In this course, students will explore and learn the principles, architectures, algorithms and programming models used in distributed systems. Topics include advantages, hardware, software, design issues, communication in distributed systems, layered protocols, asynchronous transfer mode networks, client-server model, remote procedure call, RMI, group communication, clock, mutual exclusion, election algorithms, atomic transactions, deadlocks, processes and processors, threads, system models, allocation, scheduling, fault tolerance, real time, distributed shared memory, consistency, page, variables, object-oriented based and case studies.

At the end of this course, students are expected to be able to summarize and describe general properties, challenges, and characteristics of distributed systems. Additionally, students should have the ability to describe general distributed algorithms for synchronization and concurrency, coordination, transactions, and replication

Course No.	12446
Course Name	Digital Image Processing
Credit Hours	**3**
Pre-requisite	11212
Co-requisite	

Human vision system. Artificial vision system. Cameras and display systems. Image formation, representation and digitization. Image restoration techniques: gray-scale and color modification, linear filter techniques for noise suppression and edge enhancement, non-linear filter techniques. Lossless and lossy compression techniques. Image analysis: segmentation and edge detection, shape descriptors. Frequency Domain Analysis. Image interpretation. Object detection. Pattern recognition. OCR. Biometrics techniques. Neural Network.

Course No.	**11446**
Course Name	**Special Topics in Computer Science (2)**
Credit Hours	**3**
Pre-requisite	**To be set by the Department**
Co-requisite	
This course aims to introduce new topics in computer science and information technology. The department determine the content of the course.	

Course No.	**11447**
Course Name	**Wireless Networks and applications**
Credit Hours	**3**
Pre-requisite	**20344, 11435**
Co-requisite	
This course aims to introduce Wireless Data Communication principles. Topics include: wireless protocols, Mobile IP, Ad hoc Networks, Wireless Sensor Networks, and Vehicular networks.	

Course No.	**11449**
Course Name	**Computer and Society**
Credit Hours	**1**
Pre-requisite	**90 Cr. Hrs**
Co-requisite	
This course aims to discuss the social impacts of computing technology. The course will provide a brief introduction to ethics and to the history of computing and the Internet. It will focus on a number of areas in which computers and information technology are having an impact on society including privacy, freedom of speech, intellectual property, work, distribution of wealth, and the environment. Current issues that will be discussed include electronic voting, spyware, spam, and intellectual property issues associated with digital content distribution	

Course No.	**11464**
Course Name	**Information Systems Security**
Credit Hours	**3**
Pre-requisite	**11212 (Data Structure & Int. to Alg.)**
Co-requisite	
This course aims to introduce the fundamental of Information Systems Security. Topics include Security protocols, authentication protocols, data integrity, digital signatures, intrusion detection, key management and distribution, viruses and other malicious codes, information flow, mobile code and agent security, cryptographic algorithms (such as : Secret Key Encryption (DES), Public Key Encryption (RSA) and Message Digest Algorithm (MD5)), attacks and countermeasures, network security (including application layer security, transport layer security, network layer security, access control and firewalls, and wireless networks security).	

Course No.	**11493**
Course Name	**Graduation Project 1**
Credit Hours	**1**
Pre-requisite	**90 Cr. Hrs**
Co-requisite	
Project is aimed at developing real-world problem-solving skills, including problem definition, analysis, and needed software. A project should be performed by a group of students under the supervision of a faculty member. Students are required to develop a complete implementation fulfilling the project objectives and submit a final report. Project must be presented to a committee of faculty members.	

Course No.	**11494**
Course Name	**Graduation Project 2**
Credit Hours	**2**
Pre-requisite	**90 Cr. Hrs**
Co-requisite	
Project 2 aims at implementing the planned requirements, which were collected in Project 1 Students must work in groups to achieve a functional system at the end of this course. Students must test the product / system and that should be included in the documentation.	

Course No.	12273
Course Name	Computer Graphics
Credit Hours	**3**
Pre-requisite	11212
Co-requisite	
A comprehensive introduction to the field of Computer Graphics. The conceptual framework for interactive computer graphics: transformations, viewing, projection, shading, clipping, and texture mapping. Interactive graphic systems and 3D graphics.	

Course No.	12324
Course Name	Human-Computer Interaction
Credit Hours	**3**
Pre-requisite	12348
Co-requisite	
Designing, building, and programming graphical user interfaces, Human-centered software evaluation, Human-centered software development, HCI aspects of multimedia systems and Web-based systems, these topics are intended as an introduction to human-computer interaction. Emphasis will be placed on understanding human behavior with interactive objects, knowing how to develop and evaluate interactive software using a human-centered approach, and general knowledge of HCI design issues with multiple types of interactive software.	

Course No.	12348
Course Name	Multimedia Systems
Credit Hours	**3**
Pre-requisite	11206
Co-requisite	
Fundamentals of computer-based multimedia. Audio. Images and graphics. Video Streaming. Compression. Multimedia database. Students will design and develop multimedia applications that combine text, images, sound, video, and animation.	

Course No.	22241
Course Name	Digital Logic Design
Credit Hours	**3**
Pre-requisite	--
Co-requisite	
Binary system. Boolean algebra and logic gates. Simplification of Boolean functions. Combinational logic with MSI and LSI. Sequential logic. Registers. Counters. The memory unit.	

Course No.	22342
Course Name	Computer Organization and Assembly
Credit Hours	**3**
Pre-requisite	22241
Co-requisite	
Register transfer and micro-operations. Basic computer organization and design. Design of arithmetic logic unit. Design of accumulator. Central processing unit. Hardwired control. Micro programmed control. Execution of instructions. Pipelining. Introduction to memory hierarchy. Microprocessor organization. Central processing unit. Addressing modes. Instruction set. Programming in assembly language. Software interrupts and interfacing with BIOS and DOS. A specific microprocessor will be studied in detail.	

Course No.	22541
Course Name	Computer Architecture
Credit Hours	**3**
Pre-requisite	22342
Co-requisite	
Computer Evolution and Performance. System Buses and Memory. Input/Output. Computer Arithmetic. CPU Structure and Function. Multimedia instruction set. Reduced Instruction Set Computers (RISCs). Instruction-Level Parallelism and Superscalar Processors. Control Unit Operation. Parallel Processing. SMPs, clusters, and NUMA systems.	