

Course Descriptions

CSC101- Mathematics I

This an elementary course provides students with background in mathematics. Topics include: functions, domain and range of functions, families of functions and inverse functions, limits and continuity, continuous functions, derivative and integration.

(Pre-requisite: None)

CSC102- Discrete Mathematics

This course introduces student to the mathematical structures related to computer science. Topics include: Numbering systems, sets and binary operations, operations on sets, functions, introduction to graph theory, diagraph and relations, sequence and series, counting methods and probabilities.

(Pre-requisite: None)

CSC141- Communication Skills

The course covers issues related to effective technical communication, how to communicate with potential higher administrators, fellow, colleagues, and non-technical customers including: procedural (performing tasks), technical (using technology), personal (expressing identity), cooperative (interacting in groups), systems (interacting with organizations) and public (interacting with the wider community).

(Pre-requisite: None)

CSC103- Probability and Statistics

This an introductory course provides students with background in probability and statistics. Topics include: introduction to concepts, tools, techniques and methods of probability and statistics, presenting and describing of statistical data, measures of central tendency and dispersion, introduction to probabilities and their laws, methods of counting, random variables, probability distributions and sampling distributions, correlation and regression.

(Pre-requisite: None)

CSC111- Structured Programming

This course qualifies students to gain programming skills where introduce computer programming methods and emphasis on problem solving of the fundamentals of the structured design using the principles of top down problem solving strategy. This include: an introduction to computer programming, problem solving steps, program design modeling using pseudocode, algorithms, and flowcharts, and also structured programming constructs, and implementation (sequence, decision, repetition, arrays, pointers, functions, and files) using C++ programming language.

(Pre-requisite: None)

CSC142- Computer Ethics and Social Responsibility

This course covers guidelines for proper use of computers and information, copyrights, computer access, computer crimes, data security and privacy, software licensing and protection from viruses and hacking.

(Pre-requisite ENG111)

CSC241- Scientific Research Methods

The course introduces and develops the concepts, organizational structure and deliverables of a research project using qualitative and quantitative methods including: problem statement definition, research scope, research objectives, methodologies, results and discussion.

(Pre-requisite CS103)

CSC203 – Mathematics II

This an advance course provides students with deep knowledge and skills in mathematics. Topics include: limits, properties of limits, Sandwich theorem, Derivatives, rules for differentiation, chain rules, implicit differentiation, derivatives of exponential and logarithmic functions, and application of derivatives, Definite integral and antiderivatives, fundamental theorem of calculus, Trapezoidal rules, and application of definite integral, integration by parts, differential equations and mathematical modeling, infinite sequence and series are also included.

(Prerequisite: CSC101)

CSC212 – Object Oriented Programming I

this course explains the principles of the object-oriented paradigm, provide familiarity with approaches to object-oriented modelling and design, provide a familiarity with the syntax, class hierarchy, inheritance, environment and simple application construction for an object-oriented

programming language and files. The course emphasizes modern software engineering principles and developing fundamental programming skills in the context of a language that supports the object-oriented paradigm and UML modeling of small systems.

(Prerequisite: CSC111)

CSC202 – Digital Logic

This course introduces students to the design and implementation of digital circuits. Topics include: numbering systems, Boolean algebra, logic expressions, adders, combinational and sequential circuit analysis and design, digital circuit design optimization methods using random logic gates, multiplexers, decoders, registers, counters and programmable logic arrays. The lab experiments will involve the design of digital circuits. Emphasis is on the use of computer aided tools in the design, simulation, and testing of digital circuits.

(Prerequisite: CSC102)

CSC215 – Data Structures

This course covers Data Structures concepts, fundamentals and characteristics of Data structures, Array, Linked list, Stack, Queue, Graph, tree. In addition, student will learn and practice the suitable algorithm to manipulate the required data structure.

(Prerequisite: CSC212)

CSC231 – Computer Organization and Architecture

The course emphasizes on the following knowledge areas: Digital components used in the organization and design of digital computer, serial and parallel transfer, Flow of information and timing signals, assembly language programming, Interrupts, call/return mechanism, addressing modes, instructions set architecture, integer and floating-point arithmetic, performance evaluation, data path and control unit.

(Prerequisite: CSC202)

CSC221 – Database Systems

In this course, the students will be introduced to traditional files structure problems, database systems concepts, database systems evolution, database types, entity, attributes, relationship, and relationship degree, architecture, modeling methods using ERD, relational algebra, normalization

and relational database constraints. SQL data definition and manipulation languages are also covered.

(Prerequisite: CSC212)

CSC222 – Software Engineering I

This course provides students with a solid base in software engineering, students will learn principles of software engineering, evolving roles of software, software process, software product, process models and advanced models, requirements engineering: gathering, modeling and analysis, architectural design, component-level design, designing class-based components, component-level design for web applications, user interface design, web applications interface design, software testing and testing strategies.

(Prerequisite: CSC212)

CSC321 – System Analysis and Design

Topics include: Introduction to Information Systems and system analysis, types of systems, integrating technologies for systems, roles for system analyst, systems development approaches: SDLC, AGILE and object-oriented analysis, system and data modeling, depicting systems graphically, use case, levels of management, project management, feasibility study, information gathering: interactive methods and unobtrusive methods, Agile methodologies and Prototyping, modeling with DFD, using data dictionaries to analyze systems, system specification: structured decision, structured English, Object-oriented analysis and Unified Modeling Language(UML).

(Prerequisite: CSC221)

CSC331 – Operating Systems

This course discusses topics of operating systems including: virtual machines, real-time and embedded systems, distributed and parallel processing, file systems, fault tolerance, performance evaluation, management functions(memory, device (I/O), process) and OS security/protection

(Prerequisite: CSC231)

CSC314 – Object Oriented Programming II

This course introduces advanced techniques of object-oriented programming.

This course expands the object-oriented programming concepts introduced in the object oriented programming I. It introduces advanced programming concepts: multiple inheritance, polymorphism, abstract classes, exception handling. Gain more practical experience by designing and writing object oriented programming applications.

(Prerequisite: CSC212)

CSC322 – Web Based Software Development I

This course introduces students to the context of Web based software development. Topics include: creating a web site using HTML, CSS and JavaScript, tables, page division, inserting animation and multimedia, managing hosting and its control panel.

(Prerequisite: CSC212)

CSC304 – Artificial Intelligence

Artificial intelligence (AI) is a research field that studies how to realize the intelligent human behaviors on a computer. The ultimate goal of AI is to make a computer that can learn, plan, and solve problems autonomously. In this course, we will study the most fundamental knowledge for understanding AI. We will introduce some basic search algorithms for problem solving; knowledge representation and reasoning.

(Prerequisite: CSC212)

CSC323 – Visual Programming

This course provides students capabilities to design and implement the applications using visual programming through Microsoft Visual Studio .Net with object-oriented programming principles. Emphasis is on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools. In addition to event-driven Windows programming, data types, operators, objects and properties, menus, procedures, control structures, database file processing, using human computer interaction principles to enhance user interface design.

(Prerequisite: CSC314&CSC221)

CSC332 – Data Communications and Comp. Networks

This course provides students with a broad coverage of the concepts of data communication and computer networking, network topologies, four layers of TCP/IP, The seven layer model of OSI network. Protocol algorithms; resource-sharing, circuit and packet switching.

(Prerequisite: CSC331)

CSC302 – Computational Theory

This course explains to students the theory of computation through a set of abstract machines that serve as models for computation (finite automata, pushdown automata, and Turing machines), lexical analyzer, and examines the relationship between these automata and formal languages. Additional topics beyond the automata classes themselves include deterministic and nondeterministic machines, regular expressions, context free grammars, and the P & NP question.

(Prerequisite: CSC212)

CSC301 – Numerical Analysis

This course introduces students to numerical analysis covering topics: mathematical preliminaries: computer arithmetic, round-off error, source of errors, solution of equations in one variable: bisection method, fixed point method, false position method, secant method, Newton-Raphson method, interpolation and polynomial approximation, introduction to interpolation, direct methods for solving linear systems of equations, iterative methods for solving linear systems, iterative methods for solving nonlinear systems, and curve fitting techniques.

(Prerequisite: CSC203)

CSC325 – Database Development

The course covers the following topics: practicing the database PL/SQL (Cursors, Triggers, Functions, Procedures...). Also the student will practice Database development tools such as: APEX, Oracle Developer: Forms, Reports and Graphics.

(Prerequisite: CSC221)

CSC436 – Mobile Computing

This course introduces students to the fundamental principles of mobile computing, and its applications and challenges. Through this course, students will learn both fundamentals and applications of and mobile computing, and wireless communication technology.

Topics include: mobile and pervasive computing, wireless communication technologies, mobile computing applications (i.e. location based systems and context-aware systems), mobile application languages and software engineering principles of mobile computing.

(Prerequisite: CSC332)

CSC401 – Algorithms Design and Analysis

This course introduces formal techniques to support the analysis and design of algorithms, focusing on both the underlying mathematical theory and practice considerations of efficiency. The course introduces basic principles and methods of algorithm design and analysis. Topics include analysis of algorithm efficiency, asymptotic analysis, brute force and exhaustive search, decrease-and-conquer, divide-and-conquer, transform-and-conquer algorithms, recurrences and greedy algorithms.

(Prerequisite: CSC215)

CSC402 – Compilers Design

In this course, students will study compilers design, major problems in translation of programming languages, compilation steps, difference among translators, Top-down versus bottom-up grammatical analysis, codes generation, and storage allocation strategies. It includes the building of translators, identifies and explores the main issues of the design of translators, lexical analysis, parsing, symbol tables, declaration, code generation, and optimization techniques.

(Prerequisite: CSC302)

CSC425 – Graduation Project 1

In this course, the student follows a research methodology to identify specific problem (define the research questions), conducts a literature survey and proposes a solution (an artifact) to the identified problem utilizing computer algorithms, software packages and/or hardware devices. This will take place with guidance from a supervisor. At the end of the course, the student will demonstrate the outcome of the project and will submit part one of graduation project report.

(Prerequisite: 90Cr)

CSC435 – Ciphering and Computer Security

This course provides students with a firm understanding of the major issues of data and computer security. Topics of the course include: computer security concepts, security attacks, security services, security mechanisms, symmetric and asymmetric ciphers, block ciphers, DES, AES, block cipher operation, message confidentiality, public-key cryptography and message authentication, key distribution and user authentication.

(Prerequisite: CSC332)

CSC426 – Graduation Project 2

In this course, the student has to use the outcomes of CSC425 Graduation Project I to implement and test the proposed solution. This will take place with guidance from a supervisor. At the end of the course, the student has to demonstrate the project findings and submit a complete graduation project report.

(Prerequisite: CSC425)

CSC441 – Internship

The course is designed to provide students with the opportunity to gain experience in a workplace setting and to put into practice what they have learned during the course of their studies. It focuses on enhancing students' transferable skills and employability. The course also teaches students how to be self-confident when they face problems in their practical life.

(Prerequisite: 90Cr)

Major Elective

CSC204 – Linear Algebra

At its core, the course will introduce students to the fundamental concepts of linear algebra culminating in abstract vector spaces and linear transformations. The course starts with systems of linear equations and some basic concepts of the theory of vector spaces in the concrete setting of real linear n -space. The course then goes on to introduce abstract vector spaces over arbitrary fields and linear transformations, matrices, matrix algebra, similarity of matrices, eigenvalues and eigenvectors. The course material is of vital importance in all fields of mathematics and in science in general.

(Prerequisite: CSC203)

CSC327 – Web Based Software Development II

This course introduces students to advance topics in web applications development. Topics include: web applications development, smart devices and web design programming languages (i.e. PHP, ASP.NET,...), database connection, web hosting, file transfer protocol, control panel for local and remote servers, web development tools.

(Prerequisite CSC322 & CSC221)

CS326 – Mobile Application Development

This course covers key technologies underlying mobile application development. Topics include mobile platforms, GUI design, mobile programming, web services processing, database access and event-driven programming.

(Prerequisite: CSC322 & CSC221)

CSC305 – Operations Research

Topics include: Overview of Operation Research modeling approach, formulating a mathematical model, linear programming, iterative nature of the simplex method, transformation model. In addition to queuing theory, stock control models (Inventory) and project management (Network models) (CPM and PERT Technique). Analytic techniques and computer packages will be used to solve problems facing business managers in decision environments.

(Prerequisite: CSC103)

CSC312 – Programming Language Concepts

This course focuses on programming languages' specifications and concepts that are gives students enough background that they can argue persuasively why a particular language is appropriate or inappropriate for a particular problem. Topics are: Concepts of programming languages, domains, evaluation, environments, syntax formal methods, attribute grammars, binding, scope, types (data, user-defined, record, tuple, list, union, pointer, and reference), arithmetic expressions, operators, conversions, programming statements, subprograms, parameter-passing methods, design issues for functions, user-defined overloaded operators, dynamic scoping, abstract data types, and object-oriented languages.

(Prerequisite: CSC314)

CSC315 – Data Mining

This course provides students with an understanding of the concepts and elements of data mining both from a business and technology perspective, including hands-on experience with a sample of tools used in decision support environments. Topics include : the basic concepts of data mining, classification and Prediction, Data Warehouses, Multi-dimensional data model, Data cleaning, data integration and transformation, data, Data mining primitives, Mining Association in rules in large databases, Categorization of major clustering methods

(Prerequisite: CSC304)

CSC421 – Software Engineering II

This course introduces students to advance topics of software engineering including: object-oriented software engineering (concepts and principles, analysis, design and testing), technical metrics for object-oriented systems, patterns design, software quality assurance, formal methods, component-based software engineering, client/server software engineering, web engineering, reengineering, and CASE(Computer-Aided Software Engineering).

(Prerequisite: CSC222)

CSC328 – Human Computer Interaction

This course used to analyze and design implementation and evaluation of interactive computing system for human use; Ergonomics; Components of an interactive system; The Human; Input - output channels, the eye, hearing, touch, smell, taste, movement, memory; The computer: Interacting with computers, Virtual reality concept, Virtual reality HW/SW, Virtual reality applications.

(Prerequisite: CSC222)

CSC329 – Multimedia Systems

This course introduces the theory and fundamentals of multimedia systems. It defines the various types of media such as sound, image, animation and video. The course also covers the various types of image filters speech signals, the animation and computer programs that deal with managing and enhancing such a types of media.

(Prerequisite: CSC322)

CSC343 – Special Topics In Computer Science

This course covers the hottest topics, latest research and state of arts, or technology in the field of Computer Science. The topic might be different from one semester to another; an approval from the computer science department is required to select the course contents whenever offering the course.

(Prerequisite: Dept. Approval)

CSC403– Image Processing

This course introduces concepts and applications of computer vision. Topics include image processing, boundary detection, segmentation and clustering, feature detection, motion estimation and tracking, probabilistic and statistical methods for detection and classification, multiple view geometry, object and scene recognition.

(Prerequisite: CSC401)

CSC411 – Computer Graphics

This course introduces the concepts and implementation of computer graphics, the theoretical aspects and implementation of computer graphics using OpenGL (or other tools). Topics include: overview of interactive computer graphics, two dimensional system and mapping, then it presents the most important drawing algorithm, two-dimensional transformation; Clipping, filling and an introduction to 3-D graphics.

(Prerequisite: CSC401)

CSC437 – Cloud Computing

This course introduces students to cloud computing technologies. Topics include cloud infrastructure, reference model, resource management, programming models, application models, system characterizations, and implementations, deployment of cloud computing systems, parallel processing in the cloud, distributed storage systems, virtualization, security in the cloud, and multicore operating systems

(Prerequisite: CSC332)

CSC438 – Parallel and Distributed Computing

This course covers theory of parallelism and distributed computing, parallelism, communication, concurrency, hardware and software features, language features for concurrent and distributed systems, concurrent and distributed algorithms and middleware, coordination, sequential and parallel processing, parallel and scalable architecture, parallel decomposition, multiple simultaneous computations, and parallel computer models.

(Prerequisite: CSC332)