Computer Science brief course description

Structured Programming (CS111) (3 Credit hours)

Prerequisite (CS104)

The student is introduced to the step-by-step problem-solving capability and the need for a well-thought-out plan before programming begins. The student practices problem-solving techniques and illustrates these techniques by writing numerous, short, simple programs. Actual programming language is used to introduce the student to the basic logic structures of sequence, selection and iteration, in a modular, top-down, event-driven programming environment. This is an introductory course to computer programming and assumes no previous programming experience.

Computer Ethics (CS204) (3 Credit hours)

Prerequisite (CS104)

This course cover the following topics: Introduction to the module, Problems of ethics decision-making, Professional Societies and their codes of conduct and practice, Professional Behavior, Discussion of case studies: Describing steps to resolve the current situation, preparing policies and strategies to prevent recurrence. Introduction to the crawling eye case study, formal laws do not make for ethics, Graduate careers in 21st century, building the foundations to future career success, concurrent engineering, group working and distributed enterprises, the law and contracts, safety critical systems and legal liability, introduction to killer root case study, a business view of contracts, IPR and copyright, IPR and patents, computer misuse and the law, data protection, the act and its implications.

Probability and Statistics (STA201) (3 Credit hours)

Prerequisite (None)

The course aims to help students grasp basic statistical techniques and concepts, and to present real-life opportunities for applying them. Presentation and description, methods of presenting data, frequency distribution, Graphic presentation, stem-and-leaf display, forms of frequency distribution, Measures of central tendency and dispersion, arithmetic mean, arithmetic mean of raw data, arithmetic mean for grouped data, Properties, the median, median of raw data, median of grouped data, The mode, raw data mode, grouped data mode, the geometric mean, Quartiles, deciles, percentiles, integrative range, relation between measure of tendency and dispersion, Range, mean deviation from the mean, variance and standard deviation, Coefficient of variation, standardized scores, stem and leaf, Simple linear regression and correlation, correlation coefficient, coefficient of rank correlation, simple linear regression, Probability and random variable, set theory, Sample space and event, Probability and its meaning, Random variable and probability distribution, probability distribution for discrete random variables, Probability density functions for continuous random variable, the expected value, binomial experiment.

Mathematics (MAT101) (3 Credit hours)

Prerequisite (None)

This course will let the student be familiar with the various types of functions and be able to solve and sketch the functions. It will also increase the student's ability and skills in mathematics, Principles of set theory, Union, Intersection, Complement of a set, Rules of set theory, Inequalities, Double inequalities, Distance formula, Slope and Line equation, Parallel and perpendicular lines, Simultaneous equations, Functions, Graph of functions, Domain and range, Exponential functions, Matrices, Derivation.

Mathematics II (MAT201) (3 Credit hours)

Prerequisite (MAT101)

In this course the student will able to solve problems with definite integrations and the application of definite integrations such as Areas, Volumes, Length of curve. Differential equation and mathematical

modeling will also be discussed through out this course. The student will understand L'Hopital's role, Improper integrals and Partial fraction infinity series such as Power, Taylor, series will be introduced for the student.

Discrete Mathematics (CS121)   (3 Credit hours)

Prerequisite (None)

This course will enable the students to analyze the problems related to Mathematical structures using the basic principles of Discrete Mathematics. This course includes: sets, Mathematical induction, recursion formula, binary relation, trees of graph theory.

Digital Logic   (CS152)   (3 Credit hours)

Prerequisite (None)

This course focuses on the electronic Circuit design; switches are used as elementary units for designing Digital control systems. They include: numbering system, binary system, Boolean algebra, Logic gates, functions of their simplification, sequential circuit, registers, counters & memory, Data transfer Description, Digital set, basic structure of micro computers.

Object Oriented Programming I (CS212)   (3 Credit hours)

Prerequisite (CS111)

This course provides a solid base in software engineering. Students will study object-Oriented Programming with C++ as the language. The student will develop a sound understanding of the fundamental concepts of Object-Oriented Modeling. Solid theoretical foundation, mastery of the notation, and Object-Oriented analysis and design principles are taught. This course will provide students with realistic application of O.O development using a variety of problem domains.

Object Oriented Programming II (CS314)   (3 Credit hours)

Prerequisite (CS212)

The purpose of this course is to enhance the student skills in O.O program design and implementation by fallowing a consistent methodology. The course covers the fallowing topics, data structures and recursion, Advanced techniques in Inheritance and polymorphism member function working with two objects, pointer variables with arrays and functions, and returning address from a function.

Data Structures & Algorithm I   (CS214)   (3 Credit hours)

Prerequisite (CS111)

Students will study the basic data structures, Arrays, linked list, Queue, Stack, Tree, graph, file, record, structured. Also, students will create complete programs in structured programming using the above data structures.

Visual Programming   (CS313)   (3 Credit hours)

Prerequisite (CS212)

The student is introduced to programming in the windows environment using this powerful technique as a tool for program development. Students will write business applications to illustrate the features of the technique. Students will cover the window environment, events, objects, properties, methods, program design, logic design, data arrays, control arrays, data manipulation, subroutines, input/output, and data structures. Visual Basic Language will be used in practice.

Microcomputers & Assembly Languages (CS251)   (3 Credit hours)

Prerequisite (CS152)

This course provides the students with the opportunity to explore the organization of micro computer systems, how to program & microprocessor. Microprocessor architecture and its addressing modes will be discussed through this course. The student will be able to differentiate between different types of instructions, such as, data transfer, logic and arithmetic and program central using Assembly language.

Computer Architecture (CS252) (3 Credit hours)

Prerequisite (CS251)

The purpose of this course is to give the student an introduction to logic design, logic circuits which are used to build digital systems such as digital computer of control system, it also defines the organization of a computer, instruction & its addressing types, its architecture & also defines other computer peripherals and the way of connecting them all together.

Systems Software (CS253) (3 Credit hours)

Prerequisite (CS251)

The student will study the designing & implementation of several operating software (such as Assembler, Loader, Linker, Compilers, etc) He will also be introduced to the relation between computer architecture and designing the functions of these software. It also explains many ways of designing this software, & implements them for comparison purposes with other systems.

Communication Skills (CS201) (3 Credit hours)

Prerequisite (ENG111)

Students will learn today's communication realities, the negative impact of poor communication, and the challenges facing every organization in today's world. Two critical communication components are addressed, aiming at building effective communication skills. Also, the student will study the related event to the communication.

Algorithms Design & Analysis (CS311) (3 Credit hours)

Prerequisite (CS214)

The course introduces the student to algorithm design & analysis, calculating the algorithm complexity. Using the big-O-notation. The course is designed to let the student experience algorithm in sorting and searching techniques.

Computational Theory (CS371) (3 Credit hours)

Prerequisite (CS214)

The student will study the basic mathematical concepts, finite & infinite states machines. Context free and context sensitive grammar, computational complexity, organized expression, turning machine, Minsky theory.

Software Engineering I (CS333) (3 Credit hours)

Prerequisite (CS335)

This course provides the student with knowledge and skills of software engineering concepts, software process evolution, software engineering practice, a generic view of process, process models, a agile view of process, requirements engineering, system, modeling, creating an architectural design, user interface design, testing strategies.

Software Engineering II (CS431) (3 Credit hours)

Prerequisite (CS333)

This course cover the following topics, web engineering, analysis of web application, design of web application, testing, software project management, metrics, estimation, project scheduling, risk management, quality management, change management, formal methods cleanroom software engineering, component-based development and reengineering.

Web Based Software Development I (CS385) (3 Credit hours)

Prerequisite (CS212)

This course is designed to give an Introduction to internet and www, and a general view about internet paging research, problems of the internet, showing different kinds of photos, information retrieval files,

storing voice and image files in the internet pages. JAVA script, dynamic HTML, will also be covered in this course.

Web Based Software Development II   (CS386)   (3 Credit hours)

Prerequisite (CS385)

The course aims at developing the student abilities that he learned in the computing internet field by learning XML language and how to deal with the server aspects (Apache web, PW, ITS server). Using (MSQL, SQL, ADO, DBL) and for programming by using (ASP, NET). And also by designing integrated pages that connect the user and the server, the student will also learn programming by using (PHP).

Data Communications & Comp. Networks (CS361)   (3 Credit hours)

Prerequisite (CS351)

The purpose of this course is to introduce the student to the principles of transmission and its standards, and protocols. It also includes media transport data, different architectures for building networks, studying the internet protocols and mobile protocols as well as protecting the networks.

Operating Systems   (CS351)   (3 Credit hours)

Prerequisite (CS252)

This course will give a general vision about operating systems and their evolution over the last decades. It also focuses on the main components of an operating system; it will describe the functions of operating systems which include (processor management, time sharing, failure, memory management strategy, I/P & O/P management, file systems, and case studies in operating systems.

Artificial Intelligence   (CS341)   (3 Credit hours)

Prerequisite (CS251)

This course will introduce the basic concept of artificial intelligence and its application, it will concentrate on many topics such as problem space, the search method, information representation, ways of logical decisions, automatic problem solving. It will also present the uses of artificial intelligence in many aspects such as computer vision, natural language processing, expert systems, management plans for automatic learning.

Ciphering & Computer Security (CS462)   (3 Credit hours)

Prerequisite (CS361)

The student will study an introduction to computer security, threats & ways for protection, ciphering algorithms, public & private keys algorithms, authentication, network security firewalls, internet security, etc.

Compilers Design   (CS471)   (3 Credit hours)

Prerequisite (CS371)

Student will study compilers design, major problems in interpretation of programming languages, compilation steps, difference between compilers and interpreters, Top-down versus bottom-up grammatical analysis, codes generation, and storage allocation strategies.

Computer Graphics Algorithms (CS481)   (3 Credit hours)

Prerequisite (CS311)

The student is introduced to the principles of two & three dimensional graph algorithms. It gives a comprehensive study on computer graph application, basic graph element & their characteristic, translation algorithms for two dimensional objects, principles of graph animation, graphical user interface, interacting I/P three dimensional object principles, case studies.

Internship (CS433)   (3 Credit hours)

Prerequisite (Passing 90 Credit hours)

After the completion of 90 credit hours, the student will attend practical training in his field, in a selected company related to his/ her specialization.

Graduation Project (CS432)   (3 Credit hours)

Prerequisite (Passing 90 Credit hours)

After completing 100 hours of study the student will start a scientific research by agreement with the department. One of the faculty members will supervise him/ her and will evaluate student performance in studying all the theoretical and analysis sides of the research problem, giving the priority to the practical side of the project, by the end of this work, the student will give a printed research with what he did at the end of the semester. Then a committee should be formed from the department to discuss the research with the student and evaluate his work.

Special Topics in Computer Science (CS384)   (3 Credit hours)

Prerequisite (Department Approval)

The department offers a course covering the latest trends or technology in the computer information field based on the departments' board recommendation

Database Systems (**CS336)**   (3 Credit hours)

Prerequisite (CS335)

The student is introduced to traditional files problems, data base systems, DBMS, Database system evolution, architecture, database types, data modeling, entity, attributes, relationship, and relationship degree.

Multimedia Systems (CS383)   (3 Credit hours)

Prerequisite (CS385)

This course covers contemporary, interactive media technology systems, focusing on types, application, and theories of application. In addition to the computer generated media, text, still graphics, and sound.

Operations Research   (OR301)   (3 Credit hours)

Prerequisite (STA201)

Linear programming applications of the dual solution and sensitivity analysis ,The problem of duplicity and its application in the allocation of limited resources, employment of manpower production , planning and the optimum use of resources, Markov chains and processes, The transportation and assignment problems, Network models, Process of Evaluation and Review Technique (PERT),Inventory models, Input and output analysis.

Information Systems Analysis (CS335)   (3 Credit hours)

Prerequisite (CS212)

This course addresses the following topics, systems concepts, basic types of computer-based systems, roles of system analyst, techniques used in the analysis process, explore other methodologies such as XP programming, prototyping, and object-oriented. CASE tool will also be introduced.

Neural Networks & Genetic Algorithms (**CS345)**   (3Credit hours)

Prerequisite (CS311)

Neural Networks: Introduction, Classifying patterns, Pattern association, Neural networks based on competition, Links to Artificial Intelligence. Links to Neural Networks (neuro-fuzzy modeling). Introduction to Genetic algorithms and their applications including: chromosome design, fitness function and permutation and their link to AI.

Data Mining (CS342)   (3 Credit hours)

Prerequisite (CS336)

The Data that has relevance for managerial decisions is accumulating at an incredible rate due to a host of technological advances. Electronic data capture has become inexpensive and ubiquitous as a by-product of innovations such as the internet, e-commerce, electronic banking, point-of-sale devices, bar-code readers, and intelligent machines. Such data is often stored in data warehouses and data marts specifically intended for management decision support. Data mining is a rapidly growing field that is concerned with developing techniques to assist managers to make intelligent use of these repositories. A number of successful applications have been reported in areas such as credit rating, fraud detection, database marketing, customer relationship management, and stock market investments. The field of data mining has evolved from the disciplines of statistics and artificial intelligence.

Database Systems II   (CS434)   (3 Credit hours)

Prerequisite (CS336)

The course covers the following topics: data models, database design methodologies likes, normalization, entity relationship diagram (ERD), extended entity relationship diagram (EERD), and Object oriented database design (OODBD). Also the student will learn the Unified Modeling language (UML), how to carry out design optimization, mapping design model constructs to relations, and schema definition using SQL DDL.

Mobile Computing (CS463)   (3 Credit hours**)**

Prerequisite (CS361)

This course covers abstractions and implementation techniques for the design of Mobile computing. Topics include: server design, network programming, naming, storage systems, security, and fault tolerance.

Introduction to Physics (PHY101)   (3 Credit hours)

Prerequisites (None)

This course focuses on the principles of moments and pressure, forces, motion, Newton's laws, moments, pressure the student understand the electrons, photons, resistance, voltage and power. In this course student will learn, DC circuits, and how to analyze it by different methods, such as kirchhoff's law, Norton and Thevinin theorems.

Image Processing (CS482)   (3 Credit hours)

Prerequisites (CS481)

This course discusses the fundamental principles of digital image processing including: Fourier transform, discrete Fourier transform, image enhancer algorithms (i.e. smoothing filters, Gaussian filters and Sobel filter). It also covers discontinuity detection, similarity and region detection.

Linear Algebra (MAT202)   (Zero Credit hours)

Prerequisites (MAT201)

This course covers the following topics: principles of matrix theory, systems of equations, matrix algebra, eigenvalues, vector spaces, determinants, positive definite matrices and similarity.

Scientific Research Methods (SRM201)   (Zero Credit hours)

<div align="right">Prerequisites (STA201)</div>

This course covers the following topics: the theoretical and practical skills needed to structure, analyze, design, implement and write a scientific report in the field of computer science. It also discusses the principles for research methodologies and the way for analyzing the results for scientific experiments.

Introduction to Computer Science (CS051)   (Zero Credit hours)

<div align="right">Prerequisites (None)</div>

This course will discuss the basic concepts of a computer system and its peripherals. It also focuses on the new technology in computer communication such as computer networks and internet.

Introduction to programming   (CS011)   (Zero Credit hours)

<div align="right">Prerequisites (None)</div>

Fundamental Concepts of programming, problem solving, logical thinking, Analysis frameworks, programmer frameworks, flowchart and algorithm, testing, programming Languages types, system analysis and design framework.

Introduction to Mathematic and Statistics (MAT099)   (Zero Credit hours)

<div align="right">Prerequisites (None)</div>

Number, basic rule of algebra, properties of negation, fractions, zero, and equality. Exponents and radicals, properties of exponents polynomials, operations with polynomials, factoring, fractional expression, linear equations, solving linear equation, quadratic equations, solving quadratic equations, equalities, functions and graphs. Presentation and description of statistical data, measures of central tendency and dispersion, probability, random variables.

Introduction to Computer Mathematic (CS020)   (Zero Credit hours)

<div align="right">Prerequisites (None)</div>

An introduction to set theory, sets, functions, relations, graph theory, automata theory, formal languages and algorithmic analysis.