كلية الهندسة وعلوم الحاسب

قسم هندسة علوم الحاسب

توصيف مقررات

برنامج علوم الحاسب

العام الجامعي 1443 هـ

📁 MATH-101: CALCULUS I

This course introduces the students to various topics such as the concept of limits, continuity of functions, the derivative, formulas of differentiation, differentials, extrema and mean value theorems, and graph sketching/optimization.
Prerequisite: None

📁 LS-101: Learning skills

Topics cover in this course the skills of learning motivation; the skills of knowledge and information search and assessing; the skills of information processing; the skills of scientific writing and reporting; the skills of quick reading; The skills of thinking and types; basic principle of innovative problem solving (TRIZ).
Prerequisite: None

📁 MGT-001:Entrepreneurship

Topics cover in this course include Concept and principles of Entrepreneurship; Enterprises business; Types of business; Enterprise planning (executive summary, objective and potential, product and technology; key to success, market analysis, income and cost analysis, and assessment and due diligence); Introduction to market research; principle of preparing feasibility plan
Prerequisite: None

📁 IAS-101: Practical Grammar

Selection of aspects of Arabic grammar essential for written and spoken communication in everyday life with emphasis on correct grammar usage.
Prerequisite: None

📁 PHYS-101: General Physics I

Topics in this course include Measurement, Motion Along a Straight Line, Vectors, Motion in Two and Three Dimensions, Force and Motion — I, Force and Motion — II, Kinetic Energy and Work, Potential Energy and Conservation of Energy, Center of Mass and Linear Momentum, Rotation, Rolling, Torque, and Angular Momentum, Equilibrium and Elasticity, Gravitation, Fluids, and Oscillations.
Prerequisite: MATH-101

📁 CS-111: Computer Skills

Topics cover in this course the skills of operating the computer; the skills of use Microsoft software; the skills of developing simple scientific and educational program; basic principle of MATLAB software and its modules for solving scientific problems
Prerequisite: None

📁 IAS-111: Belief & its Consequences

The roots of the true faith. Special characteristics of Islamic faith. The Islamic view of the universe, mankind and life. Means for enrichment of life and beliefs.
Prerequisite: None

📁 PE-001: Prep. Physical Educ. I

A required course sequence commencing in the freshman year and completed with no more than one semester for each course. Students take semester-long courses and study one sport or two each semester and choices may be made from sports offered in the Preparatory Year Program including fencing, judo, karate, tae kwon do, weight training, weight control and physical fitness. Students may train and compete at a higher level by joining the team squads from which representative selection is made.
Prerequisite: None

📁 CS-101: Computer Programming I

Introduction to computers and programs. Programmer's algorithm, byte code and Java Virtual Machine. Java program's structure, constants, variables and built-in data types. The arithmetic, assignment, increment and decrement operators. Classes and object definition, UML representation of a class, declaration of objects (Instance variables), primitive types and reference types. Relational and logical operators, Boolean expressions, conditional statements, loop statements. Object oriented principles, encapsulation and information hiding, methods and the message passing principles, setters, and getters. Methods in depth, passing parameters, constructors, setters. Arrays, usefulness of arrays, declaration of arrays, access to array elements, operations on arrays.
Prerequisite: MATH 101

📁 MATH-102: Calculus II

Indefinite integrals, definite integrals, The fundamental theorem of calculus, Techniques of integration, Application on definite integrals, Sequences and Series, Power Series, Taylor and Maclaurin Series.
Prerequisite: MATH 101

📁 ENGL-101: Intro. to Academic Discourse

This course is designed to enable students to recognize and interpret the various modes of spoken and written academic discourse and to produce written documents related to what they have read. The main writing skills component of the course teaches students to make use of the principal modes of exposition and various types of academic correspondence common in English to write well-organized texts The course's reading skills element focuses on ways to improve students' reading of scientifically-oriented college-level text books and specialist articles and to familiarize them with the organizational and typographical features (glossaries, indices, headings, boldface, italics, etc.) of such texts. The course's oral skills element introduces students to academic oral communication in classroom and tutorial interaction. The electronic skills taught are intended to complement the written and oral skills by enabling students to use state-of-the-art internet and database search techniques to locate the information they require for expository composition writing and class-related tasks. Students will also be required to maintain a portfolio (including a reflective journal) exhibiting their efforts, progress, and achievement throughout the course.
Prerequisite: ENGL 002

📁 PHYS-205: General Physics II

Electric Charge, Coulomb's Law, Electric Field, Point Charges in Electric Fields Electric Flux, Gauss' Law, A Charged Isolated Conductor, Cylindrical Symmetry Spherical and Planar Symmetries, Electric Potential and Potential Energy, Potential Due to Charged Particles, Electric Potential Energy of a System of Charges Capacitance, Capacitors in Parallel and Series, Energy Stored in a Capacitor, Dielectrics Current and Current Density, Resistance, Ohm's Law, Electric Energy and Power, EMF, Resistors in Series and Parallel, Single Loop, Multiple Loop RC Circuit, Magnetic Field and Force, Charged Particle in a Magnetic Field Torque on a Current Loop, Biot-Savart Law, Ampere's Law and Its Applications, A Current-Carrying Coil as a Magnetic Dipole Faraday's Law, Lenz's Law, Induction and Energy Transfers.
Prerequisite: PHYS 101

📁 IAS-212: Professional Ethics

Importance of ethics in Islam and the integration of worship and aspects of professional life. Suitability criteria for employment in Islam. Standards for professional behavior. Employee interaction with others. Application of Islam to professional violations. Saudi Laws and professional behaviour.
Prerequisite: IAS 111

📁 CS-102: Computer Programming II

This course continues the coverage of the fundamental concepts of Object Oriented Programming started in Programming I (CS 101). It covers more advanced concepts and topics such as relationships between classes, inheritance, polymorphism, abstract classes, error handling, interfaces, generics and data structures.
Prerequisite: CS-101

📁 CS-290 : Web Applications Development

This course is a basic introduction to the Internet and WWW. It covers the following topics Static web page development using HTML. Formatting web pages with tables, images, frames and CSS (Cascading Style sheets). Introduction to client side scripting such as JavaScript. Dynamic web content generation and use of DHTML. Introduction to server side programming such as PHP, JSP, Java Servlets, and ASP .NET. Database connectivity to web applications. Fundamentals of Web 2.0 – the modern web applications. Basics of other relevant concepts and technologies such as XHTML, XML, Web Services, and Ajax. Students participate in a group project on web design and development.
Prerequisite: CS-101

📁 CS-225: Software Engineering. Design and Development

This is a general course, presenting the basic principles and concepts of software engineering and giving foundation for many other courses. It gives broad coverage of the most important terminology and concepts in the software engineering: basic understanding of software life cycle, software processes, requirements engineering processes, introduction to agile and extreme programming, basic modeling and design, basics of project management, software cost estimation, configuration management, and testing, introduction to ethics and professional practice in software engineering.
Prerequisite: CS-101
STAT-219: Prob. & Stat. For Eng. & Sc.

Topics cover in this course include the role of statistics in engineering and science; Descriptive Statistic (numerical summaries of data, stem-leaf diagram, frequency distribution, boxplot, time sequence plot, and probability plot)Probability, sample events, interpretation and axiom of probability, conditional probability, Bayes' theorem, random variable; Discrete random variable and probability distributions (binomial, geometric, hypergeometric , and Poisson) and Continuous random variable and probability distributions (Normal, exponential, Erlanger and gamma); Joint probability distribution, covariance and correlation;; Sampling Distribution and point estimation of parameters; statistical interval for a single sample; Test of hypotheses; statistical inference; Simple leaner regression.
Prerequisite: MATH-102

📁 CS-210: Data Structures and Algorithms

Fundamental concepts of data structures. Performance measurement of algorithms. Implementation and use of lists, stacks, queues, priority queues, trees, heaps, hash tables and graphs. Recursion. Students will do programming assignments.
Prerequisite: CS-102

📁 CS-285: Discrete Math for Computer

This course studies the mathematical elements of computer science including propositional logic, predicate logic, sets, functions and relations, combinatorics, mathematical induction, recursion, algorithms, matrices, graphs, trees, and Boolean logic. During the semester students learn to recognize and express mathematical ideas graphically, numerically, symbolically, and in writing.
Prerequisite: MATH-102

📁 CS-340 : Introduction to Database Systems

Purpose of Database Systems, View of Data, Data Models, Data Definition Language, Data Manipulation Language, Transaction Management, Storage Management, Database Administrator, Database Users, Overall System Structure. Entity Sets, Relationship Sets, Design Issues, Mapping Constraints, Keys, E-R Diagram, Design of an E-R Database Schema. Structure of Relational Databases, Relational Algebra, Extended Relational-Algebra-Operations, Modification of the Database, Reduction of an E-R Schema to Tables. Basic Structure, Set Operations, Aggregate Functions, Null Values, Nested Sub-queries, Derived Relations, Views, Modification of the Database, Joined Relations, DDL, DML. First Normal Form, Relational Database Design, Functional Dependencies, Decomposition, Boyce-Codd Normal Form, Third Normal Form, Overall Database Design Process.
Prerequisite: CS-102

📁 ETHC-303: Ethical and Social Aspects of Computer

The course concentrates on the theory and practice of computer and information ethics. It covers the basics of ethical decision-making, and emphasizes group work and presentations. Topics studied in the course include risk and reliability, privacy, info-war, crime, access, business ethics, copyright, patents, and more.
Prerequisite: None

📁 IAS-311: Islamic Shariah

This course is important for the student to act well in like. The course includes: Good manners in life of Muslims in general; The state of Arabs before Islam in terms of marriage, divorce, and inheritance; The merits and characteristics of Islamic Sharia; A short study of the four Islamic jurisprudence schools, and A short study of Islamic jurisprudence branches.
Prerequisite: IAS-212

📁 CS-251 : Introduction to Comp. Organization and Assembly Language

The course introduces basic digital logic design techniques and integrates the topics of generic assembly language programming, computer organization, and computer design. The objectives of this course are to: help students learn the fundamental elements of computer architecture from a functional, hardware perspective; foster an appreciation of organizational models and design decisions that determine the overall performance, capabilities, and limitations of a computer system; and help students understand the interdependencies among assembly languages, computer organization, and design. Topics include Introduction to basic computer organization and how the computer works; DeMorgan's Law, simplifying circuits using Karnaugh maps, Instruction code, Computer registers, Instruction set, Timing and control; Register Transfer Language HDL (Hardware Description Language) and Micro-operations; Computer Arithmetic Logic Unit Design. -Hardwired control unit, instruction set, introduction to addressing modes; Central Processing Unit Design, Register organization, Instruction format, Addressing modes.
Prerequisite: CS-210

📁 CS-311: Design and Analysis of Algorithms

The course aims at answering two questions: what can be computed by a machine? And how efficiently? It starts by presenting machines models, then addresses the computability problem, and then the complexity of algorithms and their classification according to it.
Prerequisite: CS-102

📁 CS-330: Introduction to Operating Systems

The course explores the evolution, services, and structures of operating systems. It covers the basic concepts of operating system design and implementation and management of system resources such as Central Processing Unit (CPU), Input/output (I/O) devices, memory, and software. Examples given from modern operating systems such as Unix and Windows-driven operating systems are scrutinized. The course features

practical hands-on exercises in implementation and testing of small multi-programmed operating systems.
Prerequisite: CS-210

📁 IAS-201 : Writing for Prof. Needs

Characteristics and types of formal writing: reports; scientific research; summaries; forms resume; evaluations and minutes of meetings.
Prerequisite: IAS 101

📁 CS-344: Advanced Programming

Programming languages are a fundamental part of computer science. This course introduces the formal tools needed to describe precisely what a program means. These tools help us answer many useful questions about program analyses and transformations. Writing and maintaining good code. Version control, Agile software development, Naming, Functions, Classes and abstraction, Formatting and commenting, Error handling, Testing.
Prerequisite: CS-111, CS-102

📁 CS-490: Internship 1(1.0.0)

Students spend 2 months (around 300 working hours) in an approved company or institute.
Students, with assistance from the CS Departmental find internships.
Prerequisite: 95 Hr

📁 CS 370: Introduction to Artificial Intelligence

The course will provide an introduction to artificial intelligence. Topics include: problem solving using search (search procedures e.g. depth-first, breadth-first, A*, etc.), constraint satisfaction problems, game playing, knowledge representation and inference procedures. Abstract highlights cover an advanced AI topic (e.g. machine learning, natural language processing). Students will do a small project in this course as well.
Prerequisite: None

📁 COE 344: Computer Networks

Introduction to computer networks: Internet architectures, Circuit-switching and Packet switching, Delay and loss, Protocol architectures and reference models; Application layer: Design issues, Client-server vs. peer-to-peer, main Internet protocols (HTTP, FTP, Email, DNS and P2P), Network Sockets; Transport layer: Multiplexing/Demultiplexing applications, UDP, Reliable data transfer, TCP, Congestion control mechanisms. Network layer: Virtual circuits vs. Datagram networks, routing, IP addressing and forwarding, Routing algorithms, Routing in the Internet; Link layer: Multiple Access protocols, Switched LANs, Link-layer addressing and ARP, Link-layer switches; Wireless LANs: 802.11 architecture, 802.11 MAC protocols.
Prerequisite: None

📁 CS 498: Senior Project I

The graduation project I is the first part of a senior design and development software project that will give the chance to students to apply the knowledge they acquired in the curriculum on a real project of appropriate complexity within a team under realistic constraints. The outcome of this project must be a significant software system, employing knowledge gained from courses throughout the curriculum. The project should cover most phases of the software lifecycle. In this part of the project, the focus will be on software process and development methodologies, requirements analysis & specification, high-level design, quality assurance, as well as on management of the project. Students must use software case tools to realize their work. They also need to implement a "hello world" version of their software.
Prerequisite: None

📁 CS 432: Software Security Engineering

This course mainly deals with engineering techniques for developing secure software systems. It covers Security fundamentals of Information assurance concepts (confidentiality, integrity, and availability); Nature of threats (e.g., natural, intentional, and accidental); Encryption, digital signatures, message authentication, and hash functions; Common cryptographic protocols (applications, strengths, and weaknesses) relevant to buffer overflows, SQL injections, format string bugs, integer overflows, heap attacks, race conditions, concurrency vulnerabilities, access control, and malicious code; and Nontechnical security issues (e.g., social engineering). The course also covers Computer and Network security issues relevant to Network security threats and attacks; Use of cryptography for network security; and Protection and defense mechanisms and tools. Furthermore, the course focuses on developing secure software by covering topics such as Building security into the software development life cycle, Security in requirements analysis and specification, Secure design principles and patterns, and Secure software construction techniques. A course project is included for demonstration of different techniques.
Prerequisite: None

📁 CS 412: Theory of Computation

Mathematical preliminaries. Regular languages, regular expression, deterministic and non-deterministic finite automata, closure properties and pumping lemma. Context-free grammar and languages, pushdown automata and pumping lemma. Turing machines, the Church-Turing Thesis, Computability. Decidability and the Halting problem. Complexity, class P and NP.
Prerequisite: None

📁 CS 444: Software Quality Assurance

The Need for Software Quality Assurance, Project Quality Management, Components of SQA, SQA Standards: ISO Std. 12207, IEEE Std. 730, SQA Process Area in the CMMI, Anatomy of a Software Process, Typical Life Cycle Phases and Life Cycle Models (Aggregations of Phases), SQA Role: Process Expert, Process Definition Facilitator, Life Cycle Model Facilitator, Focal Point for Process Improvement, Inspection Procedures and Auditing Process, Typical Product Metrics and Their Use, Typical Process Metrics and Their Use, How to Define a Metric, Building the SQA Team, Software reliability models, Future of SQA.
Prerequisite: None

📁 CS 499: Senior Project II

This is a continuation of the graduation project started in CS 498 . The focus is on low-level design, implementation, testing and quality assurance as well as management of the project. The outcome of this project must be a significant software system, employing knowledge gained from courses throughout the curriculum. Students must use software case tools as well as programming environments to do their work. Students must deliver the code, a final report, and must do a presentation of their work as well as a demo of the software realized.
Prerequisite: None