ملحق (١) المحتوى العلمي للمقررات

مقررات المواد الإنسانية

HUM111 **لغة إنجليزية ١**

Credits 2 Hours
Prerequisites –
Contents The material reflects the stylistic variety that advanced earners have to be able to deal with. The course gives practice in specific points of grammar to consolidate and extend learners existing knowledge. Analysis of syntax; comprehension; skimming and scanning exercises develop the learner's skills, comprehension questions interpretation and implication. The activities aim to develop listening, speaking and writing skills through a communicative, functional approach, with suggested topics for discussion and exercises in summary writing and composition.

HUM112 **لغة إنجليزية ٢**

Credits 2 Hours
Prerequisites HUM111
Contents The course aims at enabling the students to further polish and develop their skills in English language through various interactive activities. The need for more articulate written English is reinforced through further in depth study of applied grammar. Again a conversational and situational dialogue based contents are presented to attract students' interest. Pronunciations and comparatively complex grammar are simultaneously introduced. Field related terminology and longer conversations are also presented with emphasis on contrastive grammar and a more articulate pronunciation.

HUM121 **السياق الاجتماعي للحوسبة**

Credits 1 Hour
Prerequisites –
Contents Introduction to the social implications of computing – Social informatics – Social impact of IT on society – Social implications of networked communication – Growth of, control of, and access to the Internet – International issues – Online communities & social implications – Philosophical context – Diversity issues – Gender-related issues – Cultural issues – Accessibility issues – Globalization issues – Economic issues in computing –Digital divide

HUM122 **الملكية الفكرية**

Credits 1 Hour
Prerequisites –
Contents Foundations of intellectual property – Ownership of information – Copyrights, patents, trademarks and trade secrets – Software piracy – Software patents – Transnational issues concerning intellectual property – Fair use – Digital Millennium Copyright Act (DMCA) – International differences – Egyptian Intellectual Property law

HUM131 **سلوكيات الهيئات**

Credits 2 Hours

Prerequisites –
Contents Perception, learning, motivation and value; individual differences and work performance; undestanding yourself; motivating yourself and others, working within groups, achieving success through goal setting, achieving high personal productivity and quality; achieving rewarding and satisfying career; communicating with people; leading and influencing others; building relationships with supervisors, co-workers and customers.

HUM132 التواصل الشخصي

Credits 2 Hours
Prerequisites –
Contents Elements of the communication process, barriers to communications, effective writing skills, report writing, and oral presentation skills. Good diction, extempore speaking in the appropriate context will be key skills in this course.

HUM133 اقتصاديات الحوسبة

Credits 2 Hours
Prerequisites –
Contents Monopolies and their economic implications; Effect of skilled labor supply and demand on the quality of computing products; Pricing strategies in the computing domain; cost-benefit analysis and break-even analysis; return on investment; analysis of options; time value of money; management of money: economic analysis, accounting for risk; Differences in access to computing resources and the possible effects thereof.

HUM141 قوانين الحاسبات

Credits 2 Hours
Prerequisites –
Contents History and examples of computer crime – "Cracking" ("hacking") and its effects – Viruses, worms, and Trojan horses – Crime prevention strategies – System use policies & monitoring – Risks and liabilities of computer-based systems – Accountability, responsibility, liability.

HUM142 المدنية الخصوصية والحريات

Credits 1 Hour
Prerequisites –
Contents Ethical and legal basis for privacy protection; Privacy implications of computer and information systems; Technological strategies for privacy protection; Freedom of expression in cyberspace; International and intercultural implications.

HUM151 الرسم باليد

Credits 2 Hours
Prerequisites –
Contents Introduction and proportions - Gestalt theory and gestural drawing - Blind contour drawing - Using light and dark; discovering mass drawing; using negative space as a tool to create atmosphere and shape - Exploring different mediums and paper - Conclusion and final portfolio drawing

HUM152 تاريخ الحوسبة

Credits 2 Hours
Prerequisites –
Contents Prehistory—the world before 1946; Implications of: History of computer hardware, software; History of the Internet; Telecommunications ; The IT profession; IT education; Pioneers of computing.

HUM153 الثقافة الإسلامية

Credits 1 Hours
Prerequisites –
Contents Fundamental elements of the Islamic Culture; Islamic culture concept; Islamic culture resources; Islamic culture importance; Islamic culture relation with other cultures; The faith's impact on society.

التفكير العلمي

Credits 1 Hour
Prerequisites –
Contents Personal Development Planning – Learning and personal skills development – Transferable skills development, including time and stress management, note taking, essay writing, literature finding, and exam and revision skills – Develops an understanding of the nature of scientific thinking – Scientific methods are introduced and evaluated – Critical and creative thinking skills – The processes of induction and deduction – Empirical reasoning and the evaluation of evidence – Heuristic strategies for critical and creative thinking – A range of motivating examples on sustainability and personal development.

HUM231 إدارة الأعمال

Credits 2 Hours
Prerequisites –
Contents Management concepts, level and types of management, planning and organization of work flow, delegation, leadership styles, decision making, stress and time management, and employee relations, decision-making in such areas as investment in operations, productions planning, scheduling and control, reliability and maintenance.

HUM2٣2 الكتابة التقنية

Credits 2 Hours
Prerequisites HUM111
Contents General Principles of Good Writing – Design and Usability – Documentation Development Process – Writing Procedures – Aspects of the Language – Obstacles to Readability – Writing Reports – Practices in Technical Writing

HUM241 الحاسبات والأخلاقيات

Credits 1 Hour
Prerequisites –
Contents Community values and the laws by which we live – The nature of professionalism in computing – Various forms of professional credentialing and the advantages and

disadvantages – The role of the professional in public policy – Maintaining awareness of consequences – Ethical dissent and whistle-blowing – Codes of ethics, conduct, and practice (IEEE, ACM, SE, AITP, and so forth) – Dealing with harassment and discrimination – "Acceptable use" policies for computing in the workplace.

مقررات العلوم الأساسية

رياضيات ١

Credits 3 Hours
Prerequisites –
Contents Pre-calculus review: sets and functions; limits and continuity – Derivatives: techniques of differentiation; derivatives of the basic and fundamental functions; implicit differentiation; linear approximation and differentials; extreme of functions; optimization problems; velocity and acceleration – Integrals: indefinite integrals; change of variables; definite integrals; the fundamental theorem of calculus – Techniques of integration: integration by parts; trigonometric integrals and substitutions; integrals of rational functions – Numerical integration – Applications of definite integrals.

رياضيات ٢

Credits 3 Hours
Prerequisites MATH101
Contents Partial fractions – Infinite series: sequences, convergent and divergent series, positive-term series, tests of convergence, alternating series and absolute convergence, power series, power series representations of functions, Maclauran and Taylor series – Differential equations: definition, classifications and terminology, techniques of solution of ordinary first-order linear differential equations – Matrices – Linear equations – Vector spaces, inner product spaces – Linear transformations – Eigen-values and eigenvectors.

MATH٢٠١ **رياضيات ٣**

Credits 3 Hours
Prerequisites MATH102
Contents Laplace transform – Inverse Transform – Fourier series – complex Fourier series – Fourier integrals – Fourier cosine and sine transforms – Fourier transform – Discrete and fast Fourier transforms – Z-transform – Inverse Z-transform – Discrete-time systems and difference equations – Discrete linear systems – Wavelet transform – Applications.

MATH٢٠ **الاحتمالات والاحصاء**

Credits 2 Hours
Prerequisites MATH102
Contents Introduction to probability: Basic concepts; Properties of probability; Conditional probability and independence; Total probability and Bayes' rule; Random variables; Probability distributions.
Introduction to statistical analysis: Sampling and sampling distributions; Point estimation; Methods of moments and maximum likelihood; Interval estimation; Least squared concept; Testing hypotheses; Statistical tests.
Applications: Statistical software packages; Applications of statistics to reliability

engineering.

تحليل عددي

Credits 3 Hours
Prerequisites MATH102
Contents Numerical Computing and Computers – Solving Nonlinear Equations – Solving Sets of Equations – Interpolation and Curve Fitting – Approximation of Functions – Finite Differences – Numerical Differentiation and Numerical Integration – Numerical Solution of ODEs – Boundary-Value Problems – Sample applications using software tools.

هياكل متقطعة

Credits 3 Hours
Prerequisites MATH102
Contents Introduction to logic and proofs – Fundamental structures: Functions; relations; sets; cardinality and countability – Boolean algebra – Propositional logic: Logical connectives; truth tables; normal forms; validity – Elementary number theory: Factorability; properties of primes; greatest common divisors and least common multiples; Euclid's algorithm; modular arithmetic; the Chinese Remainder Theorem – Basics of counting: Counting arguments; pigeonhole principle; permutations and combinations; binomial coefficients – Predicate logic: Universal and existential quantification; modus ponens and modus tollens; limitations of predicate logic – Recurrence relations: Basic formulae; elementary solution techniques – Graphs and trees: Fundamental definitions; simple algorithms; traversal strategies; proof techniques; spanning trees; applications.

بحوث عمليات

Credits 3 Hours
Prerequisites CS201
Contents Linear programming: The Simplex method – Integer programming – Probabilistic modeling – Queuing theory: Petri nets; Markov models and chains – Optimization – Network analysis and routing algorithms – Prediction and estimation: Decision analysis; Forecasting; Risk management; Econometrics and microeconomics; Sensitivity analysis – Dynamic programming – Sample applications – Software tools.

النمذجة والمحاكاه

Credits 3 Hours
Prerequisites MATH202
Contents Definition of simulation and modeling: Purpose including benefits and limitations – Important application areas: healthcare; economics and finance; classroom of the future; training and education; city and urban simulations; simulation in science and in engineering; games; military simulation – Different kinds of simulations – The simulation process – Model building: use of mathematical formula or equation, graphs, constraints – Methodologies and techniques – Use of time stepping for dynamic systems – Theoretical considerations; Monte Carlo methods, stochastic processes, queuing theory – Technologies in support of simulation and modeling – Human computer interaction considerations – Assessing and evaluating simulations in a variety of contexts – Software in support of simulation and modeling; packages, languages.

الفيزياء ١

Credits	3 Hours
Prerequisites	–
Contents	Mechanics: Physics and measurements; Motion in one dimension; Vectors; Motion in two dimensions; Laws of motion; Circular motion and its applications; Work and energy; Potential energy and conservation of energy; Linear momentum and collision; Rotation of a rigid body; Rolling motion; Law of gravity. Waves: Oscillatory motion; Wave motion; Sound waves.

الفيزياء ٢

Credits	3 Hours
Prerequisites	–
Contents	Physical optics: Interference, diffraction and polarization. Magnetic fields: Definitions and properties; Sources of magnetic fields; electromagnetic waves; The four Maxwell's equations. Selected topics: Introduction to modern physics and applications, Molecules and solids; Semiconductors and semiconductors devices; Superconductivity.

الإلكترونيات

Credits	3 Hours
Prerequisites	–
Contents	Electrical circuit laws and theorems: Ohm's Kirchhoff's, mesh, nodal, Thevenin's maximum power transfer theorems for both DC and AC circuits , R, L, C elements. Electronic components and circuits diodes – bipolar junction transistors – field-effect transistors and use of transistors in amplifiers. OP-Amp, digital circuits – physical design of simple gates – flip-flops and memory circuits.

الدوائر الرقمية

Credits	2 Hours
Prerequisites	–
Contents	Numbering systems, logic functions and logic gates, Boolean algebra. Combinational circuits: Simplification of logic circuits using Karnaugh maps and tabulation method. Gate level design, adders, subtractors, encoders and decoders, multiplexers and demultiplexers. MSI Design, Programmable devices (ROM, PAL, PLA, ...). Sequential circuits: Flip-flops, latches, analysis and design of simple sequential circuits, state tables and state diagrams, counters, registers, RAMs. Integrated circuits and logic families.

معالجة الاشارات الرقمية

Credits	3 Hours
Prerequisites	MATH201
Contents	Digital processing of signals, sampling, difference equations, discrete-time Fourier transforms, discrete and fast Fourier transforms, digital filter design.

مقررات الحوسبة الأساسية

أساسيات البرمجة

Credits 3 Hours
Prerequisites IT101
Contents Fundamental programming constructs: Syntax and semantics of a higher-level language; variables, types, expressions, and assignment – Simple I/O – Conditional and iterative control structures – Functions and parameter passing – Structured decomposition – Algorithms and problem-solving: Problem-solving strategies; the role of algorithms in the problem-solving process; implementation strategies for algorithms; debugging strategies; the concept and properties of algorithms – Fundamental data structures – Machine level representation of data – Human-computer interaction: Introduction to design issues – Software development methodology: Fundamental design concepts and principles; structured design; testing and debugging strategies; test-case design; programming environments; testing and debugging tools.

هياكل البيانات والخوارزميات

Credits 3 Hours
Prerequisites CS241
Contents Review of elementary programming concepts – Fundamental data structures: Stacks; queues; linked lists; hash tables; trees; graphs – Basic algorithmic analysis: big "O," little "o," omega, and theta notation – Fundamental computing algorithms: O(N log N) sorting algorithms; hash tables, including collision-avoidance strategies; binary search trees; representations of graphs; depth- and breadth-first traversals – Recursion and divide-and-conquer strategies – Basic algorithmic strategies: Brute-force algorithms; greedy algorithms; divide and conquer; backtracking – Standard complexity classes.

البرمجة الشيئية

Credits 3 Hours
Prerequisites CS141
Contents Introduction to object-oriented programming – Using an object-oriented language; classes and objects; syntax of class definitions; methods; members – Simple data: variables, types, and expressions; assignment – Control structures: Iteration; conditionals – Message passing: Simple methods; parameter passing - Sub-classing; encapsulation and information hiding; separation of behavior and implementation; class hierarchies; inheritance; polymorphism – Collection classes and iteration protocols – Using APIs: Class libraries; packages for graphics and GUI applications – Object-oriented design: Fundamental design concepts and principles; introduction to design patterns; object-oriented analysis and design; design for reuse .

نظم التشغيل

Credits 3 Hours
Prerequisites **CS321**

Contents Overview: Role and purpose of operating systems; history of operating system development; functionality of a typical operating system; design issues (efficiency, robustness, flexibility, portability, security, compatibility). Basic principles: Structuring methods; abstractions, processes, and resources; device organization; interrupts; user/system state transitions. Concurrency: The idea of concurrent execution; states and state diagrams; implementation structures; dispatching and context switching; interrupt handling in a concurrent environment. Mutual exclusion: Definition of the "mutual exclusion" problem; deadlock detection and prevention; solution strategies; models and mechanisms (semaphores, monitors, condition variables, rendezvous); synchronization; multiprocessor issues. Scheduling: Preemptive and non-preemptive scheduling; scheduling policies; processes and threads; real-time issues. Memory management: Review of physical memory and memory management hardware; overlays, swapping, and partitions; paging and segmentation; page placement and replacement policies; working sets and thrashing; caching. Device management: Characteristics of serial and parallel devices; abstracting device differences; buffering strategies; direct memory access; recovery from failures. File systems: Fundamental concepts (data, metadata, operations, organization, buffering, sequential vs. non-sequential files); content and structure of directories; file system techniques; memory-mapped files; special-purpose file systems; naming, searching, and access; backup strategies. Security and protection: Overview of system security; policy/mechanism separation; security methods and devices; protection, access, and authentication; models of protection; memory protection; encryption; recovery management.

معماريات الحاسب ونظم التشغيل

Credits 3 Hours
Prerequisites CS141, CS201
Contents Computer architecture: data representation, digital logic, the internal structure of the CPU, primary and secondary storage, input/output, control unit, and assembly language. Operating systems: processes, inter-process communication, process scheduling, resource allocation, memory management, virtual memory, file systems, and input/output device management.

البرمجة المرئية

Credits 3 Hours
Prerequisites CS211
Contents Graphical user interface (GUI), review of concepts, and anatomy of a windows program using different languages. Available developing tools. Keyboard and mouse input, menus creating, adding menus to programs. Dialog boxes: buttons, text, list boxes, grids and spreadsheets. Graphics files and file handling. Multiple documents interfaces and views (MDI). Exception Handling and Debugging. Object Linking and Embedding (OLE).

الرسم بالحاسب

Credits 3 Hours
Prerequisites IT101, CS201
Contents This course introduces techniques for 2D and 3D computer graphics, including simple color models, homogeneous coordinates, affine transformations (scaling, rotation, translation), viewing transformation, clipping, illumination and shading, texture maps, rendering, high level shader language, video display devices,

physical and logical input devices, hierarchy of graphics software, hidden surface removal methods, Z-buffer and frame buffer, color channels, and using a graphics API.

الذكاء الاصطناعي

Credits 3 Hours
Prerequisites IT101, CS201
Contents Fundamental issues in intelligent systems – History of artificial intelligence – Agents: Definition of agents; successful applications and state-of-the-art agent-based systems; software agents, personal assistants, and information access; multi-agent systems – Modeling the world; the role of heuristics – Search and constraint satisfaction – Knowledge representation and reasoning – Advanced search: Genetic algorithms; simulated annealing; local search – Advanced knowledge representation and reasoning – Structured representation; nonmonotonic reasoning; reasoning on action and change – AI planning systems: Definition and examples of planning systems; planning as search; operator-based planning; propositional planning.

أساسيات نظم المعلومات

Credits 3 Hours
Prerequisites IT101
Contents Information systems components. Information systems in organizations: Characteristics of IS professionals, IS career paths, Cost/value information, Quality of information, competitive advantage of information, IS and organizational strategy, Value chains and networks. Globalization. Valuing information systems: Investment evaluation, Multi-criteria analysis, Cost-benefit analysis, Identifying and implementing innovations. E-business: B-to-C, B-to-B, Intranets, Internet, extranets, E-government, Web 2.0 Technologies: e.g., wikis, tags, blogs, netcasts, self-publishing, New forms of collaboration: social networking, virtual teams, viral marketing crowd-sourcing. Security of information systems: Threats to information systems, Technology-based safeguards. Business intelligence: Organizational decision making, functions, and levels, Executive, managerial, and operational levels, Systems to support organizational functions and decision making. Information and knowledge discovery: Reporting systems, Online analytical processing, Data, text, and Web mining, Business analytics. Application systems: Executive, managerial, and operational support systems, Decision support systems.

تنظيم الملفات

Credits 3 Hours
Prerequisites CS241
Contents Introduction to the Design and Specification of File Structures – Fundamental File Processing Operations – Fundamental File Structure Concepts – Managing Files of Records – Secondary Storage and System Software – Organizing Files for Performance. Indexing – Multi-Level Indexing and B-Trees – Indexed Sequential File Access and Prefix B+ Trees. Hashing.

قواعد البيانات

Credits 3 Hours
Prerequisites CS141

Contents Database systems: History and motivation for database systems; components of database systems; DBMS functions; database architecture and data independence. Data modeling: Data modeling; conceptual models; object-oriented model; relational data model. Relational databases: Mapping conceptual schema to a relational schema; entity and referential integrity; relational algebra and relational calculus. Database query languages: Overview of database languages; SQL; query optimization; 4th-generation environments; embedding non-procedural queries in a procedural language; introduction to Object Query Language. Relational database design: Database design; functional dependency; normal forms; multivalued dependency; join dependency; representation theory.

تحليل وتصميم النظم

Credits 3 Hours
Prerequisites IT101
Contents Information requirements: Structuring of IT-based opportunities into projects; Project specification; Project prioritization; Analysis of project feasibility. Operational, Tangible costs and benefits (financial and other measures such as time savings), Intangible costs and benefits such as good will, company image: Technical; Schedule; Cultural (organizational and ethnic). Fundamentals of IS project management in the global context. Using globally distributed communication and collaboration platforms. Analysis and specification of system requirements; Data collection methods; Methods for structuring and communicating requirements; Factors affecting user experience; User interface design; System data requirements; Factors affecting security; Ethical considerations in requirements specification. Different approaches to implementing information systems to support business requirements: Packaged systems; enterprise; systems; Outsourced development; In-house development. Specifying implementation alternatives for a specific system. Methods and impact of implementation alternatives on system requirements specification. Different approaches to systems analysis and design: structured SDLC, unified process/UML, agile methods

أساسيات تكنولوجيا المعلومات

Credits 3 Hours
Prerequisites –
Contents Introduction: Brief history of computing; the components of a computing system.
Machine level representation of data: Bits, bytes, and words; numeric data representation and number bases; signed and twos-complement representations; fundamental operations on bits; representation of nonnumeric data.
Digital logic: Switching circuits; gates; memory.
Assembly level machine organization: Basic organization of the von Neumann machine; control unit; instruction fetch, decode, and execution; instruction sets and types; assembly/machine language programming; instruction formats.
Hardware realizations of algorithms: Data representation; the von Neumann model of computation; the fetch/decode/execute cycle; basic machine organization.
Operating systems and virtual machines: Historical evolution of operating systems; responsibilities of an operating system; basic components of an operating system.
Computing applications: Word processing; spreadsheets; editors; files and directories.
Introduction to net-centric computing: Background and history of networking and

the Internet; demonstration and use of networking software including e-mail, telnet, and FTP.

تراسل البيانات

Credits 3 Hours
Prerequisites IT101
Contents Communication models, Data communication, networks, protocol architectures. Data Transmission, Transmission media wired and wireless, transmission impairment. Encoding and modulating baseband, Digital and analog modulation. Flow control and Error control. Multiplexing.

شبكات الحاسب

Credits 3 Hours
Prerequisites IT251 or CS322
Contents Standards bodies. Switched vs. packets networking. OSI model. Internet model (TCP/IP). Nodes & links. LAN, WAN. Bandwidth, throughput. Components and architectures. Routing and switching. Communication protocols. Application, Transport, and network layers protocols.

البرمجة العنكبوتية

Credits 3 Hours
Prerequisites CS141, IT251
Contents The fundamental technologies behind the Web. Concepts of Web Programming both client-side and server-side. HTML and CSS Web page development. Fundamentals of Server side scripting language such PHP. Fundamentals of Client side scripting language such as JavaScript.

مقدمة في تكنولوجيا الوسائط المتعددة

Credits 3 Hours
Prerequisites CS241
Contents Basic knowledge about multimedia and multimedia technology. Basic media such as text, image, animation, graphic, and sound. Current multimedia technology. Roles and uses of multimedia technology in many areas such as education, advertisement, and public relation etc.

معماريات الحاسب

Credits 3 Hours
Prerequisites CS141, CS201
Contents Register transfer notation; physical considerations (gate delays, fan-in, fan-out). Assembly level organization: Basic organization of the von Neumann machine; control unit; instruction fetch, decode, and execution; instruction sets and types (data manipulation, control, I/O); assembly/machine language programming; instruction formats; addressing modes; subroutine call and return mechanisms; I/O and interrupts. Memory systems: Storage systems and their technology; coding, data compression, and data integrity; memory hierarchy; main memory

organization and operations; latency, cycle time, bandwidth, and interleaving; cache memories (address mapping, block size, replacement and store policy); virtual memory (page table, TLB); fault handling and reliability. Interfacing and communication: I/O fundamentals: handshaking, buffering, programmed I/O, interrupt-driven I/O; interrupt structures: vectored and prioritized, interrupt acknowledgment; external storage, physical organization, and drives; buses: bus protocols, arbitration, direct-memory access (DMA); introduction to networks; multimedia support; raid architectures. Functional organization: Implementation of simple datapaths; control unit: hardwired realization vs. microprogrammed realization; instruction pipelining; introduction to instruction-level parallelism (ILP). Multiprocessor and alternative architectures: Introduction to SIMD, MIMD, VLIW, EPIC; systolic architecture; interconnection networks; shared memory systems; cache coherence; memory models and memory consistency. Performance enhancements: RISC architecture; branch prediction; prefetching; scalability. Contemporary architectures: Hand-held devices; embedded systems; trends in processor architecture.

تصميم وتحليل الخوارزميات

Credits 3 Hours
Prerequisites CS211
Contents Review of proof techniques − Basic algorithmic analysis: Asymptotic analysis of upper and average complexity bounds; best, average, and worst case behaviors; big-O, little-o, Ω, and Θ notation; standard complexity classes; empirical measurements of performance; time and space tradeoffs in algorithms; using recurrence relations to analyze recursive algorithms − Algorithmic strategies: branch-and-bound; heuristics; pattern matching and string/text algorithms; numerical approximation − Graph and tree algorithms: Shortest-path algorithms (Dijkstra's and Floyd's algorithms); transitive closure (Floyd's algorithm); minimum spanning tree (Prim's and Kruskal's algorithms); topological sort – Dynamic Programming – Randomized Algorithms – NP-complete problems.

نظرية الآليات واللغات

Credits 3 Hours
Prerequisites CS141, CS201
Contents Introduction: The purpose of automata theory; relationship of automata and languages; the Chomsky hierarchy. Finite automata: Definition of finite automata and their operation; deterministic and nondeterministic automata and their equivalence; two-way finite automata; minimization of deterministic automata. Regular expressions: Relationship of regular expressions and finite automata; Kleene analysis and synthesis theorems; applications of regular expressions. Properties of regular sets: The Myhill-Nerode theorem; the pumping lemma; closure properties; decision algorithms. Context-free grammars: Equivalence and ambiguity of grammars; languages generated by context-free grammars; simplification of context-free grammars; Chomsky and Greibach normal forms; general strategies for top-down and bottom-up parsing. Properties of context-free languages: The pumping lemma for context free languages; closure properties of context-free languages; decision algorithms. Pushdown automata: Languages accepted by pushdown automata; pushdown automata and context-free languages. Linear-bounded automata: Definition and operation; context-sensitive languages; properties of context-sensitive languages. Turing machines: Definitions and introduction to the mechanics of Turing machine operation; the universal Turing machine; the Church-Turing thesis; variations of Turing machines; languages recognized by Turing machines; computable languages; undecidability; the P = NP question.

معاجة الصور

Credits 3 Hours
Prerequisites CS211
Contents Scope and applications of image are processing. Perspective transformations (Modeling picture taking, perspective transformations in homogeneous coordinates and with two reference frames). The spatial frequency domain (The sampling theorem, template matching and the convolution theorem, spatial filtering). Enhancement and restoration, image segmentation. Image

representation: (Spatial differentiation and smoothing, template matching, region analysis, contour following). Descriptive methods in scene analysis. Hardware and software considerations. Applications.

الرسم بالحاسب المتقدم

Credits 3 Hours
Prerequisites CS351
Contents This course will study advanced topics in computer graphics which includes GPU programming, shader languages, modeling natural phenomena, real-time rendering for games, information visualization, geometric optimization, level-of-detail rendering, bi-directional reflectance distribution functions (BRDFs), environment mapping, bump mapping, subdivision surfaces, higher-order surface modeling.

نظم التشغيل المتقدمة

Credits 3 Hours
Prerequisites CS321
Contents Parallel and distributed operating systems. Load sharing, scheduling, reliability, recovery, memory management. Distributed file systems, distributed agreement, and object- oriented operating systems.

الحسابات المتوازية

Credits 3 Hours
Prerequisites CS311, CS321
Contents Introduction to parallel computing – Models of parallel computers – Data and task parallelism – Shared and Distributed memory parallel machine architecture concepts – Interconnection networks – Basics of threaded parallel computation– Parallel algorithmic design – Languages and libraries for threaded parallel programming – Languages and libraries for distributed memory parallel programming – Co-processor techniques including GPU and FPGA – Experimental techniques – Measuring performance and computing speed-up.

بناء المترجمات

Credits 3 Hours
Prerequisites CS211, CS341
Contents Compiler Functions, Language Elements – BNF Grammars, Regular Expressions, Finite State Machines, Lexical Analyzers – Context Free Grammars, Grammar Ambiguity, Parse Trees, Push Down Automata – Parsing Methods; Top-Down, Recursive Descent, LL, LR – Symbol Table Construction, Type Checking – Code Generation – Handling Recursion and Arrays – Code Optimization Techniques.

تصميم لغات البرمجة

Credits 3 Hours
Prerequisites CS211
Contents Fundamental issues in language design: General principles of language design; design goals; typing regimes; data structure models; control structure models; abstraction mechanisms. Overview of programming paradigms: Procedural paradigm; object-oriented paradigm; functional paradigm; logic paradigm. Type systems: Data types; type-checking models; semantic models of user-defined types;

parametric polymorphism; subtype polymorphism; type-checking algorithms. Models of execution control: Order of evaluation of subexpressions; exceptions and exception handling; parallel composition; functions with delayed evaluation; runtime systems. Declaration, modularity, and storage management: Declaration models; parameterization mechanisms; type parameterization; mechanisms for sharing and restricting visibility of declarations; garbage collection. Programming language semantics: Informal semantics; overview of formal semantics; denotational semantics; axiomatic semantics; operational semantics. Language-based constructs for parallelism: Communication primitives for tasking models with explicit communication; communication primitives for tasking models with shared memory; programming primitives for data-parallel models; comparison of language features for parallel and distributed programming; optimistic concurrency control vs. locking and transactions; coordination languages; asynchronous remote procedure calls; other approaches.

الحركة بالحاسب

Credits 3 Hours
Prerequisites –
Contents Basics of key-frame animation, camera animation, forward and inverse kinematics, particle systems, rigid body simulation, flocking, autonomous behavior, modeling natural phenomena such as water and gases, animation of articulated structures, facial animation, clothes, scripting system, morphing, motion capture, and deformation.

الرؤية بالحاسب

Credits 3 Hours
Prerequisites CS241, PHYS102
Contents An introduction to the concepts and applications in computer vision. Topics include: cameras and projection models, low-level image processing methods such as filtering and edge detection; mid-level vision topics such as segmentation and clustering; shape reconstruction from stereo, as well as high-level vision tasks such as object recognition, scene recognition, face detection and human motion categorization. Applications such as scene reconstruction and tracking.

برمجة الألعاب

Credits 3 Hours
Prerequisites MM301
Contents This course describes the techniques and programming tricks used to build efficient game engines that support landscape visualization, complex scenes, lighting, shadows, motion control, collision, dynamics, image based rendering, and multi-player.

النظم الذكية

Credits 3 Hours
Prerequisites CS361
Contents Application Areas of Intelligent Systems – Intelligent System Architecture – Knowledge Engineering and Control –Languages Used in Expert Systems – Bayesian Interference – Fuzzy Logic – Decision Support Systems – Software tools for developing expert systems – Software tool for developing intelligent systems).

Robotics: Overview; configuration space; planning; sensing; robot programming; navigation and control.

تعلم الآلة

Credits 3 Hours
Prerequisites CS361
Contents Introduction to machine learning – Definition and examples of machine learning – Supervised learning (of classification and regression functions); K-nearest neighbors, decision trees, naïve Bayes, support vector machines, logistic regression, evolutionary algorithms, Bayesian Networks, hidden Markov model, neural networks, boosting – Unsupervised learning and clustering K-means, hierarchical clustering (agglomerative and divisive), principal component analysis, independent component analysis, Expectation Maximization algorithm – Reinforcement learning – Kernel methods – Sparse kernel machines – Mixture models and the EM algorithm – Combining multiple learners.

التعرف بالنماذج

Credits 3 Hours
Prerequisites CS361
Contents Introduction − Statistical Decision Theory − Statistical Decision Theory continued − Parameter Estimation − Parameter Estimation continued − Introduction to Principal Component Analysis and Linear Discriminant Analysis − Face Recognition − Non-parametric Techniques − Decision Trees − Neural Networks − Classifier Combination − Feature Selection − Unsupervised Learning, Clustering, and Multidimensional Scaling − Semi-supervised learning.

مقدمة أمن الحاسب

Credits 3 Hours
Prerequisites CS211, IT351
Contents Security Goals, Fundamentals (confidentiality, integrity, availability, etc.). Introduction to risk assessment and management. Security standards in government and industry. Computer system protection principles (UNIX and Windows). Access controls, including MAC, DAC, and role-based. Cryptography fundamentals. Authentication, passwords, introduction to protocols, Kerberos. Security operations. Attacks: software attacks, malicious code, buffer overflows, social engineering, injection attacks, and related defense tools. Network attacks: Denial of service, flooding, sniffing and traffic redirection, defense tools and strategies. Attacking web sites: cross-site scripting. IPSec, Virtual Private networks and Network Address Translation. Ethics, SP issues that are related. Introduction to Forensics.

التشفير

Credits 3 Hours
Prerequisites CS211, IT351
Contents Introduction − Secret-Sharing − Defining Encryption − Symmetric-Key Encryption − Public-Key Encryption − Hash functions, Digital Signatures − Key Exchange − Secure Communication Protocols − Homomorphic Encryption − Private Information Retrieval − Attribute-based Cryptography − Pairing-based Cryptography − Formal Methods in Cryptography − Private Set Intersection −

Signatures.

نظم المعلومات الجغرافية

Credits 3 Hours
Prerequisites IS201, IS212
Contents Fundamentals of Geographic Information Systems concepts to create, edit, and query spatial data. An introduction to map projections, coordinate systems, data capture, attribute tables, data manipulation, remote sensing, aerial and satellite imagery and using Global Position Systems (GPS). Transferring data to GIS data models. Spatial relationships analysis and making decisions from presented information through various geo-processing techniques. Using GIS in many fields. Hands-on experience in GIS techniques using appropriate tools.

إدارة المشروعات المتقدمة

Credits 3 Hours
Prerequisites IS221
Contents Managing Project Quality. Managing Project Risk. Managing Project Procurement: Alternatives to systems development; External acquisition; Outsourcing-domestic and offshore; Steps in the procurement process; Managing the procurement process. Project Execution, Control & Closure: Managing project execution; Monitoring progress and managing change; Managing Project Control & Closure; Cost control; Change control; Administrative closure; Personnel closure; Contractual closure; Project auditing.

نظم دعم اتخاذ القرار

Credits 3 Hours
Prerequisites IS201
Contents Basic concepts of DSS and their architectures and different components. Characteristics, structures, and uses of DSS in different fields. DSS models. Institutional and ad hoc DSS. DSS operating and evolving. Application of decision support systems in different disciplines. Hardware and software selections of DSS.

استراتيجية وإدارة واكتساب نظم المعلومات

Credits 3 Hours
Prerequisites IS201
Contents The Strategic Role of Information Systems; Information Systems and Organizations; Information Management, and Decision Making; Ethical and Social Impact of Information Systems; Information Systems Software; Managing Data Resources: Telecommunications, Enterprise-Wide Computing and Networking; Redesigning the Organization with Information Systems; Ensuring Quality with Information Systems; Systems Success and Failure: Implementation, Information and Knowledge Work Systems; Enhancing Management Decision Making; Controlling Information Systems; Managing International Information Systems.

قواعد البيانات المتقدمة

Credits 3 Hours
Prerequisites IS212
Contents Data and database administration: Transaction processing; Using a database

management system from an application development environment; Use of database management systems in an enterprise system context; Data / information architecture; Data security management. Basic data security principles. Data security implementation: Data quality management. Data quality audits. Data quality improvement: Business intelligence. On-line analytic processing. Data warehousing.

قواعد البيانات الموزعة والشيئية

Credits 3 Hours
Prerequisites IS212
Contents Levels of distribution transparency. Distributed database design, mapping users' transactions to distributed level. Optimization of accesses strategies. The management of distributed transactions. Distributed concurrence control, recovery in distributed database. Distributed database administration. Commercial systems. The SDD 1 system. Object-databases.

نظم المعلومات الشبكية

Credits 3 Hours
Prerequisites IS201, IT371
Contents Expertise and skills in web technologies. Professional web publishing and web-application development. Server side and client side scripting languages. Using the web technology to manage and maintain information systems. Concepts of the distributed database and developing its web interface. Web master administration.

استخلاص البيانات وذكاء الأعمال

Credits 3 Hours
Prerequisites IS201
Contents Main concepts and algorithms to data mining. Data warehouses/data marts. Online analytic processing. Data, text, web mining. Applied studies on problems in financial engineering, e-commerce, geo-sciences, bioinformatics and elsewhere. Reporting systems; Business analytics; Organizational decision making, functions, and levels: Executive, managerial, and operational levels; Systems to support organizational functions and decision making. Information visualization: Visual analytics; Dashboards.

إدارة قواعد البيانات

Credits 3 Hours
Prerequisites IS212
Contents Different DBA job roles (VP of DBA, developer DBA, production DBA). The changing job role of the DBA. Environment management (network, CPU, disk and RAM). Instance management (managing SGA regions). DBMS table and index management. Instance Architecture. The three security methods (VPD, Grant security/role-based security, grant execute). Creating New Database Users. Auditing User activity. Identifying System and Object Privileges. Granting and Revoking Privileges. Creating and Modifying Roles. Displaying user security Information from the Data Dictionary. Object management. Database maintenance.

معالجة المعاملات

Credits 3 Hours

Prerequisites IS212
Contents Overview of transaction processing systems and their implementation for applications such as airline reservations, banking, and inventory control. Evolution and history of transaction processing systems. Fault tolerance, processing monitors and their implementation. Lock managers, recovery managers, file management and access paths, and disaster recovery and data replication. Understanding replication including single-master and multi-master replication.

قواعد بيانات الوسائط المتعددة

Credits 3 Hours
Prerequisites IS212, CS241
Contents Types of multimedia information; multimedia database applications; characteristics of multimedia objects; components of a multimedia database management system; Multimedia storage and retrieval; Multimedia object storage; file retrieval structures; disk scheduling and server admission; Multimedia information modeling; Metadata for multimedia; multimedia data access; Object-oriented models temporal models, spatial models and multimedia authoring; Querying multimedia databases; Query processing and query languages; multimedia database architecture.

ضمان جودة نظم المعلومات

Credits 3 Hours
Prerequisites IS201
Contents Quality Assurance in designing information systems. Data quality in information systems. Quality Assurance in Designing the Supply Chain Network. Supply Chain Performance, Metrics, and Quality Attributes. Optimization and Uncertainty of Supply Chain Network. Demand Uncertainty: Forecasting. Managing Uncertainty in the Supply Chain (Safety Inventory). Decision-Support Systems for Supply Chain.

تطوير تطبيقات نظم المعلومات

Credits 3 Hours
Prerequisites IS212, IS413
Contents Database access. Development approaches: Object-oriented; Procedural; Declarative; Rapid application; Structured. Application integration. Prototyping. Development of various applications in information systems.

نظم المعلومات الاجتماعية

Credits 3 Hours
Prerequisites IS413
Contents Identifying the major social and technical elements of an online community, drawing on relevant social science theories. Analysis of online communities' technology and social support needed to make these social interactions successful. Understanding specific social network design choices and their implications on the community. Guiding an on-line community through the startup phase and the selection and configuration of new social and technical features and activities. Current research in analysis and security of social networks.

أمن الشبكات

Credits 3 Hours
Prerequisites IT351
Contents Fundamentals of cryptography. Applications of cryptography to networks. Secret-key algorithms; Public-key algorithms; Authentication protocols; Digital Signatures; VPN applications. Network security protocols, Network attack scenarios (DOS, Intrusion, Repudiation, Malicious SW…etc). Firewalls. Intrusion detection. Wired, wireless and mobile network security.

إدارة الشبكات

Credits 3 Hours
Prerequisites IT351
Contents Management models FCAPS & OAMP. Management layers, Manager/agents, MIB, OID, management communication patterns, polling, event based management. Management protocols SNMP, netflow, netconfig. CLI, Management metrics, SLA. Labs experiment.

ضمان المعلومات وحمايتها

Credits 3 Hours
Prerequisites IT351
Contents Threats to information systems. Technology-based safeguards. Human-based safeguards. Information systems security planning and management. Identification and authentication, authorization rules. Different encryption and decryption techniques, different types of ciphers, characteristics of good ciphers, crypt analysis, public-key system, single-key system and data encryption standards. Computer virus protection, privacy and data protection, designing of secure system, models of security, database security, reliability and integrity, sensitive data.

الحوسبة اللاسكية والمحمولة

Credits 3 Hours
Prerequisites IT251
Contents Overview of the history, evolution, and compatibility of wireless standards. The special problems of wireless and mobile computing. Wireless local area networks and satellite-based networks. Mobile Internet protocol. Mobile aware adaptation. Extending the client-server model to accommodate mobility. Mobile data access: server data dissemination and client cache management. The software packages to support mobile and wireless computing. The role of middleware and support tools. Performance issues. Emerging technologies.

برمجة الشبكات

Credits 3 Hours
Prerequisites IT351
Contents Programming aspects of computer networks. Computer networks and communication protocols, socket programming, inter-process communication, and development of network software.

IT433 **Network Forensics** **الأدلة الشرعية في الشبكات**

Credits 3 Hours
Prerequisites IT351
Contents Fundamentals of computer and network forensics, forensic duplication and analysis, network surveillance, intrusion detection and response, incident response, anonymity and pseudonymity, cyber law, computer security policies and guidelines, court report writing and presentation, and case studies.

المعمارية التكنولوجية للشركات

Credits 3 Hours
Prerequisites IT351
Contents Design, selection, implementation and management of enterprise IT solutions. Applications and infrastructure and their fit with the business. Frameworks and strategies for infrastructure management, system administration, data/information architecture, content management, distributed computing, middleware, legacy system integration, system consolidation, software selection, total cost of ownership calculation, IT investment analysis, and emerging technologies. Managing risk and security within audit and compliance standards.

تحليل وتصميم الشبكات

Credits 3 Hours
Prerequisites IT351, MATH202
Contents Introduction to the design and performance analysis of local computer networks. Emphasis is on performance analysis of representative multi-access procedures.

الأنظمة المدمجة الشبكية

Credits 3 Hours
Prerequisites IT351
Contents Why networked embedded systems. Example networked embedded systems: automobiles, factory automation systems. The OSI reference model. Types of network fabrics. Network performance analysis. Basic principles of the Internet protocol. Internet-enabled embedded systems.

التجارة الإلكترونية

Credits 3 Hours
Prerequisites IT371
Contents Electronic commerce economics, business models, value chain analysis, technology architectures for electronic business, supply chain management, consumer behavior within electronic environments, legal and ethical issues, information privacy and security, transborder data flows, information accuracy and error handling, disaster planning and recovery, solution planning, implementation and rollout, site design, Internet standards and methods, design of solutions for the Internet, intranets, and extranets, EDI, payment systems, support for inbound and outbound logistics.

تفاعل الإنسان والحاسب

Credits 3 Hours
Prerequisites CS341

Contents Foundations of human-computer interaction: Motivation; contexts for HCI; human centered development and evaluation; human performance models; human performance models; accommodating human diversity; principles of good design and good designers; engineering tradeoffs; introduction to usability testing.
Human-centered software evaluation: Setting goals for evaluation; evaluation without users; evaluation with users.
Human-centered software development: Approaches, characteristics, and overview of process; functionality and usability; specifying interaction and presentation; prototyping techniques and tools.
Graphical user-interface design: Choosing interaction styles and interaction techniques; HCI aspects of common widgets; HCI aspects of screen design; handling human failure; beyond simple screen design; multi-modal interaction; 3D interaction and virtual reality.
Graphical user-interface programming: Dialogue independence and levels of analysis; widget classes; event management and user interaction; geometry management; GUI builders and UI programming environments; cross-platform design.
HCI aspects of multimedia systems: Categorization and architectures of information; information retrieval and human performance; HCI design of multimedia information systems; speech recognition and natural language processing; information appliances and mobile computing.
HCI aspects of collaboration and communication: Groupware to support specialized tasks; asynchronous group communication; synchronous group communication; online communities; software characters and intelligent agents.

معمارية الحاسب المتقدمة

Credits 3 Hours
Prerequisites CE221
Contents Single-threaded execution, traditional microprocessors, DLP, ILP, TLP, memory wall, Parallel architecture and performance issues, Shared memory multiprocessors, Synchronization, small-scale symmetric multiprocessors on a snoopy bus, cache coherence on snoopy buses, Scalable multiprocessors, Directory-based cache coherence, Interconnection network, Memory consistency models, Software distributed shared memory, multithreading in hardware, Chip multiprocessing, Current research and future trends.

الأنظمة المدمجة

Credits 3 Hours
Prerequisites CE221
Contents Nature of embedded systems, particular problems, special issues; role in information technology; embedded microcontrollers, embedded software; real time systems, problems of timing and scheduling; testing and performance issues, reliability; low power computing, energy sources, leakage; design methodologies, software tool support for development of such systems; problems of maintenance and upgrade.

هندسة البرمجيات

Credits 3 Hours
Prerequisites CS211
Contents Software processes: Software life-cycle and process models; process assessment models; software process metrics. Software requirements and specifications. Software design: Fundamental design concepts and principles; software architecture; structured design; object-oriented analysis and design; component-level design; design for reuse. Software validation: Validation planning; testing fundamentals; unit, integration, validation, and system testing; object-oriented testing; inspections. Software evolution: Software maintenance; characteristics of maintainable software; reengineering; legacy systems; software reuse. Software project management. Component-based computing: Fundamentals; basic techniques; applications; architecture of component-based systems; component-oriented design; event handling; middleware.

SE422 **Software Quality Assurance and** ضمان جودة البرمجيات واختبارها

Credits 3 Hours
Prerequisites CS391
Contents Quality: how to assure it and verify it, and the need for a culture of quality − Avoidance of errors and other quality problems − Inspections and reviews − Testing, verification and validation techniques − Process assurance vs. Product assurance − Quality process standards − Product and process assurance − Problem analysis and reporting − Statistical approaches to quality control.

SE331 **Software Design & Architecture** تصميم ومعمارية البرمجيات

Credits 3 Hours
Prerequisites SE301
Contents An in-depth look at software design. Continuation of the study of design patterns , frameworks, and architectures. Survey of current middleware architectures. Design of distributed systems using middleware. Component based design. Measurement theory and appropriate use of metrics in design. Designing for qualities such as performance, safety, security, reusability, reliability, etc. Measuring internal qualities and complexity of software. Evaluation and evolution of designs. Basics of software evolution, reengineering, and reverse engineering.

بناء البرمجيات

SE332 **Software**

Credits 3 Hours
Prerequisites SE331
Contents General principles and techniques for disciplined low-level software design. BNF and basic theory of grammars and parsing. Use of parser generators. Basics of language and protocol design. Formal languages. State-transition and table-based software design. Formal methods for software construction. Techniques for handling concurrency and inter-process communication. Techniques for designing numerical software. Tools for model-driven construction. Introduction to Middleware. Hot-spot analysis and performance tuning.

تحليل متطلبات البرمجيات

SE321

Credits 3 Hours
Prerequisites SE3٠1
Contents Domain engineering. Techniques for discovering and eliciting requirements. Languages and models for representing requirements. Analysis and validation techniques, including need, goal, and use case analysis. Requirements in the context of system engineering. Specifying and measuring external qualities: performance, reliability, availability, safety, security, etc. Specifying and analyzing requirements for various types of systems: embedded systems, consumer systems, web-based systems, business systems, systems for scientists and other engineers. Resolving feature interactions. Requirements documentation standards. Traceability. Human factors. Requirements in the context of agile processes. Requirements management: Handling requirements changes.

ادرة مشروعات البرمجيات

SE411

Credits 3 Hours
Prerequisites SE422, SE321

Contents Project planning, cost estimation, and scheduling. Project management tools. Factors influencing productivity and success. Productivity metrics. Analysis of options and risks. Planning for change. Management of expectations. Release and configuration management. Software process standards and process implementation. Software contracts and intellectual property. Approaches to maintenance and long-term software development. Case studies of real industrial projects.

هندسة تطبيقات الويب

SE411

Credits 3 Hours
Prerequisites SE301, CS141
Contents Web Engineering introduces a structured methodology utilized in software engineering to Web development projects. The course addresses the concepts, methods, technologies, and techniques of developing Web sites that collect, organize and expose information resources. Topics covered include requirements engineering for Web applications, design methods and technologies, interface design, usability of web applications, accessibility, testing, metrics, operation and maintenance of Web applications, security, and project management. Specific technologies covered in this course include client-side (XHTML, JavaScript, and CSS) and server-side (Perl and PHP).

الطرق الرشيقة لهندسة البرمجيات

SE333

Credits 3 Hours
Prerequisites SE332
Contents The Agile Methods course will address what agile methods are, how they are implemented (correctly), and their impact on software engineering. A variety of agile methods will be described, but the focus will be on Scrum and Extreme Programming. Issues associated with planning and controlling agile projects, along with the implications of empowered teams on the customer supplier dynamic, will give a fuller picture of how the agile practices are realized. The course will conclude with a discussion of some of the issues facing organizations adopting agile methods.

تطوير البرمجيات مفتوحة المصدر

SE311

Credits 3 Hours
Prerequisites SE331

Contents This course provides an overview of the historical and modern context and operation of free and open source software (FOSS) communities and associated software projects. The practical objective of the course is to teach students how they can begin to participate in a FOSS project in order to contribute to and improve aspects of the software that they feel are wrong. Students will learn some important FOSS tools and techniques for contributing to projects and how to set up their own FOSS projects.

SE322 نظم و برمجيات الوقت الحقيقى

Credits 3 Hours
Prerequisites SE331
Contents This course provides a comprehensive view of real-time systems with theory, techniques and methods for the practitioner. After successfully completing this course, the student will be able to identify and understand timing issues in system development and propose approaches or solutions to address basic problems in real-time computing. It is the goal of this course to motivate and prepare students to pursue more in-depth study of specific problems in real time computing and systems development.

SE412 **Estimating Software Development. &** تقدير تكاليف تطوير وصيانة مشاريع البرمجيات

Credits 3 Hours
Prerequisites SE321
Contents The objective of the course is to teach participants how to develop estimates for software development and maintenance projects, how to communicate them to others and how to include them in a contract. Although the orientation is basically quantitative, the course will delve into the cognitive biases and the administrative behaviors that afflict the estimation process. The course will also address the use of parametric models and counting methods.

SE431 تصميم برمجيات الشبكات المتنقلة

Credits 3 Hours
Prerequisites SE331, IT351

Contents Introduction to principles of software engineering for mobile devices and best practices, including code reviews, source control, and unit tests. Topics include Ajax, encapsulation, event handling, HTTP, memory management, MVC, object-oriented design, and user experience. Languages include HTML5, JavaScript, Objective-C, and PHP. Projects include mobile web apps and native IOS apps.

SE433 تطوير البرمجيات العالمية

Credits 3 Hours
Prerequisites IT351, SE331
Contents This course covers a set of topics that are essential to both professionals who will become participants and leaders in globally-distributed projects, as well as researchers interested in studying virtual teams, distributed organizations, and global software development. Software development is increasingly a globally-distributed undertaking. The search for talent across national boundaries and the integration of groups thrown together by mergers and acquisitions are but two of the many forces conspiring to fundamentally change the organizational context of software development. The skills that allow developers and managers to thrive in this milieu are among the most important in today's development organizations.

SE432 تصميم برمجيات الشبكات المتنقلة

Credits 3 Hours
Prerequisites CS 423
Contents This course provides an introduction to advanced systems software engineering: the first part covers advanced operating-system-level aspects in scheduling, memory management, and communication; the second part focuses on higher-level aspects such as real-time programming languages, coordination languages, models for real-time and embedded systems and methods for their verification.

مقررات المشروعات والتدريب

CS381 **Software Development and Professional Practic** تطوير البرمجيات والممارسة المهنية

Credits 3 Hours
Prerequisites CS211, CS391
Contents Event-driven programming – Foundations of human-computer interaction – Using APIs – Building a graphical user interface – Graphic systems – Professional issues of software processes including software requirements and specifications; Software design; Software validation; Software evolution – Software project management – Methods and tools of analysis – Professional and ethical responsibilities – Risks and liabilities of computer-based systems.

إدارة المشروعات

Credits 2 Hours
Prerequisites IT101
Contents Managing the system life cycle: requirements determination, design, implementation; system and database integration issues; network management; project tracking, metrics, and system performance evaluation; managing expectations of managers, clients, team members, and others; determining skill requirements and staffing; cost-effectiveness analysis; reporting and presentation techniques; management of behavioral and technical aspects of the project; change management. Software tools for project tracking and monitoring. Team collaboration techniques and tools.

مشروع التخرج ١

Credits 3 Hours
Prerequisites CS381, IS221
Contents Computer Science Capstone Project I course will provide coverage of some of the material from the body of knowledge, such as: Foundations of human-computer interaction – Graphical user-interface design – Graphical user-interface programming – Software design – Using APIs – Software tools and environments – Software processes – Software requirements and specifications – Software validation – Software evolution – Software project management – Team management – Communications skills.
The focus of the course must remain on the project, which gives students the chance to reinforce through practice the concepts they have learned earlier in a more theoretical way.

مشروع التخرج ٢

Credits 3 Hours
Prerequisites CS481
Contents Computer Science Capstone Project II course gives the student more practical and professional skills in developing a project.

مشروع التخرج ١

Credits 3 Hours
Prerequisites CS381, IS221
Contents Information Systems Capstone Project I course will provide coverage of some of the

material from the body of knowledge, such as: Foundations of human-computer interaction – Graphical user-interface design – Graphical user-interface programming – Software design – Using APIs – Software tools and environments – Software processes – Software requirements and specifications – Software validation – Software evolution – Software project management – Team management – Communications skills.
The focus of the course must remain on the project, which gives students the chance to reinforce through practice the concepts they have learned earlier in a more theoretical way.

مشروع التخرج ٢

Credits 3 Hours
Prerequisites IS451
Contents Information Systems Capstone Project II course gives the student more practical and professional skills in developing a project.

مشروع التخرج ١

Credits 3 Hours
Prerequisites CS381, IS221
Contents Information Technology Capstone Project I course will provide coverage of some of the material from the body of knowledge, such as: Foundations of human-computer interaction – Graphical user-interface design – Graphical user-interface programming – Software design – Using APIs – Software tools and environments – Software processes – Software requirements and specifications – Software validation – Software evolution – Software project management – Team management – Communications skills.
The focus of the course must remain on the project, which gives students the chance to reinforce through practice the concepts they have learned earlier in a more theoretical way.

مشروع التخرج ٢

Credits 3 Hours
Prerequisites IT461
Contents Information Technology Capstone Project II course gives the student more practical and professional skills in developing a project.

مشروع التخرج ١

Credits 3 Hours
Prerequisites CS381, IS221
Contents Software Engendering Capstone Project I course will provide coverage of some of the material from the body of knowledge, such as: Foundations of human-computer interaction – Graphical user-interface design – Graphical user-interface programming – Software design – Using APIs – Software tools and environments – Software processes – Software requirements and specifications – Software validation – Software evolution – Software project management – Team management – Communications skills.
The focus of the course must remain on the project, which gives students the chance to reinforce through practice the concepts they have learned earlier in a more

theoretical way.

مشروع التخرج ٢

Credits 3 Hours
Prerequisites SE431
Contents Software Engendering Capstone Project II course gives the student more practical and professional skills in developing a project.

المراجع

[1]. **Computing Curricula 2005,** *The Association for Computing Machinery* (ACM), *The Association for Information Systems* (AIS) and *The Computer Society* (IEEE-CS)

[2]. **Computing Curricula 2001 - Computer Science,** *IEEE Computer Society* and *Association for Computing Machinery* (ACM).

[3]. **Computer Science Curriculum 2008: An Interim Revision of CS 2001,** *Association for Computing Machinery* (ACM) and *IEEE Computer Society*.

[4]. **IS 2002: Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems,** *Association for Computing Machinery* (ACM), *Association for Information Systems* (AIS) and *Association of Information Technology Professionals* (AITP).

[5]. **IS 2010: Curriculum Guidelines for Undergraduate Degree Programs in Information Systems,** *Association for Computing Machinery* (ACM) and *Association for Information Systems* (AIS).

[6]. **Information Technology 2008: Curriculum Guidelines for Undergraduate Degree Programs in Information Technology,** *Association for Computing Machinery* (ACM) and *IEEE Computer Society*.

[7]. **Software Engineering 2004: Curriculum Guidelines for Undergraduate Degree Programs in Software Engineering,** *IEEE Computer Society* and *Association for Computing Machinery* (ACM).

[8]. **Computer Engineering 2004: Curriculum Guidelines for Undergraduate Degree Programs in Computer Engineering,** *IEEE Computer Society* and *Association for Computing Machinery* (ACM).