

متطلبات قسم علوم الحاسوب

(Physics) الفيزياء CE111	متطلب سابق
<p>The importance of this course is to provide students with physical background of the variable ways to solve real problems. This Course includes physical quantities, vectors, Newton's Laws of Motion, physical prosperities of materials, Waves and sounds, Electricity, Magnetism, Light and Optics. The course carried out using the lectures and self-learning and discussion, Miniature education, Solve problems, experiments used to teach this course, We will use strategies assessment Quizzes, Written Examinations, oral examinations, notes, and micro-reports and there are no pre requests.</p>	-----
	متطلب مصاحب

(Discrete Structures) الهياكل المتقطعة CS212	متطلب سابق
<p>This course will provide students with fundamental concept of Differential Equations and foundational knowledge for Computer Science mathematics course. The course will focus on the following: Basic concepts of Differential Equations: Definition , types , order , power Solutions of Differential Equations of order one; Separate, Homogeneous and inhomogeneous , Exact and inexact , linear and nonlinear , General Solutions of Homogeneous Differential Equations of order two by use characteristic equation , Partial Solution of Inhomogeneous Differential Equations of order two by operator differentiation. Some methods will be used in the teaching of this course, such as: lectures, problem-solving, Brainstorming, micro- assignments and micro-report.</p>	-----
	متطلب مصاحب

(Digital Logic Design) التصميم الرقمي والمنطقي CS213	متطلب سابق
<p>This course is an introductory to the basic concepts and methods needed to analyze, design, build, and test combinational, synchronous, and asynchronous sequential logic circuits with SSI, MSI, and LSI integrated circuits. This course covers number systems, data representation, Boolean algebra, karnough maps, combinational and sequential logic circuits, including the basics for analysis and design</p>	-----
	متطلب مصاحب

methodologies using the logical devices concepts. Emphasizing the functions of these devices in the logical systems. The course provides students with the basic knowledge necessary for computer architecture and organization. Students must understand the computer fundamentals as a pre-request for this course. To make the issues more concrete, the class includes several multi-week projects requiring significant design and implementation in hardware and software systems.

(Database Systems Design) تصميم أنظمة قواعد البيانات CS221	متطلب سابق
<p>There are two principle goals for this course. First, to introduce the basic concepts in selected database issues such as database design using normalization, database security, transaction management and replication and mobile databases. Second, to provide practical experience in applying and using the SQL/PLSQL and Oracle 9i and require introduction to database.</p>	متطلب
	مصاحب

(Differential Equations) المعادلات التفاضلية CS211	متطلب سابق
<p>This course will provide students with fundamental concept of Differential Equations and foundational knowledge for engineering mathematics course. The course will focus on the following: Basic concepts of Differential Equations: Definition, types, order, power. Solutions of Differential Equations of order one; Separate, Homogeneous and inhomogeneous , Exact and inexact , linear and nonlinear , General Solutions of Homogeneous Differential Equations of order two by use haracteristic equation , Partial Solution of Inhomogeneous Differential Equations of order two by operator differentiation. Some methods will be used in the teaching of this course, such as: lectures, problem-solving, Brainstorming, micro- assignments and micro-report.</p>	متطلب
	مصاحب

CS223 مبادئ تراسل البيانات والشبكات (Principles of Data Communication and Networks)	متطلب سابق
<p>This course presents an introduction to data transmission , transmission media, basic fundamentals, network topologies (both local area networks and wide area networks) and protocols, the Internet and OSI models, current network operating systems, network analysis, design, and administrative. An emphasis will be placed on current technologies for optimum network design.</p>	<div style="border: 1px dashed black; height: 20px; width: 100%;"></div> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> متطلب مصاحب </div> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> ----- </div>

CS222 الجبر الخطي (Linear Algebra)	متطلب سابق
<p>This course will provide students with fundamental concept of linear algebra and foundational knowledge for some Computer Science courses.</p> <p>This course discusses the basic concepts of : matrices; matrix operations, transpose, inverse ; determinants; solution of linear systems; eigenvalues and eigenvectors and its practical applications , basic concept of graph theory. Some methods will be used in the teaching of this course, such as: lectures, problem-solving, Brainstorming, micro- assignments and micro-report.</p>	<div style="border: 1px dashed black; height: 20px; width: 100%;"></div> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> متطلب مصاحب </div> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> ----- </div>

CS311 مواءمة الإنسان مع الحاسوب والبرمجة المرئية (Human Computer Interaction and Visual Programming)	متطلب سابق
<p>Visual programming languages are widely used for the rapid development of graphical applications. This course emphasizes on software systems development in a visual environment. Major topics include visual programming concepts, object oriented concepts, database linkages, and graphics. User interface design and code optimization are covered. Different types of will be covered applications that run on in this course a standalone PC, on a network application. An additional aim of this subject is to give students an understanding of the main ideas of Human-Computer Interaction (HCI).</p>	<div style="border: 1px dashed black; height: 20px; width: 100%;"></div> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> متطلب مصاحب </div> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> ----- </div>



(Software Engineering) هندسة البرمجيات CS325	متطلب سابق
<p>This course is very important to computer science, software engineering, IT and IS students in order to take a look at the Software Engineering concepts that are needed to develop software systems that can meet basic functional and non-functional requirements within a well- defined problem domain. It covers the traditional and most recent practices of different software engineering approaches including the requirements analysis, design, development, verification, and maintenance. A look at some related issues such as SWE projects management and critical systems. An examination of object-oriented software construction focused on the Unified Modeling Language.</p>	
	متطلب مصاحب



(Systems and Networks Security) أمنية النظم والشبكات CS412	متطلب سابق
<p>This course considers the technical and operational issues of information and computer network security. The course investigates the to network security including schemes for breaking security, and techniques threats for detecting and preventing security violations. Emphasis will be on conventional and public-key cryptosystems and their applications to achieve various security goals. Web security is reviewed with focus on the standardized schemes. Intrusion, malicious software, and denial of service attacks are reviewed. The main teaching strategies include lecture, Dialogue and discussion, Self Study and Problem solving.</p>	
	متطلب مصاحب



برنامج علوم الحاسوب

مقررات البرنامج الإجبارية

متطلب سابق	CS312 نظرية الحوسبة وتصميم اللغة (Theory of Automata and Language Design)
-----	Mathematical preliminaries (includes graphs and proof techniques). Regular languages, regular expression, deterministic finite automata and nondeterministic finite automata, closure properties and pumping lemma. Context free languages, context free grammars, pushdown automata and pumping lemma. Turing machines and computability. Complexity.
متطلب مصاحب	

متطلب سابق	IS223 تحليل وتصميم النظم (Systems Analysis and Design)
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متطلب مصاحب	

(Algorithms Design and Analysis) تحليل وتصميم الخوارزميات CS314	متطلب سابق
<p>Algorithms play the central role in both the science and practice of computing. This course aims to provide students with an understanding of computer algorithms. It will critically approach algorithms from, both, an analysis and design perspectives. Among these, methods that include the Incremental, Divide and Conquers, Greedy and Dynamic Programming will be investigated. The pre-requisite of this course is Data Structures and Algorithms course. To achieve these course goals different teaching strategies will be applied such as direct, indirect and interactive and self-learning.</p>	<div style="border: 1px dashed black; padding: 5px; text-align: center;">-----</div> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> متطلب مصاحب </div> <div style="border: 1px dashed black; padding: 5px; text-align: center;">-----</div>

(Principles of Artificial Intelligence) مبادئ الذكاء الاصطناعي CS321	متطلب سابق
<p>This course aims to provide an introduction to Artificial Intelligence (AI) and its applications. A breadth of topics will be covered, including agents, problem solving through search, game playing, knowledge and logic reasoning. As an application of AI, a brief overview of Expert Systems (ES) and Artificial Neural Network (ANN) will be provided in the end of this course. In order to practice on ES application, students will practice on AI tools or languages in separated Lab sessions such as Python. Data Structures and Algorithms course and Algorithms Analysis and Design course are pre-requisites for this course. To achieve these course goals different teaching strategies will be applied such as direct, indirect and interactive and self-learning.</p>	<div style="border: 1px dashed black; padding: 5px; text-align: center;">-----</div> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> متطلب مصاحب </div> <div style="border: 1px dashed black; padding: 5px; text-align: center;">-----</div>

(Advanced Operating Systems) نظم التشغيل المتقدمة CS323	متطلب سابق
<p>This course introduces an advanced concepts in operating systems. The emphasis will be on the techniques for creating practical and high-performance distributed operating systems. Major topics that will be covered include: Hardware concepts of parallel and distributed systems, software concepts and design issues, threads and thread usage, multithreading operating system, client – server model, implementation of client-server model, remote procedure call, implementation of remote procedure call, synchronization in distributed systems, clock synchronization , transaction and concurrent control, mass storage structure, distributed file systems, protection and security, and Real-time systems. The prerequisite of this course is the Principles of Operating Systems.</p>	<div style="border: 1px dashed black; padding: 5px; text-align: center;">-----</div> <div style="border: 1px dashed black; padding: 5px; text-align: center;"> متطلب مصاحب </div> <div style="border: 1px dashed black; padding: 5px; text-align: center;">-----</div>

(Computer Graphics) الرسم بالحاسوب CS324	متطلب سابق
This course aims to introduce computer graphics to computer science students. It concentrates on defining main concepts, applications, tools, environments, and techniques of computer graphics. It also makes the students familiar with the recent programming package OpenGL.	-----
	متطلب مصاحب

(Compilers Construction) بناء المترجمات CS411	متطلب سابق
This course aims to introduce a compiler concept and construction; lexical analysis, syntactic analysis, semantic analysis, introduction to code generation and optimization. Data Structures and Algorithms and Computation Theory courses are pre-requisites for this course. To achieve all course goals different teaching strategies will be applied such as direct, indirect, interactive and self-learning.	-----
	متطلب مصاحب

(Internet and Web Technologies) الانترنت وتقنيات الويب CS413	متطلب سابق
The aim of this course is to introduce students to the main technologies used for the development of Internet-based applications and show how these technologies can be used within application development and more specifically within systems integration. The course starts with a brief introduction to low-level technologies such as TCP/IP and then rapidly examines application-based technologies such as CORBA, SOAP and web services. The course also looks at some of the major security problems that are associated with the Internet and shows how to design large distributed systems. The final part of the course looks at how the Internet has enabled systems integration to become a major developmental paradigm. It is important to point out that no knowledge of programming is required.	-----
	متطلب مصاحب

(Modeling and Simulation) النمذجة والمحاكاة	CS421	متطلب سابق
<p>Systems modeling and simulation techniques find application in fields as diverse as physics, chemistry, biology, economics, medicine, computer science, and engineering. Computer simulation is important subject as it is complementary to laboratory field experimentation. Modeling a given problem and simulating it could lead to better results through discussing the model and enhancing it before the actual model is built. The purpose of this course is to introduce fundamental principles and concepts in the general area of systems modeling and simulation. Topics to be covered in this course include basics of discrete-event system simulation, mathematical and statistical models, simulation design, experiment design, and modeling of simulation data. The course introduces simulation examples, such as queuing systems, input modeling, High-Level Computer-System Simulation, CPU Simulation, and Memory Simulation. The prerequisite of this course is data Structures and algorithms, and probability and Statistics.</p>	-----	
	متطلب مصاحب	

مقررات البرنامج الاختيارية

(Systems Programming) برمجة النظم	CSL01	متطلب سابق
<p>This course introduces the core concepts for students who want to improve their skills by learning about what is going on under the hood of a computer system. It explains the important and enduring concepts underlying all computer systems, and shows the concrete ways that these ideas affect the correctness, performance, and utility of application programs. Topics covered in this course include Information representation, machine-level representation of C Programs, processor architecture, optimizing program performance, linking, exceptional control flow, measuring program execution time, and concurrent programming with threads. The prerequisite of this course is Advanced Operating Systems. It is assumed that students have some familiarity with C or C++, as the course centers on C/C++ programming, with some assembly language.</p>	CS323	
	متطلب مصاحب	

(Machine Learning) تعلم الآلة CSL02	متطلب سابق
<p>Machine Learning has become one of the mainstays of IT and with that, a rather central, albeit usually hidden, part of our life. With the ever increasing amounts of data becoming available there is good reason to believe that smart data analysis will become even more pervasive as a necessary ingredient for technological progress. This course introduces the basic conceptual elements of machine learning, including mathematical models of machine learning, and the design and rigorous analysis of learning algorithms. Topics range from determining appropriate data representation and models for learning, understanding different algorithms for knowledge and model discovery, and using sound theoretical and experimental techniques in assessing performance. Specific approaches covered include statistical techniques (e.g., k nearest neighbor and Bayesian learning), logical techniques (e.g., decision tree and rule induction), function approximation (e.g., neural networks and kernel methods), and reinforcement learning. The topics are discussed in the context of current machine learning and data mining research. Students will participate in seminar discussions and will complete and present the results of group projects.</p>	-----
	متطلب مصاحب

(Image Processing) معالجة الصور CSL03	متطلب سابق
<p>This is an introductory course on techniques for digital image processing and analysis. Course topics include : an introduction to image sampling, quantization, image enhancement, 2-D orthogonal transforms, image restoration, segmentation, and image compression. Principles of Artificial Intelligence course is pre-requisites for this course.</p>	-----
	متطلب مصاحب

(Parallel Algorithms) الخوارزميات المتوازية CSL04	متطلب سابق
<p>Parallel computing has been fruitfully employed in numerous application domains to process large datasets and handle other time-consuming operations of interest. The objective of this course is to study the general principles of parallel and distributed algorithms and their time complexity and compare it with its sequential equivalent. The course will start by studying various models of parallel computation. It will then cover algorithms for merging, sorting and searching. Assignments will be based on MPI implementation of some algorithms using deferent tools. To achieve the course goals different teaching strategies will be applied such as direct, indirect, interactive and self-learning. The prerequisite courseis: Analysis and Design of algorithms.</p>	-----
	متطلب مصاحب



(Distributed Systems) الأنظمة الموزعة CSL05	متطلب سابق
<p>This course is an introductory course in distributed systems. The emphasis will be on the techniques for creating functional, usable, and high-performance distributed systems. To make the issues more concrete, the class includes several multi-week projects requiring significant design and implementation. The major themes this course will teach include scarcity, scheduling, concurrency and concurrent programming, naming, client/server programming and middleware, consistency and replication, fault tolerant and distributed file systems. As the creation and management of software systems is a fundamental goal of any undergraduate systems course, students will design, implement, and debug large programming projects.</p>	<p>-----</p> <p>متطلب مصاحب</p> <p>-----</p>
(Computer Vision) الرؤية بالحاسوب CSL06	متطلب سابق
<p>This course will introduce the student to computer vision and robot control with an emphasis on vision and how to use it in specific applications. Specific topics include: applications, image formation and acquisition, image processing, pattern recognition, image understanding, representations, planning and robot control. Image Processing courses is pre-requisites for this course.</p>	<p>-----</p> <p>متطلب مصاحب</p> <p>-----</p>
(Knowledge Base Systems) الأنظمة المعتمدة على المعرفة CSL07	متطلب سابق
<p>A knowledge-based system (KBS) is a system that uses Artificial Intelligence (AI) techniques in problem-solving processes to support human decision-making, learning, and action. Ideal for advanced-undergraduate and graduate students, as well as business professionals, this course enable students to develop an appreciation of KBS and their architecture and understand a broad variety of knowledge-based techniques for decision support and planning. The course assumes that students have basic computer science skills and a math background that includes set theory, relations, elementary probability, and introductory concepts of Artificial Intelligence. Besides to the central aspects of KBS like knowledge management and KBS fundamentals, architecture, developing, this course covers the Fuzzy Logic, Agent-Based Systems, Connectionist Models, Genetic Algorithms and Soft Computing Systems. It also contains more advanced about E-Learning Solution, Diet Menu Planner, and Question Answering System as real-world KBS applications for Multiagent System Accessing Distributed Database Grid, Knowledge-Intensive Learning, and Natural Language Interface respectively.</p>	<p>-----</p> <p>متطلب مصاحب</p> <p>-----</p>
(Advanced Artificial Intelligence) الذكاء الاصطناعي المتقدم CSL08	متطلب سابق

<p>This course will provide students introduction to Soft Computing (SC), Meta-heuristics Algorithms for solving optimization problems, Artificial Neural Networks, Fuzzy Sets Theory, Fuzzy Logic, Neuro-Fuzzy Technology, Hybrid Systems and Applications of Soft Computing (three to four real life applications). Principles of Artificial Intelligence course is pre-requisites for this course. To achieve these course goals different teaching strategies will be applied such as direct, indirect and interactive and self-learning.</p>	<p>----- متطلب مصاحب -----</p>
<p>موضوعات متقدمة في علوم الحاسوب CSL09 (Advanced Topics in Computer Science)</p>	<p>متطلب سابق</p>
<p>This course aims at introducing the students to a different area of Computer Science. This will be achieved by exposing them to new tools, techniques, and research in Computer Science.</p>	<p>----- متطلب مصاحب -----</p>

<p>برنامج هندسة البرمجيات</p>
<p>مقررات البرنامج الإلزامية</p>

<p>(Project Management) إدارة المشاريع IS412</p>	<p>متطلب سابق</p>
<p>This course will introduce information technology (IT) project management principles, tools and techniques. The topics covered in this course include project management processes, tracking, human management, risk management, quality management, contract management, and change management.</p>	<p>----- متطلب مصاحب -----</p>



(Algorithms Design and Analysis) تحليل وتصميم الخوارزميات CS314	متطلب سابق
Algorithms play the central role in both the science and practice of computing. This course aims to provide students with an understanding of computer algorithms. It will critically approach algorithms from, both, an analysis and design perspectives. Among these, methods that include the Incremental, Divide and Conquers, Greedy and Dynamic Programming will be investigated. The pre-requisite of this course is Data Structures and Algorithms course. To achieve these course goals different teaching strategies will be applied such as direct, indirect and interactive and self-learning.	----
	متطلب مصاحب



(Principles of Artificial Intelligence) مبادئ الذكاء الاصطناعي CS321	متطلب سابق
Algorithms play the central role in both the science and practice of computing. This course aims to provide students with an understanding of computer algorithms. It will critically approach algorithms from, both, an analysis and design perspectives. Among these, methods that include the Incremental, Divide and Conquers, Greedy and Dynamic Programming will be investigated. The pre-requisite of this course is Data Structures and Algorithms course. To achieve these course goals different teaching strategies will be applied such as direct, indirect and interactive and self-learning.	----
	متطلب مصاحب

(Requirements Engineering) هندسة متطلبات البرمجيات SE311	متطلب سابق
This Course is designed to cover Techniques for eliciting requirements, requirements Engineering Process, Functional and non-functional requirements , System services and constraints , Requirements traceability matrix , Metrics for non-functional requirements , Use case description , Use case and context diagrams , Requirements for agile developments , Requirements for various systems: embedded systems, web-based systems, business systems, etc. This course gives also a brief introduction to formal specifications using specification languages such as Z or B. Students participate in a group project on software requirements analysis and specification and requirements management case tools.	----
	متطلب مصاحب

(Software Design & Architecture) تصميم ومعمارية البرمجيات SE321	متطلب سابق
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<p>This Course is designed to cover This course covers the fundamental design principles and strategies for software architecture and design: Architecture requirements specification , Architectural styles, Object-Oriented Paradigm , Data-Centered Software Architecture, Hierarchical Architecture , Architecture documentation, reference architecture, and interface design in detail design process are discussed. Students participate in a group project on software design and architecture and design tools.</p>	-----
	متطلب مصاحب



(Software Testing & Validation) فحص وتدقيق البرمجيات SE411	متطلب سابق
<p>This Course is designed to cover the following topics: Introduction to testing, Test process, Test levels, Test types, Static techniques ,Test design techniques, Test management, and Tool support for testing. This course will cover theory (concepts) and practical (lab sessions). The pre-requisite for this course is Software Engineering. and Students participate in a group project on software testing.</p>	-----
	متطلب مصاحب

(Software Process and Modeling) النمذجة وعمليات البرمجيات SE322	متطلب سابق
<p>This course aims to covers the key concepts, development approaches and methodologies, modeling techniques. This includes a review of Object-Oriented concepts and modeling with UML: Structural Modeling, Behavioral Modeling, System architecture design, User Interface Design, Object Persistence Design, Class and Method Design, Object-Oriented Testing, Unified Process development cycle, Use case analysis, Sequence diagrams, Encapsulation, Inheritance, Polymorphism, Design principles of coupling and cohesion, Design patterns. Students will be also exposed OO case tools, UML Generating tools, standard templates, and software quality and standards. Students will participate in a group project on object-oriented software methodologies and modeling using OO case tools.</p>	-----
	متطلب مصاحب

(Software Maintenance & Evolution) صيانة وتطور البرمجيات SE421	متطلب سابق
<p>Organizations across all industries have huge investments in their software systems. These systems must be continually adapted to the changing needs of the organizations. Software maintenance and evolution refers to the process of modifying existing software systems to maintain their usefulness. Some studies have estimated that up to 75% of all technical software professionals are involved in some form of software maintenance activity. This course builds on basic software engineering concepts by expanding the discussion of the issues involved in maintaining and evolving software systems.</p>	-----
	متطلب مصاحب

(Software quality Assurance) ضمان جودة البرمجيات SE323	متطلب سابق
<p>This Course is designed to cover the concepts, Components, metrics, and models in software quality assurance. It presents a framework for software quality assurance and discuss individual components in the framework such as planning, reviews, testing, configuration management, and so on. It also discusses metrics and models for software quality as a product, in process, and in maintenance. The course will include case studies and hands on experiences. Students will develop an understanding of software quality and approaches to assure software quality . The pre-requisite for this course is Software Engineering.</p>	-----
	متطلب مصاحب

مقررات البرنامج الاختيارية

بناء الأنظمة المعتمدة على الويب SEL02 (Web-based systems engineering)	متطلب سابق
<p>This Course is designed to covers technical and business aspects, systematic development of Web applications, requirement engineering for Web applications, modeling, Architectures of Web Applications, technology driven design, testing, operation and Maintenance of Web applications and The course explains how Web Engineering differs from software engineering, and the increased importance of user interfaces and human-computer interaction. Students will be exposed to techniques of web development implementation in web tools.</p>	-----
	متطلب مصاحب

مقررات البرنامج الاختيارية

(Multimedia Systems) أنظمة الوسائط المتعددة SEL03	متطلب سابق
<p>This course covers the basic elements of multimedia (text, sound, graphics, animation and video), multimedia applications, challenges and design issues, multimedia hardware, multimedia editing and authoring, cycle of multimedia production. primary objective of this workshop is to teach participants how to develop multimedia programs. Another objective is to demonstrate how still images, sound, and video can be digitized on the computer. Participants in this workshop will create their own multimedia courses using an authoring tool that allows you to develop an electronic</p>	-----
	متطلب مصاحب

stack of cards that contain buttons, graphics, and text. Issues concerning multimedia design and its use in education will be the focus of reading and class discussions throughout the course of the workshop

(Distributed Systems) الأنظمة الموزعة SEL04	متطلب سابق
<p>This course is an introductory course in distributed systems. The emphasis will be on the techniques for creating functional, usable, and high-performance distributed systems. To make the issues more concrete, the class includes several multi-week projects requiring significant design and implementation. The major themes this course will teach include scarcity, scheduling, concurrency and concurrent programming, naming, client/server programming and middleware, consistency and replication, fault tolerant and distributed file systems. As the creation and management of software systems is a fundamental goal of any undergraduate systems course, students will design, implement, and debug large programming projects.</p>	<p>-----</p> <p>متطلب مصاحب</p> <p>-----</p>



(E-Business) الأعمال الإلكترونية SEL05	متطلب سابق
<p>The course introduces the principles and concepts of e-business with focus on e-commerce. It provides an understanding of the many aspects that shape e-commerce systems. Topics include e-commerce infrastructure, the World WideWeb, e-business models (B-to-C, B-to-B and intra-business), developing e-commerce web sites, information and communication security, payment systems and marketing. We will also examine the challenges and limitations triggered by the deployment and expanded use of E-commerce systems, including the ethical, social and political problems and the future roles of the E-commerce systems.</p>	<p>-----</p> <p>متطلب مصاحب</p> <p>-----</p>

(ERP Systems) أنظمة تخطيط موارد المؤسسات SEL06	متطلب سابق
<p>Enterprise Resources Planning (ERP) is an advanced IT course dealing with both the theoretical and practical aspects of the enterprise systems. This course is designed to provide students with an understanding of the practical use of ERP systems in modern business. It will introduce students to ERP systems integration and show how they can be used by organizations to run their operations more efficiently and effectively. The course comprises major of the</p>	<p>-----</p>

ERP fundamentals such as the architecture, development life cycle, implementation strategies, software and vendor selection, operational and post-implementation. It also covers many of the new trends and challenges of ERP management. Particularly it explains in details the management of program and project, organizational change and business process re-engineering, global, ethics, and security, supply chain, and the customer relationship management. The course will incorporate a laboratory component using SAP software and some business cases as practices for students. It will also help you to refine your communication skills and group work skills, and assist you in the development of your research skills. ERP course is required to complete CS221-Database Systems Design and CIT10-Object Oriented Programming as pre-requisites.

متطلب
مصاحب

(Business Intelligence) ذكاء الأعمال SEL07	متطلب سابق
<p>This course is about how organizations can successfully collect, evaluate and apply information to become better decision makers. It provides students with a thorough understanding of theory, design, implementation of BI including the processes, methodologies, infrastructure, and current practices used to transform business data into useful information and support business decision-making. Data, text and web mining, visualization, and statistical analysis along with reporting options such as management dashboards and balanced scorecards will be covered.</p> <p>Technologies utilized in the course include advanced information technologies that extract novel knowledge from data to achieve strategic goals of organizations emphasizing on multidimensional data modeling, online analytic processing, data warehouse, and data mining such as SAP Business Warehouse, SAP Business Objects, Crystal Reports, and RapidMiner. To achieve these course goals different teaching strategies will be applied such as lectures, case studies, problem solving and self-learning.</p>	<p>-----</p> <p>متطلب مصاحب</p> <p>-----</p>

مواضيع مختارة في هندسة البرمجيات (Selected topics in Software Engineering) SEL08	متطلب سابق

This Course is designed to cover the different special topics of interest . Topics of interest could be one or several from the followings: Software Reuse, Embedded software, component-based engineering, Distributed software engineering, Aspect-oriented engineering and Service-oriented architecture. and Other topics can be added as needed. The course will include case studies and hands on experiences. students participate during group discussions projects related to the special topics selected.

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(Mobile application engineering) هندسة تطبيقات الأجهزة النقالة	SEL09	متطلب سابق
As informatics is underway of migrating from desktop platform to mobile platform, mobile computing has been evolved to be the frontier of computing technology. It is necessary to prepare students majoring in SE to be professional application developers in mobile computing platforms. Therefore, this course is introduced to provide students with knowledge and skills of software development on Android mobile computing platforms. It covers the fundamentals of Android programming using the Android SDK. Topics discussed in this course include: fundamental concepts in Android programming: activities and intents, designing user interface using views, data persistence, content providers, messaging and networking, location-based services, and developing android services. The prerequisite of this course is Operating systems, Java programming, and Data structure.		متطلب مصاحب

برنامج شبكات الحاسوب
مقررات البرنامج الإجبارية

(Local Area Networks) الشبكات المحلية	NT311	متطلب سابق
This course highlights and describes networking fundamentals; to explain how network transmissions travel from one PC to another over a network, or from one network to another network. We will explore how Hubs, Switches, and Routers work in relationship to the OSI model. In exploring this technology and the OSI model, the course provide the students a basic understanding of Collision Domains, LAN topologies, media choices, protocols and transmission techniques are addressed, overview of LAN planning, installation considerations, Broadcast Domains, VLANS, and		متطلب مصاحب

Firewalls. The course will concentrate on current industry technology such as Ethernet & Wireless Networks and Telephony. Network Security will be introduced. Lab Activities will provide students practical experiences in computer networking. It will be centered on implementation, configuration and troubleshooting of a LAN.



(Network Protocols) بروتوكولات الشبكات NT321	متطلب سابق
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This course cover in-depth study of internet algorithms and protocols at Layer 3 more. Topics include internet Protocols (IPv4,IPv6,ICMP),addressing (ARP),out-configuration(DHCP), multicast routing and transport, name services (DNS), end-to-end services. protocols for the next -generation internet will also be .discussed

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(Algorithms Design and Analysis) تحليل وتصميم الخوارزميات CS314	متطلب سابق
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Algorithms play the central role in both the science and practice of computing. This course aims to provide students with an understanding of computer algorithms. It will critically approach algorithms from, both, an analysis and design perspectives. Among these, methods that include the Incremental, Divide and Conquers, Greedy and Dynamic Programming will be investigated. The pre-requisite of this course is Data Structures and Algorithms course. To achieve these course goals different teaching strategies will be applied such as direct, indirect and interactive and self-learning.

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(Client/Server Computing) حوسبة المزود العميل NT323	متطلب سابق
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This course covers client/server architecture and low level network programming techniques. it acts as middleware between applications and Internet layers and protocols such as socket programming (TCP/IP) or (UDP/IP). Major topics include two and three-tier client server architectures, application layer issues, programming considerations, client and server issues and client/server frameworks, advanced. This course requires initial knowledge in O.O.P, operating systems, and computer networks. The used technique in lab is socket programming in java networking.

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(Network Operating Systems) نظم التشغيل الشبكات NT324	متطلب سابق
<p>This course introduces an advanced concepts in operating systems. The emphasis will be on the techniques for creating practical and high-performance networks operating systems. Major topics that will be covered include: software concepts and design issues, threads and thread usage, multithreaded operating system, client-server model, implementation of client-server model, remote procedure call, implementation of remote procedure call, synchronization in distributed systems, transaction and concurrent control, mass storage structure, distributed file systems, protection and security, and real-time systems. In practical part of the course, fundamentals of Linux, system administrative tasks, essential system services, and planning for server deployment and management are covered. The prerequisite of this course is the principles of operating systems and data communication.</p>	-----
	متطلب مصاحب



(Wireless Networks) الشبكات اللاسلكية NT411	متطلب سابق
<p>This course is essential for student to join the modern labor market. It equips student with the main basics of wireless techniques and enables him/her to analyze, design, and build an enterprise network that include different aspects of wireless techniques. The course is designed to cover the main concepts of wireless networks including types architecture, applications, requirements, protocols and standards. It emphasizes on main characteristics and structure of wireless network techniques. The course also covers the design issues of wireless network design and planning such as frequency, transmission rate, distance, power, and security. The course also provides an introductory for the infrastructure-less networks such as MANET, VANET, WSN, and Mesh network and ubiquitous computing. According to the program course plan, Computer Networks (2) is a prerequisite to this course. The course involves lectures, Lab, and group-based project that enables student to use and apply the skills acquired in the implementation of a wireless networks using the most common network simulators such as NS2 and OPNET.</p>	-----
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(Network Application Software) برمجيات تطبيقات الشبكات NT423	متطلب سابق
<p>This course presents enterprise network planning, design. An emphasis will be placed on current technologies for optimum network design. It equips student to gain an intermediate level understanding of the design, and analysis of enterprise Computer Networks. The proficiency gained will extend to the installation and use of common network hardware and software using network simulators. Analysis and design of enterprise networks will also be covered by the hands-on analysis and design of network operating systems and other networking tools. Topics include analysis and design network protocols, technologies and network security.</p>	<p>-----</p> <p>متطلب مصاحب</p> <p>-----</p>

(Network Management and Design) تصميم وإدارة الشبكات NT421	متطلب سابق
<p>This course presents enterprise network planning, design. An emphasis will be placed on current technologies for optimum network design. It equips student to gain an intermediate level understanding of the design, and analysis of enterprise Computer Networks. The proficiency gained will extend to the installation and use of common network hardware and software using network simulators. Analysis and design of enterprise networks will also be covered by the hands-on analysis and design of network operating systems and other networking tools. Topics include analysis and design network protocols, technologies and network security.</p>	<p>-----</p> <p>متطلب مصاحب</p> <p>-----</p>

(WAN and High Speed الشبكات الواسعة والشبكات عالية السرعة Networks) NT412	متطلب سابق
<p>This course highlights structures and features of different technologies involved in High Speed Networking and their performance either in LANs or WANs including Fast Ethernet, Gigabit Ethernet, Fiber Channel, T-1, E-1, ISDN, DSL, Frame Relay Networks, ATM, and MPLS. The course also covers high speed networks backbone structure and services. Tradeoff will be taken into consideration between different technologies in terms of speed, security, scalability and QoS. The course also presents techniques involved to support real-time traffic and congestion control such as VoIP and video conferencing. As the creation and management of software systems is a fundamental goal of any undergraduate systems course, students will design, implement, and configure several high speed protocols using lab projects.</p>	<p>-----</p> <p>متطلب مصاحب</p> <p>-----</p>

مقررات البرنامج الاختيارية

(Network Modeling and Simulation)	نمذجة ومحاكاة الشبكات	NTE01	متطلب سابق
<p>experiments based on networking simulation have become essential for teaching the key computer networking topics to students and professionals. The simulation approach is highly useful because it provides a virtual environment for a variety of desirable features such as modeling a network based on specified criteria and analyzing its performance under different scenarios. Modeling a given problem in the networks and simulating it could lead to better results through discussing the model and enhancing it before the actual model is built. The purpose of this course is to introduce fundamental principles and concepts in systems modeling and simulation, and to focus essentially to modeling and simulation a variety of networking designs and protocols. Topics to be covered in this course include basics of discrete-event system simulation, mathematical and statistical models, simulation design, experiment design, and modeling of simulation data.</p> <p>The course introduces simulation examples, such as queuing systems, Ethernet, Token Ring, Switched LANs, Network planning and design, ATM, Routing Information Protocol, Open Shortest Path First, Border Gateway Protocol, Transmission Control Protocol, Resource Reservation Protocol, Firewalls and VPN, Wireless Local Area Network, Mobile Wireless Network. The prerequisite of this course is Principles of Data Communication and Networks, and Networks protocols.</p> <p>In this course, you will learn to create and maintain Web pages using HTML and CSS. This course is taught in our PC computer lab, but you can do the coursework on other computer platforms. It is assumed that the student is proficient with the operating system on their computers, including file management and connecting to the Internet. It is also assumed that you are proficient with using of Web browsers.</p>			-----
			متطلب مصاحب

(Distributed Systems)	الأنظمة الموزعة	NTE02	متطلب سابق
<p>This course is an introductory course in distributed systems. The emphasis will be on the techniques for creating functional, usable, and high-performance</p>			-----
			متطلب مصاحب

distributed systems. To make the issues more concrete, the class includes several multi-week projects requiring significant design and implementation. The major themes this course will teach include scarcity, scheduling, concurrency and concurrent programming, naming, client/server programming and middleware, consistency and replication, fault tolerant and distributed file systems. As the creation and management of software systems is a fundamental goal of any undergraduate systems course, students will design, implement, and debug large programming projects.

(Mobile Computing) حوسبة الأجهزة النقالة NTE03	متطلب سابق
<p>This course aims to discover of a comprehensive and important in mobile computing and communications. The topics are grouped into four main areas: basic issues and problems, mobile and wireless networks, mobile /wireless communication architecture and related communication protocols, This problems in mobile computing computing with computing in fixed network systems will be explained. Different mobile communication architectures will be introduced including smart phone mobile technology. wireless network such as 2G/3G/G networks and protocols such as wireless LAN Mobile ad-hoc network multimedia sensor networks and mobility management strategies are needed to support mobile computing will be discussed advanced and recent and standard and technology in mobile networks will be also studied.</p>	<p>-----</p> <p>متطلب مصاحب</p> <p>-----</p>

(Multimedia Networking) شبكات الوسائط المتعددة NTE04	متطلب سابق
<p>This course introduces fundamental technologies for multimedia processing, coding, and communications. It specifically addresses multimedia data representation and delivery over a variety of networks. Before addressing the multimedia coding and communication aspects, the basics of analog and digital video formation and specification, analog TV system, video raster, and digital video formats are introduced. In the coding aspect, state-of-the-art compression</p>	<p>CS223</p>

<p>technologies are presented. Emphasis will be given to the state-of-the-art multimedia coding standards, including JPEG/JPEG-2000, H.26x, MPEG, and scalable video coding . In the aspect of multimedia networking, the course introduces the networking protocols oriented for streaming and interactive multimedia applications and their required quality of service, and also presents special considerations for sending multimedia over the Internet and wireless networks, such as multimedia multicasting, video adaptation, error resilience, and error concealment. It also presents protocols and architectures for QoS support such as best-effort, IETF Differentiated Services and IETF Integrated Services. The prerequisite of this course is Principles of Data Communication and networks. In my opinion, it is also assumed that students have already developed certain basic skills in programming language, mathematics ,analog and signal systems, and research skills.</p>	
	متطلب مصاحب

(Cellular Networks) الشبكات الخلوية	NTE05	متطلب سابق
<p>Concepts and techniques involved in wireless digital communications with emphasis on cellular, PCS, and 3G/4G systems. Properties of mobile radio channels; inter symbol interference, multipath, and fading effects; interleaving and diversity; multiple access schemes (TDMA, FDMA, CDMA, SDMA, OFDMA); inter user interference, traffic issues, and cell capacity; power control strategies; frequency reuse and channel assignment; handoff, paging, and location update; cell layout; introduction to modern cellular standards.. As the creation and management of software systems is a fundamental goal of any undergraduate systems course, students will design, implement, using simulation lap projects.</p>		-----
		متطلب مصاحب

مواضيع مختارة في شبكات الحاسوب	NTE08	متطلب سابق
)Selected Topics in Computer Networks(
<p>New trends and research directions in the area of WAN such as: MPLS, optical Network, network security and wireless networks.</p>		-----
		متطلب مصاحب

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(Principles of Artificial Intelligence) مبادئ الذكاء الاصطناعي CS321	متطلب سابق
<p>This course aims to provide an introduction to Artificial Intelligence (AI) and its applications. A breadth of topics will be covered, including agents, problem solving through search, game playing, knowledge and logic reasoning. As an application of AI, a brief overview of Expert Systems (ES) and Artificial Neural Network (ANN) will be provided in the end of this course. In order to practice on ES application, students will practice on AI tools or languages in separated Lab sessions such as Python. Data Structures and Algorithms course and Algorithms Analysis and Design course are pre-requisites for this course. To achieve these course goals different teaching strategies will be applied such as direct, indirect and interactive and self-learning.</p>	-----
	متطلب مصاحب
