



جامعة كل العرب

Faculty of Information Technology
Computer Science Courses Description 2019/2020

Faculty Requirements

1301106- Structured Programming (Th: 2 Lab: 2), (Tot: 3)

The course introduces procedural programming using C++ and the C++ language syntax that enables first-time programmers to use it. Specific topic coverage includes Data Types, Declarations, and Displays; Assignments and Interactive Inputs; Conversions, Selection; Repetition; Modularity Using Functions; Overloading; Arrays; Pointers; Strings as Character Arrays.

1301108- Object Oriented Programming (1) (Th: 2 Lab: 2), (Tot: 3), (pr. 1301106)

Basic topics considered are programs and program structure in Java, Java syntax, data types, flow of control, methods, classes, objects, packages, inheritance, polymorphism, abstract classes and interfaces, arrays, strings, and exception handling.

1301111- Discrete Structures(1) (Th: 3 Lab: 0), (Tot: 3)

The course provides a comprehensive study of all important aspects of discrete structures used in computer science starting with propositions, logical operations, truth tables, Set Theory, Sequences, Matrices, Methods of proofs, properties of relations, Functions definitions, types of functions, Ordered Relations (partially ordered set, linearly ordered, Hasse diagrams), Lattices, Trees (rooted tree, subtree) and ending with Graph Theory.

1301266- Technical writing and Communication Skills (Th:3 Lab: 0), (Tot: 3), (pr. 1401120)

This course starts with a brief introduction to the importance of communication. Its topics include an overview of English writing styles and steps in the development written reports, oral presentations, arguments, and speeches.

1501110- Calculus (1) (Th: 3 Lab: 0), (Tot: 3)

This course involves a study of limits, continuity, derivatives and integrals; computations of derivatives-sum, product, and quotient formulas, chain rule, implicit differentiation, applications of derivatives to optimization problems and related rate problems; mean-value theorem; definite integrals and fundamental theorem of calculus; application of definite integrals to computations of areas (length, surface) and volumes.





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Specialization Requirements

1501120- General Physics (1) (Th: 3 Lab: 0), (Tot: 3)

Fundamental topics in classical physics (mechanics) motion in one dimension and two dimensions, circular motion, and energy

1501121- General Physics Lab (1) (Th: 0 Lab: 2), (Tot: 1), (pr. 1501120)

Experiments of various physical principles. Experimental procedures and scientific method. Comparison between experimental data and theoretical values.

1301120- Digital Systems (Th: 3 Lab: 0), (Tot: 3) (pr. 1301111)

The course involves the following topics: Number Systems and codes, switching algebra, Combinational Circuit Analysis, synthesis, and practice; Minimization Methods; Sequential Logic design Principles; Latches and Flip-flops, Clocked synchronous state machines, Designing state machines using state tables and state diagrams; and finally introduction to Registers and Counters designs.

1301203 - Data Structures and Algorithms (Th: 2 Lab:2), (Tot: 3), (pr. 1301110+201108)

This course covers the fundamental aspects of building data structures and algorithms in Java. The course aims to provide general techniques for the design of efficient algorithms and deepens the study of algorithms and data structures. Along the way, problem solving skills are exercised and developed.

1301208- Object Oriented Programming (2) (Th: 2 Lab: 2), (Tot: 3), (pr. 1301108)

This course covers the advanced aspects of object-oriented through the widely used Java programming language, concentrating on issues of JavaFX that best demonstrate GUI components. Such good practice will give the student the required knowledge to use JavaFX as a programming language for many purposes.

1301306 - Basics of Electric Physics (Th:3 Lab:0), (Tot:3), (pr. 1501121+1301120)

This course will introduce the students to the principles of electrical physics, including the fundamentals of the electrical and electronic circuits. The student will be introduced to various electrical parts and their application including: resistors, capacitors, IC's and sensors.





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1301307 - Basics of Electric Physics Lab (Th:2 Lab:1), (Tot:3), (pr. 1301306)

This course introduces the students to the raspberry pi computing model. In this course the student will learn the fundamental commands in Linux system and how write a C++ based system to manipulate the hardware I/O pins of raspberry pi. The student will receive an individual electronic parts kit to implement the learned circuit design.

1302281- Introduction to Software Engineering (Th:3 Lab:0), (Tot:3), (pr. 1301108)

This course covers the fundamentals of software engineering, including understanding system requirements, finding appropriate engineering compromises, effective methods of design, coding, and testing, team software development, and the application of engineering tools.

1301236- Web-Based Programming (Th:2 Lab:2), (Tot:3), (pr. 1301108)

This course covers an introduction to Internet history, World Wide Web, discussion of web browsers, searching techniques, and the use of helper applications and plug-ins for video and sound. The course covers how web pages are created using HTML 5, and how CSS3 is used to separate content from style. JavaScript are also covered to create dynamic web pages. The student will learn how to create a World Wide Web pages using all these technologies.

1301224- Microcomputer Systems and Assembly Language (Th: 3 Lab:0), (Tot: 3), (Pr. 1301120)

The course covers microcomputer system organization and microprocessor architecture including microprocessor programming model, representation of information, binary and hexadecimal numbering systems, registers, memory, addressing and I/O structure. Assembly Language programming for microcomputers is also covered in this course, including: overview of low-level languages, program structure, program logic and control, instructions set, screen and key-board processing, string operations, I/O disk processing, printing, writing macros, and linking subprograms.

1301222- Computer Organization and Architecture (Th: 3 Lab: 0), (Tot: 3), (pr. 1301224)

The course Introduces the students to the organization and architecture of computer systems, starting with the standard Von Neumann model and then moving on to recent architectural concepts. Topics include: computer architecture concepts and levels, instruction set format, encoding, and types; execution unit, control unit, RTL, memory organization, input / output systems, pipelining, parallel processing and Multi – Core Technology.





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1301304 - Visual Programming (Th:2 Lab:2), (Tot:3), (pr. 1301305)

This course starts with a brief historical perspective of the evolution of programming techniques up to visual studio.NET. The topics covered include the concepts of events and methods, standard programming statements and controls, procedures and functions, timers, creating objects at run time, multiple forms, menus, object oriented programming, and database applications.

1301305- Database and Application of Database (Th:2 Lab:2), (Tot:3), (pr. 1301203)

This course introduces students to basic relational database concept and terminology, as well as data modeling concepts. Design a database using entity-relationship approach, it also identify the database constraints, then how to develop a relational database design. The Structured Query Language (SQL) is used to interact with a relational database and manipulate data within a database. Finally, distributed database and client –server architectures are covered.

1301310 - Design and Analysis of Algorithms (Th: 3 Lab: 0), (Tot: 3), (pr. 1301203)

This course provides a clear description of the concepts of algorithms and its design and analysis. The course provides a review of the main methods of designing algorithms, the concept of algorithm efficiency, design analysis and program implementation of different searching, sorting, selection, hashing, dynamic, and graph algorithms. The classification of problems by their complexity will also be given.

1301315 - Theory of Computation (Th: 3 Lab: 0), (Tot: 3), (pr. 1301203)

It is a second level course that is an essential part of any computer science major. This course introduces the theory of computation through a set of abstract machines that serve as models for computation. Chomsky hierarchy and relations between classes of languages is covered.

1301326 - Operating Systems (Th: 3 Lab: 0), (Tot: 3), (pr. 1301203)

This course starts with an introduction to the operating, including: an overview to the components of operating system, multiprocessor and multicore systems, as well as the kernel structure. The course covers also Operating System structure, Processor Management (mutual exclusion, synchronization of process, and scheduling algorithms), Memory Management (swapping, overlay, paging, segmentation, dynamic storage allocation, protection, virtual memory).





1301341 - Artificial Intelligence (Th:2 Lab:2), (Tot:3), (pr. 1301203)

The course presents an introduction to the essential concepts and techniques of the AI and its applications' areas. The course focuses on the major sub-disciplines of AI such as: problem spaces, search strategies, knowledge representation, logic and inference mechanisms, automated reasoning and problem-solving techniques. The course introduces the utilization of the introduced concepts and techniques in two or more of the following application areas: computer vision, natural language comprehension, expert systems, managing plans of actions and robotics, and machine learning.

1301368 - Field Training (Th: 0 Lab: 0), (Tot: 0), (pr. Pass. 90 Cr. Hrs)

The course lasts for 10 weeks (320 hours) to cover the summer semester of the third year during which students will undergo a practical training at an approved private, government or semi-government agency. The training field is a jointly structured, monitored and assessed program by the faculty and their industrial counterparts.

1301386- Information Systems Analysis and Design (Th: 3 Lab: 0), (Tot: 3), (pr.1301305)

This module is designed to develop student's knowledge, understanding, and skills to solve problems through the creation of software solutions. It covers concepts and methods to develop the architectural design of medium-size software systems with sufficient complexity. It introduces fundamental design concepts and notations and discusses different design methods with emphasis on Object Oriented design methods and techniques. The module also covers the construction of maintainable software systems using one of the dominant Object-Oriented programming languages. During the course, students will undertake a term project working individually and in groups addressing the design and construction of a relatively complex software system.

1301411 Information Security (Th: 3 Lab: 0, (Tot: 3), (pr. 1301336)

This is a fundamental course on information security that discusses the basic issues in computer security measures, procedures and mechanisms. The course covers an overview of computer security, encryption types as classical encryptions, symmetric and asymmetric encryptions. The course also covers digital signatures, hash functions, authentications and authorization procedures. Also, some of the security applications and measures like firewalls, intrusion detection systems, email security and malicious codes are covered.





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1301336- Data Communications and Computer Networks (Th: 3 Lab: 0, (Tot: 3), (pr. 1301326)

Topics to be covered in this course include: communication concepts, transmission media, transmission models, digital packet switching and routing, networks topology and architecture, standard OSI and TCP/IP models, and distributed systems.

1301415 – Compiler construction (Th: 3 Lab: 0), (Tot: 3), (pr. 1301315)

This course introduces an introduction to Compiling; Lexical analysis: specification and recognition of tokens, finite automata; Syntax analysis: grammars, top-down and bottom-up passing; Syntax-directed translation; Symbol Table; Semantic Analysis.

1301491 - Graduation Project (1) (Th: 0 Practical: 2), (Tot: 1), (pr. Pass. 90 Cr. Hrs+1301386)

The final year project gives the student the opportunity to apply knowledge acquired in the early years. It aims to develop and measure the capabilities of a student to analyze and solve complex problems. Projects are assigned on a team basis, and are normally proposed by lecturers of the department. However, a student may propose a topic or an area of his/her own research interest. Projects should be problem oriented relevant to the program of study. Students are encouraged to have some original contribution.

1301492 - Graduation Project (2) (Th: 0 Practical: 4), (Tot: 2), (pr. 1301491)

This is the second phases of the graduation project development. It covers the implementation, testing, and deployment phases of the project started in 1301491. A final design and implementation report is submitted and an oral presentation including a public demo .

1301421 - Parallel programming (Th:2 Lab:2), (Tot:3), (pr. 1301310)

This is an introductory course on parallel computing. This course will teach practical aspects of parallel computing, so that you will be able to effectively use parallel machines. It will be particularly useful for those who plan to perform research on parallel computing. It should also be useful for those who want to learn programming multicore processors.





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1301466 - Cloud computing and big data (Th:2 Lab:2), (Tot:3), (pr. 1301341+1301305)

The course examines the most important APIs used in the Amazon and Microsoft clouds. We learn how to use Restful Web services, and cloud-based messaging and workflow services to construct new applications. We learn to migrate existing applications into the cloud, by navigating through phases such as creation of a private cloud; attaching, in a secure fashion, the private cloud to the public cloud; and provisioning and maintaining resources in the public cloud. We deal with non-trivial issues like load balancing, caching, distributed transactions, identity and authorization management, and data encryption. We introduce Hadoop and Big Data services in the cloud.

1301468 - Recent trends in computing (1) (Th: 0 Practical: 2), (Tot: 1), (pr. 1301305)

This course focuses on the new trends in programming languages, skills and techniques. Recent trends data is collected from git hub and students will perform hands on lab on the selected topic.

1302338 – Advanced Internet Computing(Theoretical/Practical Course) (3 Credit Hours) (Prerequisite 1303236+1301305)

The course introduces the concept of dynamic web development. The students will be able to differentiate between static web pages and dynamic programming of web sites. Upon completion of the course they will have the skills to build static and dynamic websites, connect to a database, write server code and use advanced technologies such as ASP.NET Core MVC.





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Elective

1301301 - Selective Programming Language (Th: 3 Lab: 0), (Tot: 3), (pr. 1301203+201131)

This course covers the whole aspect of Swift 4.2 programming and students will learn how to build a real-world app from scratch. Students first learn the basics of Swift, then prototype an app, and later add some features to it in each week. During the course, students will learn how to exhibit data in table view, customize the look & feel of a cell, design UI using Stack Views, create animations, work on maps, and build an adaptive UI.

1301371 - Modeling and Simulation (Th: 3 Lab: 0), (Tot: 3), (pr. 1301203+201131)

Presents a comprehensive introduction to different types of simulation techniques and the concept of time in a simulation, analytical modeling techniques , simulation process and tools, construction of models, random number generation, sampling from distributions, statistical tests for randomness and goodness fit, business and industrial applications.

1301425 - Advanced Operating Systems (Th: 3 Lab: 0), (Tot: 3), (pr. 1301326)

This course presents details for some subjects that covered in OS1 and covers other advanced topics with implementation issues of operating system on UNIX. It includes file system and secondary storage management, networking and distributed operating system, Security and protection, Resource management .

1301440 - Digital Image Processing (Th: 3 Lab: 0), (Tot: 3), (pr. 1301310)

This course gives a comprehensive treatment of all the important aspects of this topic, including all fundamental steps in digital image processing (image acquisition, enhancement, compression, segmentation, recognition, etc.). The student is expected to learn the basic concepts of image formation to model and analyze image operations.

1301461 - Machine Learning (Th:3 Lab:0), (Tot:3), (pr. 1301341)

This course provides a broad introduction to machine learning. Topics include: supervised learning (generative/discriminative learning, parametric/non-parametric learning, neural networks, support vector machines); unsupervised learning (clustering, dimensionality reduction, kernel methods); The course will also discuss recent applications of machine learning, such as to health care, data mining, autonomous navigation, bioinformatics, speech and face recognition, and text and web data processing.





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1301392 - Advanced Technologies and Tools in Computer Science (Th: 3 Lab: 0), (Tot: 3), (pr. Department Approval)

This course covers selected topics in current technologies and recent tools in the Computer Science field. Content may vary each offering or may be repeated.

1301490 - Special Topics in Computer Science (Th:3 Lab:0), (Tot:3), (pr. Department Approval)

This course covers selected topics in current research and recent developments in the Computer Science field. Content may vary each offering or may be repeated.

1301455 - Computer Graphics (Th: 2 Lab:2), (Tot: 3), (pr. 1301310)

Introduction to graphics hardware and software. Two-dimensional graphics methods, transformations, and interactive methods. Three-dimensional graphics, transformations, viewing geometry, object modeling and interactive manipulation methods. Basic lighting and shading. Video and animation methods.

1302383 - Project Management(Theoretical/ Practical Course) (3 Credit Hours) (Prerequisite 1302281)

This course aims at introducing the major topics in project management. It seeks to explain the basic principles and provide practical steps for managing projects. It also seeks to expose students to a spectrum of activities involved in project management with a specific focus on IT projects. Further, students are also expected to understand and demonstrate knowledge of managing group projects and of project presentation. This course will cover the following topics: Overview of project management; Understanding the nature of projects; Principles and basic techniques of project management; Project management tools; Integration of tools and principles; Setting up a project; Project stages; Planning and controlling a project; Role and personal qualities of a project manager.

1302337 – E-commerce (Theoretical Course) (3 Credit Hours) (Prerequisite 1301108)

This module presents concepts and skills for the strategic use of e-commerce and related information technology from three perspectives: business to consumers, business-to-business, and intra-organizational. Examination of e-commerce in altering the structure of entire industries, and how it affects business processes including electronic transactions, supply chains, decision making and organizational performance.





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1302360 – Database Systems Administration (Theoretical Course) (3 Credit Hours) (Prerequisite 1301305)

This module provides fundamental knowledge of, and practical experience with, database concepts. Includes study of information concepts and the realization of those concepts using the relational data model. Practical experience gained designing and constructing data models and using SQL to interface to both multi-user DBMS packages and to desktop DBMS packages.

1501099- Computer Skills Improvement (Th. & Lab: 3), (Tot: 3)

An introduction to the fundamental concepts of computing and information technology in the modern age. Topics covered include: the basic understanding of digital computer system, microcomputers, operating systems, application software development, some database concepts, data communication and networks, and the internet. Also, hands-on lab using Windows 8 and MS Office applications including MS Word, MS Excel and MS PowerPoint. The course also gives an overview of the fundamentals of e-commerce.

1501160- Computer Skills 2 (Th. & Lab: 3), (Tot: 3), (Pr. 1501099)

In this course the student will gain the knowledge to use advanced skills and techniques in MS-Excel, as well as the concepts of simple DB applications of MS-Access and Web Design using Joomla. This course also covers an elaborative introduction to problem solving techniques and programming.

1301302- Concepts of Programming Languages (Th: 3 Lab:0), (Tot: 3), (pr. 1301203)

This course is planned to cope with the state of the art and advances in the field of programming languages, such as .NET programming environment.

This course aims to understand the basic goals and factors behind language development and evolution learn the basic approaches to implement high level languages, to understand the different paradigms and different features of programming languages, and to understand the run-time structures needed for the implementation of programming languages.





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تاريخ الاعتماد: 2017/9/18