

Brief course description- Course Plan Development and Updating Procedures\ Artificial Intelligence Department	QF01/0409-3.0E
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Faculty	Sciences & IT	Academic Department	Artificial Intelligence	Number of the course plan (133)
Number of Major requirement courses	06/20/2018-2019	Date of plan approval	06/05/2019	

This form is just for the major requirement courses

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0113130	3	Introduction to Information Technology	مهارات استدرائية

This course presents an introductory survey of computer science. It explores the breadth of the subject while including enough depth of the topics involved. The goal of this course is to introduce the student to key terminology and components of computer hardware, software, and operating systems. Discuss the functions and uses of computers in our society, Describe the information processing cycle, and Identify the major components of computer hardware and there functions. This course is an introduction to problem solving by using Pseudo code, and flowcharting

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0101110	3	Principles of Mathematics and Statistics	---

Introduction to Statistics, populations and samples, Frequency distributions, Measures of central tendency, Measures of dispersion, Measures of skewness and kurtosis, correlation and regression, principles of probability, Rules of probability, Bayes, Theorem. The Random, Variables, discrete and continuous distributions expectation.

المتطلب السابق Prerequisite	الساعات المعمدة Credit Hours	اسم المادة الدراسية Course Name	رقم المادة Course No.
0112120	3	Principles of Programming	0113130

This course introduces programming concepts and prepares students to understand the more complicated and powerful programming tools and concepts in the following courses. It contains an introduction to programming language history, basic hardware and software concepts, basic problem-solving techniques, and the different types of programming languages. It uses C++ programming language to give students a good understanding of a typical program development environment, control statements, functions, arrays, pointers and pointer-based strings.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0112130	3	Professional Skills for Scientific Faculties	----

Technical Writing is an introduction to technical and professional writing. This course presents students with practical information about communicating in different kinds of workplace environments and professional/technical discourse communities. Throughout the semester students will produce and analyze a number of common technical writing genres, including emails, letters, resumes, memos, reports, proposals, technical descriptions, technical definitions, technical manuals, and proposals. Students will work toward understanding how to analyze and react to rhetorical situations each genre and writing situation presents, including issues of audience, organization, visual design, style, and the material production of documents .including international standards and procedures such like ISO standards.

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Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0101221	3	Linear Algebra 1	0101110
Groups and Subgroups, Cyclic Groups, Permutation Groups, Homomorphism's Of Groups, Isomorphism's Of Groups, Direct Product Of Groups, Cosets and LaGrange's Theorem, Normal Subgroups and Factor Groups, The First Isomorphism Theorem.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0112333	3	Operating systems	011232
Introduction to Operating System and Machine Architecture. Operating system and its instruction, the services provided by the OS, process management and its scheduling to the processor, type of scheduling and its algorithms, scheduling criteria's, Ways of calculating the average waiting time AWT, the modern methods of design and implementation of OS, threads , thread models and its implementation, deadlock, type of algorithms for prevents the deadlock, manipulation with files, access to the files, the proper storage media for files, memory management, RAM, and VIRUAL memory, paging, paging swapping.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142346	3	probability theory in AI	0142141
Probability theory is the branch of mathematics concerned with probability. Although there are several different probability interpretations, probability theory treats the concept in a rigorous mathematical manner by expressing it through a set of axioms. Typically these axioms formalize probability in terms of a probability space, which assigns a measure taking values between 0 and 1, termed the probability measure, to a set of outcomes called the sample space. Any specified subset of these outcomes is called an event. The word probability has several meanings in ordinary conversation. Two of these are particularly important for the development and applications of the mathematical theory of probability. One is the interpretation of probabilities as relative frequencies, for which simple games involving coins, cards, dice, and roulette wheels provide examples.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0104272	3	Numerical Analysis 1	0101110
This course is designed to introduce the student to a number of numerical methods as well as to teach the student how to do some error analysis. These include methods to approximate roots of functions, to interpolate data points with polynomials and to solve linear system			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0112110	3	Discrete Mathematics	---
This course will cover the following topics and specific applications in computer science. Numbers and Exponents , Errors (absolute and relative) , Propositions Logic , Predicates and Quantifiers , Quantifiers and logical operators, Logical Inference , Methods of Proof , Sets , Relations and Functions			

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Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0102131	3	Digital Logic Design	0112110
This course emphasis on the following topics: the number systems and conversions., Digital systems, Unsigned and signed binary numbers, Binary codes, Boolean Algebra and logic gates, The map method, Combinational circuits, MSI circuits, Sequential circuits, Registers and counters.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0112220	3	Object Oriented Programming	0112120
This course gains knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc. Beside; understanding the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods, in addition to the main principles in OOP that talks about "Encapsulation", "Inheritance", "Polymorphism" and "Interface".			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0113241	3	Database	0112220
This course provides a comprehensive concepts of the relational database design and SQL (implemented in Oracle) used with relational databases. The presentation stresses at relational data model; relational algebra; SQL; database analysis and design; ER and enhanced modeling; data normalization			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0112212	3	Data Structures	0112220
Principles of data design. Data types and structures. Abstract data types (ADTs) and encapsulation. Unsorted List and Sorted List ADTs. Stack and Queue ADTs. Linked structures. Implementing Unsorted Lists, Sorted Lists, Stacks and Queues as linked structures. Programming with recursion. Binary Search Trees.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0112222	3	Visual Programming	0112220
This course focuses on providing the students the main skills for designing the GUI interface. In addition it focuses on teaching the students the programming skills by writing the necessary codes for designing the GUI interface. This course starts by defining the JFrames, and all controls which are placed on the frame such as JLabel, JTextField, JButtons, JoptionPane, JCheckBox, JRadioButton, JComboBox, JList, Events: Mouse events and Keyboard events, event Registration, Pixels, Color Class, Font Class, JTextArea, Java 2D and 3D Shapes, Exception Handling, Java			

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Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0112313	3	Algorithms	0112212
Solving summations and recurrences. Efficiency and complexity analysis. Tree terminology and algorithms. Binary trees. Hashing methods and solving collision in hashing. Heaps and heap sort. Insertion sort, merge sort and quicksort. Graph terminology, representation and algorithms. Algorithms of Prim, Kruskal, Dijkstra and Floyd. Breadth-first and depth-first search. The greedy, divide-and-conquer, and dynamic programming techniques.			
0113324	3	Web applications Programming	0112313
This module is a reflection of web pages development techniques using ASP.Net which supported by C# programming language. In this module, a training on how to create web pages from scratch to reach a creation of full, integrated and synchronized with each other web pages. This course is led to teach the user most of the web pages programming techniques and how to link them with each other's and with the databases. As well as the fundamentals of security, where the user will be taught how to secure the created web pages from hacking.			
0142141	3	Principles of AI	0113130
This course introduces you to the basic concepts and techniques of Artificial Intelligence (AI). AI is devoted to creating software and hardware to get computers to do things that would be considered 'intelligent' as if people did them. Artificial intelligence has had an active and exciting history and is now a reasonably mature area of computer science. Many of the research discoveries have now reached the point of industrial application and many companies have made and saved millions of dollars by exploiting the results of AI research. This course will allow you to gain generic problem solving skills that have applicability to a wide range of real-world problems. Topics covered include search strategies for solving problems, knowledge representation, automated planning, and intelligent agents, and reasoning under uncertainty.			
0142223	3	AI Programming 1 (Prolog&Lisp):	0112120
An introduction to the concepts of programming, using a functional programming language. Students learn to solve small-scale problems succinctly and at an abstract level without being bogged down in details.			
142225	3	AI Programming 2 (Python)	0142223
This course is an introduction to the Python programming language for students without prior programming experience. We cover data types, control flow, object-oriented programming, and graphical user interface-driven applications. The examples and problems used in this course are drawn from diverse areas such as text processing, simple graphics creation and image manipulation, HTML and web programming, and genomics.			

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Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142342	3	Principle of Machine Learning	142225
The main area that will be discussed is supervised learning, which is concerned with learning to predict an output, given inputs. A second area of study is unsupervised learning, where we wish to discover the structure in a set of patterns; there is no output 'teacher signal'			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0112434	3	Embedded Systems	0112313
This course discusses embedded systems. Identify how to use microcontroller board to design embedded systems. Develop applications for embedded systems. Explain serial and parallel communication. Explain interrupt capabilities. Explain timing systems. Design analog-to-digital converters. Describe how to control the speed and direction of a DC motor			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0113354	3	Data Mining	0113241
Introduction to Data Mining, Classification, Clustering, Association Rule Discovery, Anomaly Detection, Web Mining, Collaborative Filtering, and various data mining topics.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0113457	3	Information Retrieval	0113354
This course includes the following topics: Introduction to Information Retrieval, Basic Techniques of information retrieval, Tokens and Terms, Static Inverted Indices, Query Processing, Index Compression, Dynamic Inverted Indices, Probabilistic Retrieval, Measuring Effectiveness, Web Search, Advanced Information Retrieval Topics.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142141	3	Principle of Artificial Intelligence	0113130
This course introduces the basic principles in artificial intelligence. It covers simple representation schemes, problem solving paradigms, constraint propagation, and search strategies. Areas of application such as knowledge representation, natural language processing, expert systems, vision and robotics are explored. The PROLOG programming language is also introduced.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142345	3	Natural Language Processing	0142342
This course represents an introduction to the theory and practice of computational approaches to natural language understanding. The course will cover common parsing methods for sentences, discourse and dialogue, and it will also address lexical processing tasks such as word sense disambiguation and clustering. We will study state of the art symbolic techniques in deep and shallow language processing, as well as statistical models, acquired by both unsupervised and supervised machine learning from online linguistic resources. Students will have the opportunity to explore what they have learned in written and practical assignments. These assignments will be designed to enable students to gain an understanding for the pervasiveness of language ambiguity at all levels and the problems this poses for automated language understanding, and for the relative strengths and weaknesses of the various theories and engineering approaches to these problems.			

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Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142347	3	Cognitive Science	0113241
This course aims to introduce students to the basic concepts and methodology needed to implement and analyze computational models of cognition. It considers the fundamental issues of using a computational approach to explore and model cognition. In particular, we explore the way that computational models relate to, are tested against, and illuminate psychological theories and data. The course will introduce both symbolic and sub-symbolic modelling methodologies, and provide practical experience with implementing models. The symbolic part will focus on cognitive architectures, while the sub-symbolic part will introduce probabilistic models.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142452	3	Deep Learning	0142344
This course provides an introduction to computer vision, including fundamentals of image formation, camera imaging geometry, feature detection and matching, stereo, motion estimation and tracking, image classification, scene understanding, and deep learning with neural networks. We will develop basic methods for applications that include finding known models in images, depth recovery from stereo, camera calibration, image stabilization, automated alignment, tracking, boundary detection, and recognition. We will develop the intuitions and mathematics of the methods in class, and then learn about the difference between theory and practice in projects.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142351	3	Robotics	0142347
This course explored the fundamental problems involved in producing real world intelligent behavior in robots, covering the different information processing methods and control architectures that have been developed and are currently in use, including probabilistic methods and approaches inspired by biological systems. The course is structured around a practical task to develop navigation algorithms on a real robot platform			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142447	3	Machine Learning Applications	0142345
This course is focused on the implementation and evaluation of machine learning systems, and is lab-based. Students who do this course will obtain experience in the design, implementation, training, and evaluation of machine learning systems.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142344	3	Neural Networks	0142342
This course covers some of the linguistic and algorithmic foundations of natural language processing. The course is strongly empirical, using corpus data to illustrate both core linguistic concepts and algorithms, including language modelling, part of speech tagging, syntactic processing, the syntax-semantics interface, and aspects of semantic processing. Linguistic and algorithmic content will be interleaved throughout the course. As well as in this course, you'll develop a clear understanding of the motivation for deep learning, and design intelligent systems that learn from complex and/or large-scale datasets. We'll show how to train and optimize basic neural networks, convolutional neural networks, and long short term memory networks. Complete learning systems in Tensor Flow will be introduced			

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via projects and assignments. You will learn to solve new classes of problems that were once thought prohibitively challenging, and come to better appreciate the complex nature of human intelligence as you solve these same problems effortlessly using deep learning methods.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142440	3	Advanced AI	0142351

The Programming for Data Science course is aimed at providing students with the skills necessary to use Python for data analysis in scientific computing. In particular the course will cover with Python: The NumPy package for scientific computing. The Pandas data analysis library, including reading and writing of CSV files. The IPython and PyDev development environments. The Matplotlib 2D plotting library. The course will also provide an introduction to best-practice software engineering techniques and Unix command line tools.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142455	3	Internet of Things	0142351

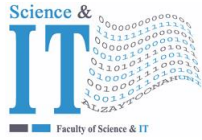
Internet of Things (IoT) is presently a hot technology worldwide. Government, academia, and industry are involved in different aspects of research, implementation, and business with IoT. IoT cuts across different application domain verticals ranging from civilian to defense sectors. These domains include agriculture, space, healthcare, manufacturing, construction, water, and mining, which are presently transitioning their legacy infrastructure to support IoT. Today it is possible to envision pervasive connectivity, storage, and computation, which, in turn, gives rise to building different IoT solutions. IoT-based applications such as innovative shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems, are gradually relying on IoT based systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142458	3	Expert Systems	0142440

In this course the student will learn the methodology used to transfer the knowledge of a human expert into an intelligent program that can be used to solve problems or give advice. This course is an introduction to expert systems. In this course, we learn how theory and applications complement each other. Both theory and application are presented. By integrating theory with a fully functional means of applying that theory to real-world situations, students will gain an appreciation for the role played by expert systems in today's world

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0142459	3	Big Data	0113354

This is an overview course of Big Data Applications covering a broad range of problems and solutions. It covers cloud computing technologies and includes a project. Algorithms are introduced and illustrated. There are three ways of becoming part of a big data project- one: be a technical person and handle the technology part, two: work with the solution and three: lead and manage a big data initiative. This course is for managing a big data initiative. In order to lead a big data initiative, one must know the underlying technology, decision making models, strategy and issues involved in a big data project



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"Tradition and Quality"

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