



Faculty of Computer Science and Informatics

Department of Mobile Computing

Study Plan of the Bachelor's Degree

In: Mobile Computing

Academic Year: 2018/2019

**Vision of the Department:**

A leading department in the region in delivering graduates who are specialized in developing, maintaining, operating and managing applications for mobile devices.

Mission of the Department:

Prepare qualified graduates in the field of Mobile Computing as an effort towards satisfying the needs of the local and regional labor markets; capable of accomplishing distinguished projects; capable of helping infrastructure developments and promoting knowledge-based economy; and capable of developing and improving performance of local community organizations.

Objectives of the Department:

Within a few years after graduating with this degree, Mobile Computer graduates will:

1. Possess the necessary skills of theoretical and applied knowledge in the field of Mobile Computing.
2. Have the professional competences and practice their profession with confidence and regional competitiveness with others.
3. Continue to lifelong learning and professional development amid future technological changes.
4. Be active members of teamwork with professional and ethical responsibilities, and know the needs of the community.

Intended Learning Outcomes (ILOs):

Student Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviors that students acquire as they progress through the program. A graduate of the Mobile Computing will demonstrate:

- a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
- b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- d) An ability to function effectively on teams to accomplish a common goal





- e) An understanding of professional, ethical, legal, security and social issues and responsibilities
- f) An ability to communicate effectively with a range of audiences
- g) An ability to analyze the local and global impact of computing on individuals, organizations, and society
- h) Recognition of the need for and an ability to engage in continuing professional development
- i) An ability to use current techniques, skills, and tools necessary for computing practice.
- j) An ability to apply computing algorithmic and networks principles in the modeling and design of mobile-based systems. [MC]
- k) An ability to apply design and development principles in the construction of mobile software systems of varying complexity. [MC]



Framework

Framework of the Bachelor's Degree in Mobile Computing (132. Cr. Hrs.)

Sequence	Classification	Credit Hours	Percent %
1st	University Requirements	27	20%
2nd	Faculty Requirements	21	15%
3rd	Department Requirements	78	60%
4th	Ancillary Courses	6	5%
Total		132	100%

Course Numbering

Sequence	Course Level	Cognitive Domain	Dept. Code	Faculty Code
			2	4
			2 CIS	Faculty of Computer Science and Informatics
			3 SE	
			4 MC	

Cognitive Domains

Number	Cognitive Domain	Credit Hours
0	Computer Science and Algorithms: Discrete Mathematics, Data Structures, Algorithms.	9
1	Programming: Object Oriented Programming, Visual Programming, Web Application Programming	12
2	Applications and Information Science: Database, Database Management Systems, Systems Analysis and Design, Information Security, Networks and Data Transmission.	12
3	Courses in Mobile Computing: Mobile Web Design, Simulation and Modeling for Mobile Devices, Distributed Systems (Cloud	15-30



	Computing, Distributed Databases), General Applications for Mobile Devices, Human Computer Interaction.	
4	Supporting Knowledge Areas: Statistics, Numerical Analysis, Linear Algebra.	6
5	Elective courses: Minimum 6 credit hours.	9
6	Field training: 0 hours after passing a minimum of 80 credit hours.	3
	Graduation Project: 3 credit hours after passing 90 credit hours.	3-6
	Elective Courses: Several courses within the sub-field of the program.	9-15
	Laboratories: Several laboratories covering the needs and number of students.	-
	Applications and Information Science: Database, Database Management Systems, Systems Analysis and Design, Information Security, Networks and Data Transmission.	12



I. University Requirements: (27 Credit Hours)

A. Compulsory Requirements: (15 Credit Hours)

Course No.	Course Title	Cr. Hr.
5501102	Arabic Language (1)	3
5501103	English Language (1)	3
5501107	National Education	3
55011308	Military Sciences	3
5501110	Computer Skills	3
5501108	Arabic Language Basics	0
5501109	English Language Basics	0
5501110	Computer Basics	0
Total		15

B. Elective Requirements: (12 Credit Hours) from the following list:

Course No.	Course Title	Cr. Hr.	Prerequisite
55021101	Arabic Language (2)	3	5501101
55021102	English Language (2)	3	5501102
55021203	Principles of Psychology	3	-
55021204	Human Rights	3	-
55041203	Environment and Community	3	-
55011306	Entrepreneurship and Creativity	3	
55011204	Life Skills	3	-
55031101	Islamic Culture	3	-
55031205	Quds and Hashemite Custodianship	3	-
55041206	Health and Community	3	-
55041307	Communication and Internet	3	-
Total		12	



2. Faculty Requirements: (21 Credit Hours)

A. Compulsory Requirements: (21 Credit Hours)

Course No.	Course Title	Cr. hr.	Theoretical	Practical	Prerequisite
4201107	Introduction to Programming (C++)	3	3	0	
4201199	Laboratory of Introduction to Programming	0	0	3	4201107 (co)
4204108	Fundamentals of Information Technology	3	3	0	
42021201	Object Oriented Programming	3	3	0	4201107
42021298	Laboratory of Object Oriented Programming	0	0	3	42021201 (co)
42042201	Databases	3	3	0	4204108
42011204	Discrete Mathematics	3	3	0	4201101
42012105	Data Structures	3	3	0	42021201
42043214	Websites Design	3	3	0	4204108
Total		21	21	6	

B. Elective Requirements: (..... Credit Hours)

Course No.	Course Title	Cr. hr.	Theoretical	Practical	Prerequisite
Total					



3. Department Requirements (78 Credit Hours)

A. Compulsory Requirements: (69 Credit Hours)

Course No.	Course Title	Cr. hr.	Theoretical	Practical	Prerequisite
44051210	Introduction to mobile computing	3	3	0	
44052111	Computer Graphic	3	3	0	42021201
42022102	Visual Programming	3	3	0	42021201
42022192	Laboratory of Visual Programming	0	0	3	42022102 (co)
42052103	Systems Analysis and Design	3	3	0	42042201
42012206	Algorithms Design and Analysis	3	3	0	42012105
44034102	Mobile operating system	3	3	0	42012105
42022204	Java Programming	3	3	0	42021201
42022295	Laboratory of Java Programming	0	0	3	42022204 (co)
42044202	Database Management Systems	3	3	0	42042201
42042217	Programming of Internet Applications	3	3	0	42042201 +42043214
44054103	Mobile Devices Modeling and Simulation Methods	3	3	0	42012206
43053110	Human Computer Interaction	3	3	0	42022102
44043103	Mobile Software Engineering	3	3	0	42052103
42044111	Distributed Databases	3	3	0	42044202
42044106	Information Systems Security	3	3	0	42042217
44043101	Computer Networks	3	3	0	42012206
44053213	Introduction to Mobile Applications	3	3	0	42022204
42054207	Communication and Writing Skills	3	3	0	
44024104	Network Programing	3	3	0	44043101
44044194	Laboratory of Network Programing	0	0	3	44024104 (co)
44054112	Programming Games for Smart Devices	3	3	0	44053213
44054114	Mobile Application Programming	3	3	0	44053213
44054195	Laboratory of Mobile Application Programming	0	0	3	44054114 (co)
44053204	Cloud Computing Systems	3	3	0	44043101



44054210	Field Training on MC	3	3	0	Complete 80 CH
44054211	Applied Graduation Project	3	3	0	Complete 90 CH
Total		69	69	9	



B. Elective Requirements: (9. Credit Hours)

Course No.	Course Title	Cr. hr.	Theoretical	Practical	Prerequisite
42043108	Geographic Information Systems (GIS)	3	3	0	42042217
42043205	Information Retrieval	3	3	0	42044202
42043203	Data Warehouses	3	3	0	42044202
42042210	Electronic Learning	3	3	0	42041108
42042202	Business Intelligent	3	3	0	42052103
25041201	Decision Support Systems	3	3	0	Dep. Approval
42041208	Information Systems Management Strategies	3	3	0	42041108
42043109	Data Analysis	3	3	0	42044202
42043110	Big and Open Data	3	3	0	42044202
42022206	Operations Research	3	3	0	
42041212	Internet of Things	3	3	0	42041108
44053203	User Experience for Smartphones	3	3	0	42042217
42043115	Web Software Tools and Techniques	3	3	0	42043214
44053211	Multimedia Applications for Smart Devices	3	3	0	42021201
42043211	Electronic Business and Commerce	3	3	0	42042217
42014211	Artificial Intelligence	3	3	0	42012206
44044102	Network Management and Security	3	3	0	44043101
42054204	Special Topics	3	3	0	Dep. Approval
43042210	Social Engineering	3	3	0	42041108
43042110	Social Networks	3	3	0	42041108
Total					

4. Ancillary Courses (..... Credit Hours):

Course No.	Course Title	Cr. hr.	Theoretical	Practical	Prerequisite
4201101	Principles of Mathematics and Statistics	3	3	0	
42051205	Numerical Analysis	3	3	0	4201101
Total		6	6	0	



Advisory Study Plan for the Bachelor's Degree in

First Year				
First Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
4201101	Principles of Mathematics and Statistics	3		
44051210	Introduction to Mobile Computing	3		
4201107	Introduction to Programming (C++)	3		
4201199	Laboratory of Introduction to Programming	0		4201107
4204108	Fundamentals of Information Technology	3		
Total		15		

Second Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
42051205	Numerical Analysis	3	4201101	
42011204	Discrete Mathematics	3	4201101	
42021201	Object Oriented Programming	3	4201107	
42021298	Laboratory of Object Oriented Programming	0		42021201
42042201	Databases	3	4204108	
	University Elective Requirement	3		
Total		15		



Second Year				
First Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
42012206	Algorithms Design and Analysis	3	42012105	
44034102	Mobile Operating Systems	3	42012105	
42022204	Java Programming	3	42021201	
42022295	Laboratory of Java Programming	0		42022204
42044202	Database Management Systems	3	42042201	
42042217	Programming of Internet Applications	3	42042201 + 42043214	
Total		18		

Second Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
44054103	Mobile Computing Simulation	3	42012206	
43053110	Human Computer Interaction	3	42022102	
44043103	Mobile Software Engineering	3	42052103	
42044111	Distributed Databases	3	42044202	
	University Elective Requirement	3		
	Program Elective Requirement	3		
Total		18		



Third Year				
First Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
42012206	Algorithms Design and Analysis	3	42012105	
43044116	Software Project Management	3	43042201	
42053101	Database Programming	3	42044202	
42053194	Laboratory of Database Programming	0		42053101
42043205	Information Retrieval	3	42044202	
	University Elective Requirement	3		
Total		18		

Second Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
44043101	Computer Networks	3	42012206	
44053213	Introduction to Mobile Applications	3	42022204	
42054207	Communication and Writing Skills	3		
42044106	Information Systems Security	3	42042217	
	University Elective Requirement	3		
	Program Elective Requirement	3		
Total		18		



Fourth Year				
First Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
44024104	Network Programing	3	44043101	
44044194	Laboratory of Network Programming	0		44024104
44054112	Programming Games for Smart Devices	3	44053213	
44054114	Mobile Application Programming	3	44053213	
44054195	Laboratory Mobile Application Programming	0		44054114
	University Core Requirement	3		
	University Core Requirement	3		
Total		15		

Second Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
42054204	Cloud Computing Systems	3	44043101	
44054210	Field Training on MC	3	Complete 80 CH	
44054211	Applied Graduation Project	3	Complete 90 CH	
	University Elective Requirement	3		
	Program Elective Requirement	3		
Total		15		



Fifth Year				
First Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
Total				

Second Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
Total				



Description of Courses offered by the

Course Number	Course Title	Credit Hours	(Prerequisite)
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4201107 Introduction to Programming (C++) 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite:

This course presents the fundamental concepts of programming using C++. It covers basic structures of programming concepts such as variables, data types, control structures, arrays, functions and pointers. A brief introduction to classes and objects is also given. Students will apply their gained knowledge in a series of assignments. Practical work for three hours weekly is included, the course includes complete a practical project or research by the students.

4201199 Laboratory of Introduction to Programming (C++) 0 Credit Hours, Lecture: 0, Lab: 3, Corequisite: 4201107

Applying of the theoretical part of the course.

4204108 Fundamentals of Information Technology 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite:

This course covers the knowledge of the terminology, information systems environment, processes, and components associated with information technology, information Systems concepts, components, tools, and applications. It will provide an introductory understanding of computer hardware, numbering system and knowledge of how data is prepared for computer, instruction processed at a basic machine level, and software (operating systems, database, and web development and applications). It also introduces the networking, Internet, and the basics of the information security, web searching, in addition to algorithms and problem solving, the course includes complete a practical project or research by the students.

42021201 Object Oriented Programming 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 4201107

This course introduces the object-oriented concepts (encapsulation, data abstraction, inheritance, and polymorphism) along with OO design using UML (unified modeling language). The OOP concepts covered using C++ programming language. The course emphasizes on the concepts of classes, templates, friend classes, inheritance, abstract class and virtual functions, exceptions, and generic programming. Upon completion, students should be

able to use an object-oriented language to develop rather complex programs, the course includes complete a practical project or research by the students.

42021298 Laboratory of Object Oriented Programming 0 Credit Hours, Lecture: 0, Lab: 3, Corequisite: 42021201

Applying of the theoretical part of the course.

42042201 Databases 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42041108

This course describes the basic concepts of databases, the main topics are database definition, database system; overview of database management, database system architecture, introduction to relational model, database algebra, database design, database integrity, an introduction to structured query language (SQL), mapping between ER- and EER-to-Relational, the course includes complete a practical project or research by the students.

42011204 Discrete Mathematics 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: Principles of Mathematics and Statistics

The course provides some fundamental aspects of discrete mathematics used in computer science starting with propositions, logical operations, truth tables, set theory, relations and functions, and methods of proofs. The course also introduces the concepts of sequences, matrices, lattices, graph theory, and trees (rooted tree, subtree) , the course includes complete a practical project or research by the students.

42012105 Data Structures 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42021201

This course teaches the students the basic concepts of data structure and algorithm. The topics that will be covered in this course concerning Data type and structures; Abstract data types and encapsulation; Stacks; Queues; Recursion; Linked Lists; Binary trees; General trees; File organization: sequential and indexed files; Graphs: representation, traversing, shortest path; Sorting: exchange, insertion, quick sort, heap and others; Searching. At the end of this course, students will be able to select the proper data structure and algorithm to solve a specific software problem, the course includes complete a practical project or research by the students.

42043214 Websites Design 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42041108



This course introduces the basic concepts of the World Wide Web, internet technology, current Web protocols, and client-server programming for desktop computers and smart phones. Students will learn standard Hypertext Markup Language (HTML) for create the web pages, basics of Cascading Style Sheets (CSS) for design and layout the web pages, as well as JavaScript, together with XML and JSON for data-interchange and Ajax technology for building rich internet applications for desktop computers and smart phones. Students will apply their gained knowledge in a series of practical assignments. At the end of this course, students will create and maintain a small web page project on a live web server for desktop computers and mobile devices.

44051210 Introduction to Mobile Computing 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite:

This course introduces the Concepts of Mobile Computing; Mobile Application Development, Mobile Computing from the perspectives of Mobile Technologies, Applications Development, Infrastructures and Wireless Networks, and User Interaction; (iii) Basic concepts of Distributed Database Systems; and (iv) Basic concepts of Cloud Computing; Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), and Infrastructure-as-a-Service (IaaS) , the course includes complete a practical project or research by the students.

44052111 Computer Graphic 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42021201

This course discuss a basic principles and techniques for computer graphics. Students will gain experience in interactive computer graphics using the OpenGL API. Topics include 2D and 3D viewing, perspective, lighting, and geometry. This course will introduce students to all aspects of computer graphics including hardware, software and applications. Students will gain experience using a graphics application-programming interface (OpenGL) by completing several programming projects, the course includes complete a practical project or research by the students.

42022102 Visual Programming 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42021201

This course is an introduction to visual programming (VP). Student will learn about VP concepts, event driven, and how to use VP to construct graphical user interface using Visual Basic.NET (VB.NET). This course covers an introduction to programming concepts and methods including the problem analysis and problem-solving techniques. Also, Data types, control structures, functions, syntax and semantics of the language, classes, class relationships, and exception handling will be covered. Connect to database could be covered, the course includes complete a practical project or research by the students.

**42022192 Laboratory of Visual Programming 0 Credit Hours, Lecture: 0, Lab: 3, Corequisite: 42022102**

Applying of the theoretical part of the course.

42052103 Systems Analysis and Design 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42042201

This course introduces the main concepts of the system development life cycle. Information gathering and reporting activities from the analysis phase through the maintenance and support phase will be covered. At the end of this course, students will be able to design, implement, and document the system development cycle. The main topics that will be covered are: introduction to systems development; development life cycle; system development feasibility; development of fact finding methods; context diagram; data flow diagram; decision tables and trees; data dictionary; installation; training; development tools: documentation, maintenance, conceptual design, DB design, reverse engineering, graphical user interface, systems life cycle, system conversion, system charts and flow of control. Case studies are used to emphasize the points covered, the course includes complete a practical project or research by the students.

42012206 Algorithms Design and Analysis 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42012105

This course introduces the concepts of designing and analyzing algorithms. Topics covered: review of abstract data types and data structures, definition of algorithms, classifying functions and computational complexities of algorithms, algorithms analysis & design techniques including: divide and conquer greedy methods, searching and sorting, trees, graphs, hashing, combinatorial algorithms and P/NP problems, the course includes complete a practical project or research by the students.

44034102 Mobile Operating Systems 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42012105

This course covers the definition and role of the operating systems for mobile devices. Topics spanned functionality and structuring methods of a typical operating system especially for mobile devices; Introduction to modern operating systems for mobile devices, including device control, interrupts, synchronization and inter-process communication, process scheduling, memory management and virtual memory, disk management, and security. Students will apply their gained knowledge in a series of assignments, the course includes complete a practical project or research by the students.

**42022204 Java Programming 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42021201**

This course covers the fundamental of JAVA language, in addition to the ideas behind the object-oriented approach to programming through the widely used Java programming language. This course will cover Java programming language syntax, OO programming using Java (inheritance, abstract class, and interface), compound classes, exception handling, file input/output, threads, and networking. Students will develop Java applications using Eclipse. At the end of this course, students should be able to develop small applications using Java and can solve real problems, the course includes complete a practical project or research by the students.

42022295 Laboratory of Java Programming 0 Credit Hours, Lecture: 0, Lab: 3, Corequisite: 42022204

Applying of the theoretical part of the course.

42044202 Database Management Systems 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42042201

This course covers the principles, design, implementation, architecture and applications of DBMS; Advanced Structured Query Language (SQL) such as: views, exit, with, create type, authorization, metadata, dynamic SQL, triggers, recursion; data dictionary; Normalization processes: 1NF, 2NF, 3NF and BCNF; DB Security; Modern DBMSs: Object-Oriented DBMSs; Physical Database design; Centralized and distributed Database systems. Advanced databases topics: Storage and File Structure, Indexing and Hashing, Transactions, Concurrency Control, and UML, the course includes complete a practical project or research by the students.

42042217 Programming of Internet Applications 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42043214 + 42042201

This course provides the knowledge and the tools to design and implement internet web applications for desktop computers and smart phones using PHP language as a server-side language. Initially, the course will introduce HTML language and web applications. Students will learn about concepts of PHP, functionality of web server, install and configure Apache HTTP server or Microsoft IIS. This course goes over the syntax and usage of PHP language such as data types, operators, arrays, control statements, expressions, sessions, cookies, as well as create programs that interact with MySQL databases. At the end of this course, students will create and maintain a small web application project on a live web server for desktop computers and smart phones, the course includes complete a practical project or research by the students.

**44054103 Mobile Devices Modeling and Simulation Methods****(3 Credit Hours, Lecture: 3, Lab: 0, Corequisite: 42012206)**

This course explores the simulation techniques that can be used to simulate/emulate mobile devices. For example, commercial iOS simulators (e.g. Electric Mobile Studio, Electric Mobile Simulator Lite, etc.) can be used to test iPad and iPhone browsing experience on a PC, the course includes complete a practical project or research by the students.

43053110 Human Computer Interaction 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42022102

This course explores the following topics as an introduction to the subject of Human-Computer Interaction (i) Specifying, Designing, Programming, and Implementing Graphical User Interfaces, Human-Centered Software Evaluation, Human-Centered Software Development; (ii) HCI Aspects of Multimedia Systems and Web-based Systems. The focus will be on (i) Understanding Human Behavior with Interactive Objects; (ii) Knowing how to develop and evaluate interactive software using a Human-Centered Approach; (iii) General Knowledge of HCI Design Issues with multiple types of interactive software, the course includes complete a practical project or research by the students.

44043103 Mobile Software Engineering 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42052103

This course focuses on software engineering using Android and Java. Students will learn: basic Java programming skills, Android operating system, Android application development, and strong software engineering practices . Students will learn how to read, obtain, and generate documentation. Moreover, students will learn good code testing strategies, the course includes complete a practical project or research by the students.

42044111 Distributed Databases 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42044202

This course will deal with the fundamental issues in large distributed systems which are motivated by the computer networking and distribution of processors, and control. The theory, design, specification, implementation, and performance large systems will be discussed. Concurrency, Consistency, Integrity, Reliability, Privacy, and Security in distributed systems will be included. A special feature of the course includes interesting problems in Mobile Ad-hoc networks that can benefit from research ideas in distributed systems. Research related to Mobile Computing, Streaming databases, Video conferencing, Peer to Peer systems will be covered, the course includes complete a practical project or research by the students.

**42044106 Information Systems Security 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42042217**

This course describes the basic concepts, which underpin the technology of data security systems. The main areas covered are public key cryptography, digital signatures, Identification and authentication, secret sharing keys. A comparison between the manual signatures and the electronic signatures are given. Also the Security of the email and Web security will be discussed. The Integrity and security of messages are very important topics and also will be explained and discussed in this Course. The malware software such as: Virus, Worms, Logical Bomb will be explained and discussed. This Course will discuss also Triggers and their actions, Firewalls and their configurations according to their types, the course includes complete a practical project or research by the students.

44043101 Computer Networks 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42012206

This course explores Key Concepts of Computer Networks; Broad Range of Topics in Networking (e.g. Networks Applications, Network Classifications and Topologies, Network Layers, Channel Performance Measures, Transmission Media, Communication Network Protocols and Architecture); Data Link Layer (e.g. Framing, Error Detection and Correction, CSMA/CD, LAN IEEE Standards); Network Layer (e.g. IP service model, IP Addressing, Sub-netting, Host Configuration DHCP, ARP Protocol, ICMP protocol); Transport Layer (e.g. UDP Protocol, TCP Protocol, TCP Reliable Transfer and Sliding Window, TCP Flow and Congestion Control); Application Layer (e.g. DNS Protocol, NAT Protocol, HTTP Protocol, Persistent and Non-Persistent HTTP Connection) , the course includes complete a practical project or research by the students.

44053213 Introduction to Mobile Applications 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42022204

This course will help student to create mobile apps that work across multiple platforms. Students will use PhoneGap to leverage existing HTML, JavaScript and CSS skills in order to create and deploy cross-platform mobile applications. This course will comprehensively cover HTML5 mobile app development from top to bottom. Students will learn how to use web services (like Google APIs), parse XML and JSON content, store data on the device, create apps that work offline, integrate audio and video and control media playback, use geolocation services and Google Maps, work with the device accelerometer hardware, use jQuery Mobile controls and styling, use a device's internal storage system, the course includes complete a practical project or research by the students.

42054207 Communication and Writing Skills 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite:

This course aims to introduce the student to the concept of administrative communication and to develop some of the skills he needs in his private life and career, in addition to his definition of the basic concepts of communication as a core and vital in the life of business organizations. To achieve this, the course will deal with the following topics: the nature, importance and objectives of the communication process, trends, elements and channels of



communication, obstacles to effective communication, the basis of successful correspondence writing. In addition to the recognition of listening skills and teamwork and the management of meetings and interviews, the course includes complete a practical project or research by the students.

44024104 Network Programming 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 44043101

This course focuses on transforming students into a Network Programmers. The students will learn how to design, develop and troubleshoot network applications using socket programming. Also, they will learn how clients and servers communicate with each other using socket programming. Covered topics include TCP/IP Protocol Stacks, Network Programming, Sockets, Port Numbers, Protocol Numbers, Domain Socket, Socket Functions, Socket System Calls, Client-Side Programming, Server-Side Programming, and Socket Debugging Techniques, the course includes complete a practical project or research by the students.

44044194 Laboratory of Network Programming 0 Credit Hours, Lecture: 0, Lab: 3, Corequisite: 44024104

Applying of the theoretical part of the course.

44054112 Programming Games for Smart Devices 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 44053213

This Course will help students to discover the motivational framework game designers use to segment and engage consumers. It will guide student to understand core game mechanics such as points, badges, levels, challenges, and leaderboards. Students will learn how consumers will engage with reward structures, positive reinforcement, and feedback loops. This course combines game mechanics with social interaction for activities such as collecting, gifting, heroism, and status. In addition, student will dive into case studies on Nike and Yahoo!, and analyze interactions at Google, Facebook, and Zynga. They will get the architecture and code to gamify a basic consumer site, and learn how to use mainstream gamification APIs from Badgeville, the course includes complete a practical project or research by the students.

44054114 Programming Applications for Mobile Devices 3 Credit Hours, Lecture: 3, Lab: 0, Corequisite: 44053213

This Course will cover the programming and development principles for device that work using iOS system by using Swift programming language. This course will help student to lean and explore the more advanced capabilities of the mobile web, including markup, Table View, Split View, Collection View Popovers advanced styling techniques, Storyboard and mobile Ajax. In addition, Student will learn more about the using database and



Background Processing. Furthermore, this course will cover how to use Map Kit, XML and JSON, the course includes complete a practical project or research by the students.

44054195 Laboratory of Programming Applications for Mobile Devices 0 Credit Hours, Lecture: 0, Lab: 3, Corequisite: 44054114

Applying of the theoretical part of the course.

44053204 Cloud Computing Systems 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 44043101

This course will cover set of Mobile computing techniques and technology. It focusses on how cloud computing cloud be used and adapted to serve smart mobile technology. In the course student will get knowledge about the main three cloud service models which are: (1) Infrastructure as a Service (2) Platform as a Service and (3) Software as a Service. Besides, student will learn more about cloud applications such as Google Cloud, Amazon, Azure Microsoft and SalesForece.com, the course includes complete a practical project or research by the students.

44054210 Field Training on MC 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: Complete 80 Credit Hours

Training is required for each student in one of organizations for not less than 6 weeks and 90 hours of training, the practice regulations are according to the training regulations issued and approved by the department, collage and dean's council of the university, the course includes complete a practical project or research by the students.

44054211 Applied Graduation Project 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: Complete 90 Credit Hours

Project includes theoretical and practical aspects related to the current problems and applications in MC, applied research oriented, technical report, and presentation.

42043108 Geographic Information Systems (GIS) 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42042217

This course introduces and overview of Geographic Information System (GIS), Concepts and Components, Geodesy and Map Projections, Data Entry and Editing, Global Navigation Satellite Systems, Aerial and Satellite Images, Tables



and Relational Databases, Basic Spatial Analysis, Topics in Raster Analysis, Terrain Analysis, Interpolation and Spatial Estimation, Spatial Models, the course includes complete a practical project or research by the students.

42043205 Information Retrieval 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42044202

The course introduces the environment of information system and theories and methods for searching and retrieval of text and bibliographic information. Topics cover analysis of relevance and utility; Statistical and linguistic methods for automatic indexing and classification; Boolean and probabilistic approaches to indexing, query formulation, and output ranking; Filtering methods; Measures of retrieval effectiveness and retrieval experimentation methodology, the course includes complete a practical project or research by the students.

42043203 Data Warehouses 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42044202

This course is an introduction to IS environment, data warehouse design. Topics covered in this course is planning, requirements gathering for data warehousing, data warehouse architecture and design, dimensional model design for data warehousing, physical database design for data warehousing, extracting, transforming, and loading strategies. Issues in are discussed in a seminar format. The role of data warehouse in supporting Decision Support Systems (DSS) is also reviewed. At the end of this course, students will be able to develop data warehouse, and how to use OLAP and data mining with it, the course includes complete a practical project or research by the students.

42042210 Electronic Learning 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42041108

The main objective of this course is to provide students with the basic knowledge of eLearning and how to apply and evaluate it. It covers a range of topics including: introducing E-learning, learning theories and information interpretation, justifying E-Learning to top management, E-learning strategies, building and managing an E-learning infrastructure, content development, content delivery, tools needed to build an E-learning course, integrating E-learning and classroom learning, E-learning and distance learning, applications and case studies, future trends. The practical part of this course involves using a suitable e-learning tool such as Blackboard along with practical applications and study cases, the course includes complete a practical project or research by the students.

42042202 Business Intelligent 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42052103

The course aims to study business intelligence as a wide range of applications and technologies to collect, store, analyze, share and provide data access to help users in the enterprise make better management decisions. Learning principles and best practices will be learned for how data is used to support decision-making based on



facts. Emphasis will be placed on marketing applications. The personal information system, for example, helps analyze campaign returns, promotional returns, or social marketing tracking; in sales, sales analysis helps me. And in application areas such as CRM and e-commerce. The practical experience will be gained through the development of Project B (Case Study) with leading BP programs, the course includes complete a practical project or research by the students.

25041201 Decision Support Systems 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: Department Approval

Business users throughout many organizations need Decision Support Systems (DSS) and Business Intelligence (BI) for quick-and-easy access to information, to make timely and accurate decisions. DSS and BI refer to technologies and practices for the collection, integration, analysis and presentation of business information. The purpose of DSS is to support better business decision making. This module provides a foundation for teaching the subject of decision support systems (DSSs) from a cognitive processes and decision-making perspective. The content emphasizes managerial applications and the implication of decision support technologies on those issues. This course place strong emphasis on helping the student thoroughly understand the “support” aspect of a DSS. The coverage of decision making, and cognitive processes includes such topics as models of decision making, biases and heuristics, decision strategies, simulation, and discovery, the course includes complete a practical project or research by the students.

42041208 Information Systems Management Strategies 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42041108

This course explores the issues and approaches in managing the information systems function in organizations and how the IS function integrates, supports, enables various types of organizational capabilities. It takes a senior management perspective in exploring the acquisition, development and implementation of plans and policies to achieve efficient and effective information systems. The course addresses issues relating to defining the high-level IS infrastructure and the systems that support the operational, administrative and strategic needs of the organization. The remainder of the course is focused on developing an intellectual framework that will allow leaders of organizations to critically assess existing IS infrastructures and emerging technologies as well as how these enabling technologies might affect organizational strategy. The course aims to understand and provide an enduring perspective that can help leaders make sense of an increasingly globalized and technology intensive business environment, the course includes complete a practical project or research by the students.

**42043109 Data Analysis 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42044202**

Data analysis is a method in which data is collected and organized so that one can derive helpful information from it. This course describes the process of analyzing data and how to manage that process, describe the iterative nature of data analysis and the role of stating a sharp question, exploratory data analysis, inference, formal statistical modeling, interpretation, and communication. In addition, the course describes how to direct analytic activities within a team and to drive the data analysis process towards coherent and useful results, the course includes complete a practical project or research by the students.

42043110 Big and Open Data 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42044202

This course aims to give students an overview of big and open data as well as the state and practice of big and open data analytics. Cutting edge techniques will be taught which will enable businesses to sift through large quantities of data to discover patterns, relationships, associations, factors and clusters. Analyzing big data can reveal new insights for a business and its key decision makers that can have a significant impact on its performance, the course includes complete a practical project or research by the students.

42022206 Operations Research 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite:

This course focuses on the concept of operations research, the formulation of linear models and linear programming techniques, the graphical method and the simplified method, the bilateral model and transport problems and customization, business networks (critical path method and Bert) and game theory, the course includes complete a practical project or research by the students.

Internet of Things 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42041108

The course aims to introduce students to the concepts underlying the Internet of Things that are important to understand the state-of-the-art as well as the trends for IoT. The students will be introduced to the history and evolution of IoT, as well as technology and business drivers and the future of IoT. The course topics include, an overview of how M2M solutions move towards IoT; the market drivers and industrial structures; overview of the IoT architecture, including overall design principles behind the various architectures; the technology building block of M2M and IoT solutions and deployment; how different technologies fit together in overall architectures; design constraints when developing real-world technical solutions; applications of IoT: asset management, industrial automation, commercial building automation, smart cities, and participatory sensing, the course includes complete a practical project or research by the students.

44053203 User Experience for Smartphones 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42052103

This course aims to introduce students to a new perspective in designing concept related to Mobile User Experience (UX); the course presents the most commonly used archetypes in the UX arena to help illustrate what mobile UX is and how the student can master it as quickly as possible to design the best websites and apps for mobile devices and tablets, since this course will be conducted in a mix of theory and practice, as it is built on establishing the ideas from the UX discipline; including understanding the device itself to design thinking and prototyping for the mobile experience, it will equip students with the skills; addressing the gap theoretical concepts and the practical application of mobile user experience design, and explaining the differences in touch gestures, user interface elements, and usage patterns across the most common mobile platforms, the course includes complete a practical project or research by the students.

42043115 Web Software Tools and Techniques 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42043214

This course introduces students to new and web innovative technologies and systems that reengineer both internal business processes related to customers, suppliers, and business partners, developing innovative ways for new business opportunities, investigates the technologies, methods and practices of developing new innovations such as online communities. The course includes several topics including: globalization, processes of IS innovation, strategic importance of the Web as a platform, Web 2.0 tools, information organization, virtual teams, economics of digital goods and services, search space, knowledge management, and future trends.

44053211 Multimedia Applications for Smart Devices 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42021201

This course will explain the technologies underlying digital images, videos and audio contents, including various compression techniques and standards, and the issues to deliver multimedia content for smart devices over the Internet. The objective of this course is to provide concept about an application, which uses a collection of multiple media sources e.g. text, graphics, images, audio, animation and video. Students will learn about mobile multimedia, which contains integration of text, graphics, drawings, still and moving images (Video), animation, audio, and any other media where every type of information can be represented, stored, transmitted and processed digitally, the course includes complete a practical project or research by the students.

42043211 Electronic Business and Commerce 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42042217

This course includes the fundamentals of e-business and e-commerce in terms of concept, elements, importance and functions, and its different models, both in the public sector, such as e-government or the private sector. It also includes the applications of government administration applications, challenges, opportunities and

determinants of application in the local environment, knowledge of e-business strategies, e-commerce e-marketing, e-learning and basic components of e-business management. In addition to the study of leading models in e-commerce and the privacy and security of electronic business, the course includes complete a practical project or research by the students.

42014211 Artificial Intelligence 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42012206

This course introduces the basic principles of artificial intelligence and its fields. It shows how to build a software system that behaves intelligently. Topics concerning introduction to AI and application, exhaustive search methods, heuristic search methods, the basic knowledge representation, problem solving, and learning methods of artificial intelligence will be covered. At the end of this course, students should be able to understand the role of knowledge representation, problem solving, machine learning, and pattern recognition, the course includes complete a practical project or research by the students.

44044102 Network Management and Security 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 44043101

This course discusses analytical and practical capabilities for computer networks' design, deployment, management and security. Basic foundations of network management, the Simple Network Management Protocol in its different versions (SNMPv1, SNMPv2, and SNMPv3), Remote network Monitoring. In addition, it focuses on Telecommunications Management Network, management tools and statistics measurement, management applications including: configuration, performance, event correlation, security, reports and service levels, the course includes complete a practical project or research by the students.

42054204 Special Topics 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: Department Approval

This course intends to introduce special topics of current trends in information systems.

43042210 Social Engineering 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42041108

This Social Engineering course is intended to teach students how to identify the many forms of social engineering and its potential impacts. Upon completion of this course, students will be able to: (1) recognize the many forms of social engineering and its potential impacts, (2) Identify techniques used by social engineers, such as malicious email attachments and phishing attacks, and (3) understand how to establish validity of requests in order to perform daily business functions in light of the threat of social engineers, the course includes complete a practical project or research by the students.

**43042110 Social Networks 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42041108**

This course focuses on the use of internet-based social media programs. Students will learn the impact of social media on businesses and consumers around the world and practical examples of how businesses have successfully implemented these strategies, using the newest social media marketing tools. Moreover, students will learn best practices and develop the skills to connect business objectives with social media strategy, platforms and tactics. They will learn how to create and promote an online brand using social networks, the course includes complete a practical project or research by the students.

42011101 Principles of Mathematics and Statistics 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite:

This course contains introduction to functions, limits and continuity, derivatives and rules, techniques of differentiation. It also introduces also the science of statistics and statistical research methods, sampling and sample data collection and classification. It covers various topics in descriptive statistics, correlation and regression analysis, time series, index numbers, the course includes complete a practical project or research by the students.

42051205 Numerical Analysis 3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 42011101

This course introduces to the numerical analysis, and its primary objective is to develop the basic understanding of numerical algorithms and required skills to implement algorithms to solve mathematical problems, the course includes complete a practical project or research by the students.