جامعة عمان العربية
AMMAN ARAB UNIVERSITY

Faculty of Computer Science and Informatics

Computer Science and Information Systems Department

B.A Study Plan

Computer Science

2023/2024

Study Plan Credit hours (132)

Type of Program: **Blended/ Online**

Major Type: ☐ Humanities ■ Scientific/Technical ☐ Science Medical

Teaching Type	Percentage of study plan hours/number	Actual Ratio
Complete Online E-Learning	20% - 10% Maximum	20%
Blended learning (for humanities)	60% - 40% Maximum	
Blended learning (for scientific majors)	50% - 30% Maximum	44%
Face-to-face learning (for humanities)	20% Minimum	
Face-to-face learning (for scientific majors)	30% Minimum	36%

Note: The learning types of the courses are disseminated at all academic levels in the program

Department Vision

Excellence in teaching, learning, scientific research, and community service in computer science and information systems fields locally and regionally.

Department Mission

Preparing qualified students with competencies in computer science and information systems fields, having the applied and research knowledge and the skills to meet the requirements of the labor market and local community institutions according to quality criteria locally and internationally.

Program Mission

Preparing qualified student in the field of Computer Science that meet the needs of the labor market locally and regionally, capable of carrying out distinguished scientific and practical projects that contribute to the development of technical infrastructure and the promotion of the knowledge economy and the development and improvement of performance in local community institutions.

Educational Program Objectives

1. Possess the necessary theoretical and applied skills and knowledge in the field of Computer Science.
2. Provides professional competencies and practicing their profession with confidence and ability to compete locally and regionally.
3. Continue learning and professional development amid technical changes.
4. Work effectively within teams, bearing ethical and professional responsibilities, and know the needs of the community.

Educational Program Outcomes

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 Computer Science will demonstrate:

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

Plan Contents

The study plan for a bachelor's degree consists of a major in Computer Science Of (132) credit hours disseminated as follows:

Sequence	Classification	Credit Hours	Percent %
1st	University Requirements	27	20%
2nd	College Requirements	18	14%
3rd	Program Requirements	87	66%
Total		132	100%

Coding System Approved by the University

4	07			year	Semester		
College Code	Major Code	Knowledge domain		Course Level		Sequence	

Faculty of Computer Science and Informatics

01 Masters in Computer Science
02 Computer Information System
03 Software Engineering
04 Mobile Computing
05 Cybersecurity
06 Data Science and Artificial Intelligence
07 Computer Science

Knowledge Domain

Domain Code	Knowledge Domain	Credited Hours of Study Plan
01	**Computer Science and Algorithms:** Discrete mathematics, Data structures, Algorithms Design and Analysis.	9
02	**Programming:** Introduction to Programming, Object-oriented programming, Visual programming, Web Application Programming	12
03	**Main Computer Components:** Digital Logic Design, Computer Organization and Architecture, Operating Systems.	9
04	**Computer Science courses**: Computer Networks, Information Security, Fundamentals of Software Engineering, Databases, Systems Analysis and Design, Theory of Computation, Computer Organization and Architecture.	21
05	**Supporting Knowledge Areas:** Calculus (1), Numerical Analysis, Linear Algebra, Principles of statistics and probability.	12
06	**Elective courses:** Minimum 9 credit hours.	9
07	**Field training:** 3 hours after passing a minimum of 80 credit hours.	3
	Graduation Project 1: 1credit hours after passing 90 credit hours. **Graduation Project 2:** 2 credit hours after passing Graduation Project 1	3

First: University Requirements: (27) Credit Hours

A. Compulsory Requirements: (18)Credit Hours

Teaching type			Course Number	Course Title	Credited Hours	Pre-Requisite
Online E-Learning	Blended	Face-to-Face				
√			50511108	Remedial Course in Arabic	0	-
√			50511109	Remedial Course in English	0	-
√			50511110	Remedial Course in Computer Science	0	-
√			50511104	Communication Skills -Arabic Language (1)	3	50511108
√			50511105	Communication Skills English Language (1)	3	50511109
√			50511206	National Education	3	-
√			50511308	Military Sciences	3	-
√			50511305	Innovation and Entrepreneurship	3	-
√			50511205	Life Skills	3	-
			Total		18	

B. Elective Requirements: (9) Credit Hours from the following list:

Teaching type			Course Number	Course Title	Credited Hours	Pre-Requisite
Online E-Learning	Blended	Face-to-Face				
√			50541103	Computer Skills	3	50511110
√			50541309	Digital Culture	3	50511110
√			50521106	Communication Skills -Arabic Language (2)	3	50511104
√			50521107	Communication Skills English Language (2)	3	50511105
√			50521203	Principles of Psychology	3	–
√			50521204	Human Rights	3	–
√			50531101	Islamic Culture	3	–
√			50531205	Quds and Hashemite Custodianship	3	–
√			50541204	Environment and development	3	–

√			50541206	Health and Community	3	–
√			50541308	Foreign Language	3	–
			Total		9	

Second: College Compulsory Requirements: (18) Credit Hours

Teaching type			Course Number	Course Title	Credited Hours*	Theoretical	Practical	Pre-Requisite
Online E-Learning	Blended	Face-to-Face						
		√	40512102	Data Structures	3	3	0	40321203
		√	40512103	Laboratory of Data Structures	1	0	3	40512102 (co)
	√		40322101	Websites Design	3	3	0	40321101
		√	40342202	Databases	3	3	0	40512102
		√	40342203	Laboratory of Databases	1	0	3	40342202 (co)
	√		50212104	Linear Algebra (I)	3	3	0	50221101
		√	40321101	Introduction to Programming	3	3	0	
		√	40321102	Laboratory of Introduction to Programming	1	0	3	40321101 (co)
			Total		18	15	3	

* **Credit Hours**

Third: **Program Requirements** (84) Credit Hours

A. **Compulsory Requirements:** (75) Credit Hours

Teaching type			Course Number	Course Title	Credited Hours*	Theoretical	Practical	Pre-Requisite
Online E-Learning	Blended	Face-to-Face						
		√	40312101	Discrete Mathematics	3	3	0	50221101
	√		40571203	Communication and Writing Skills	2	2	0	
	√		40511101	Fundamentals of Information Technology	3	3	0	
		√	40612204	Algorithms Design and Analysis	3	3	0	40512102
		√	40321203	Object Oriented Programming	3	3	0	40321101
		√	40321204	Laboratory of Object Oriented Programming	1	0	3	40321203 (co)
	√		40513103	Operating Systems	3	3	0	40332202
	√		40744208	Information Security	3	3	0	50231101
	√		40342101	Systems Analysis and Design	3	3	0	40342202
	√		40332201	Digital Logic Design	3	3	0	40311201
	√		40332202	Computer Organization and Architecture	3	3	0	40332201
		√	40352201	Fundamentals of Software Engineering	3	3	0	40342202
		√	40322106	Visual Programming	3	3	0	40321203
		√	40622101	Advanced Programming	3	3	0	40321203
		√	40322202	Programming of Internet Applications	3	3	0	40322101+ 40342202(co)
		√	40332202	Computer Networks	3	3	0	40542101
		√	50551101	General Physics (1)	3	3	0	
		√	50551102	Laboratory of General Physics (1)	1	0	3	50551101 (co)
	√		50223121	Numerical Analysis	3	3	0	50221101
	√		40743101	Theory of Computation	3	3	0	40311201
	√		40632201	Artificial Intelligence	3	3	0	40612204
	√		50231101	Principle of Statistics and Probability	3	3	0	50221101
		√	40743201	Compiler Design	3	3	0	40743101
	√		40742105	Computer Ethics	2	2	0	40511101
		√	40744102	Parallel and Distributed Computer Systems	3	3	0	40511101
	√		40774101	Field Training of Computer Science	3	3	0	Complete 80 CH

	√		40784101	Applied Graduation Project (1)	1	1	0	Complete 90 CH
	√		40784201	Applied Graduation Project (2)	2	2	0	40784101
			Total		75	73	2	

*** Credit Hours**

Elective Requirements: (9) Credit Hours

Teaching type			Course Number	Course Title	Credited Hours*	Theoretical	Practical	Pre-Requisite
Online E-Learning	Blended	Face-to-Face						
	√		40763201	Special Topics In Computer Science	3	3	0	Complete 60 CH
	√		40764102	Mobile applications design and development	3	3	0	40322106
	√		40764202	Fundamentals of multimedia	3	3	0	40321203
	√		40764203	Network programming	3	3	0	40542101
	√		40764204	Digital image processing	3	3	0	40321203
	√		40764206	Network Security	3	3	0	40542101
			Total		9	9	0	

*** Credit Hours**

C. **Ancillary Courses** (3) Credit Hours:

Teaching type			Course Number	Course Title	Credited Hours*	Theoretical	Practical	Pre-Requisite
Online E-Learning	Blended	Face-to-Face						
	√		50221101	Calculus (1)	3	3	0	
			Total		3	3	0	

*** Credit Hours**

Guidance plan

First Year

First Semester					
Course No.	Course Title	Type of Learning	Credited Hours*	Prerequisite	Co-requisite
40511101	Fundamentals of Information Technology	Blended	3		
50551101	General Physics (I)	Face-to-Face	3		
50551102	Laboratory of General Physics (I)	Face-to-Face	1		50551101
40321101	Introduction to Programming	Face-to-Face	3		
40321102	Laboratory of Introduction to Programming	Face-to-Face	1		40321101
50221101	Calculus (I)	Blended	3		
	University Core Requirement	Online E-Learning	3		
Total			17		

Second Semester					
Course No.	Course Title	Type of Learning	Credited Hours*	Prerequisite	Co-requisite
40311201	Discrete Mathematics	Face-to-Face	3	50221101	
40321203	Object Oriented Programming	Face-to-Face	3	40321101	
40321204	Laboratory of Object Oriented Programming	Face-to-Face	1		40321203
40742105	Computer Ethics	Face-to-Face	2	40511101	
	University Core Requirement	Online E-Learning	3		
	University Elective Requirement	Online E-Learning	3		
Total			15		

* **Credit Hours**

Second Year

First Semester					
Course No.	Course Title	Type of Learning	Credited Hours*	Prerequisite	Co-requisite
40512102	Data Structures	Face-to-Face	3	40321203	
40512103	Laboratory of Data Structures	Face-to-Face	1		40512102
40322106	Visual Programming	Face-to-Face	3	40321203	
40332201	Digital Logic Design	Face-to-Face	3	40311201	
40322101	Websites Design	Face-to-Face	3	40321101	
	University Core Requirement	Online E-Learning	3		
Total			16		

Second Semester					
Course No.	Course Title	Type of Learning	Credited Hours*	Prerequisite	Co-requisite
40332202	Computer Organization and Architecture	Blended	3	40332201	
40342202	Databases	Face-to-Face	3	40512102	
40342203	Laboratory of Databases	Face-to-Face	1		40342202
40322202	Programming of Internet Applications	Face-to-Face	3	40322101	40342202
40571203	Communication and Writing Skills	Blended	2		
40622101	Advanced Programming	Face-to-Face	3	40321203	
50231101	Principle of Statistics and Probability	Blended	3	50221101	
Total			18		

* **Credit Hours**

Third Year

First Semester					
Course No.	Course Title	Type of Learning	Credited Hours*	Prerequisite	Co-requisite
40612204	Algorithms Design and Analysis	Face-to-Face	3	40512102	
50212104	Linear Algebra (1)	Blended	3	50221101	
40342101	Systems Analysis and Design	Face-to-Face	3	40342202	
40743101	Theory of Computation	Blended	3	40311201	
	University Core Requirement	Online E-Learning	3		
	University Elective Requirement	Online E-Learning	3		
Total			18		

Second Semester					
Course No.	Course Title	Type of Learning	Credited Hours*	Prerequisite	Co-requisite
50223121	Numerical Analysis	Blended	3	50221101	
40743201	Compiler Design	Face-to-Face	3	40743101	
40513103	Operating Systems	Face-to-Face	3	40332202	
40352201	Fundamentals of Software Engineering	Face-to-Face	3	40342202	
40542101	Computer Networks	Blended	3	40332202	
	Program Elective Requirement	Blended	3		
Total			18		

* **Credit Hours**

Fourth Year

First Semester					
Course No.	Course Title	Type of Learning	Credited Hours*	Prerequisite	Co-requisite
40632201	Artificial Intelligence	Blended	3	40612204	
40774101	Field Training of Computer Science	Blended	3	Complete 80 CH	
40784101	Applied Graduation Project (1)	Blended	1	Complete 90 CH	
	Program Elective Requirement	Blended	3		
	University Core Requirement	Online E-Learning	3		
Total			13		

Second Semester					
Course No.	Course Title	Type of Learning	Credited Hours*	Prerequisite	Co-requisite
40744208	Information Security	Blended	3	50231101	
40784201	Applied Graduation Project (2)	Blended	2	40784101	
40744102	Parallel and Distributed Computer Systems	Face-to-Face	3	40513103	
	Program Elective Requirement	Blended	3		
	University Elective Requirement	Online E-Learning	3		
	University Core Requirement	Online E-Learning	3		
Total			17		

* **Credit Hours**

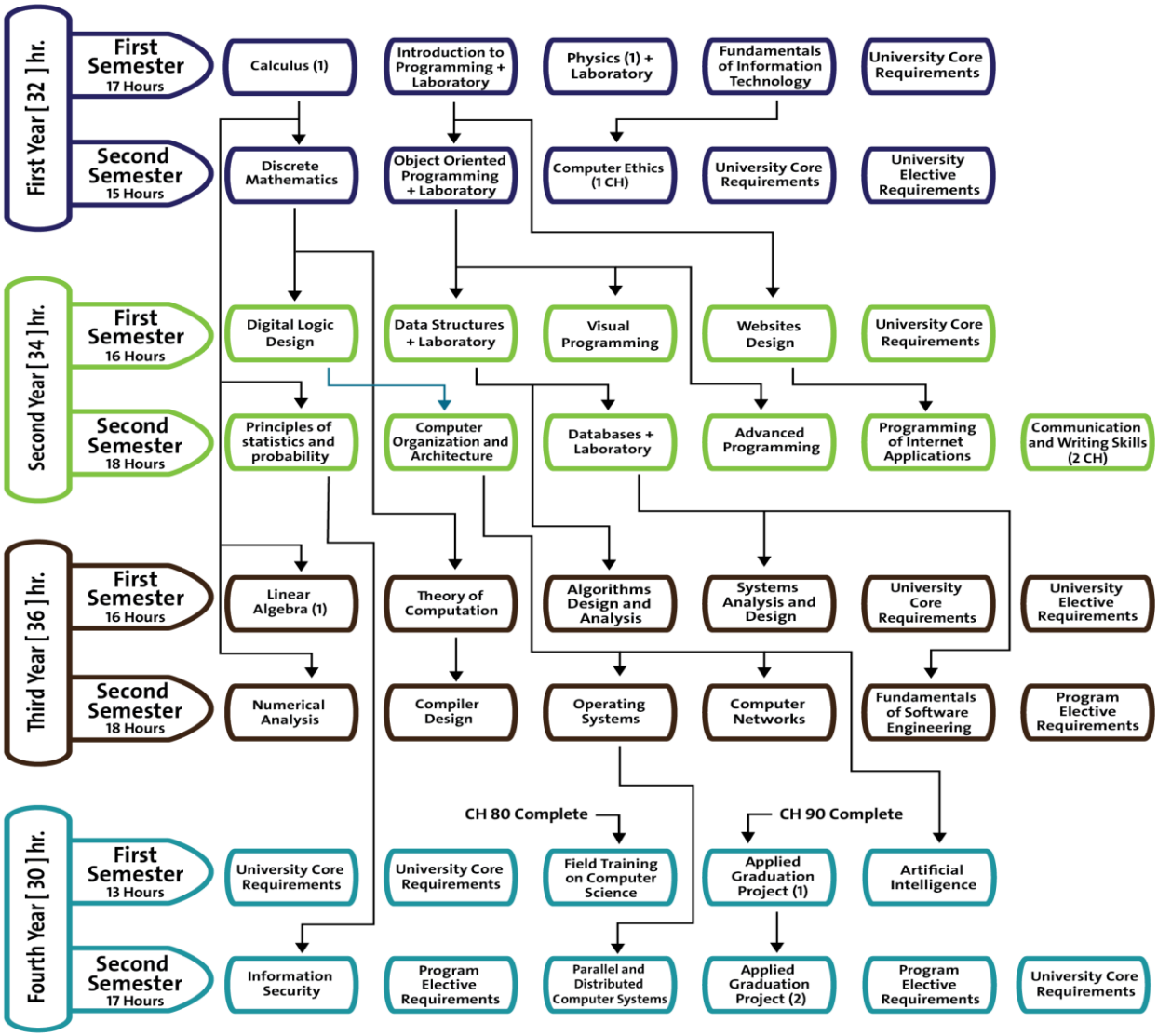
جامعة عمان العربية AMMAN ARAB UNIVERSITY

Faculty of Computer Sciences and Informatics
كلية العلوم الحاسوبية والمعلوماتية

Courses Tree

Faculty: Computer Science and Information **Department: Information Technology**

Major: : Computer Science **Program: Bachelor** **Issue Date: 2023/2024**



Course Description

40512102, Data Structures, (3) Credit Hours, Prerequisite: 40321203 Object Oriented Programming, Face-to-Face

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.

40512103, Laboratory of Data Structures, (1) Credit Hours, Corequisite: 40512102, Face-to-Face

A practical laboratory in data structures, covering practical exercises including abstract data types and encapsulation; Stacks; Queues; Recursion; Linked Lists; Binary trees, general trees, File organization, Graphs, Sorting and Searching. The course includes complete a practical project or research by the students.

40511101, Fundamentals of Information Technology, (3) Credit Hours, Prerequisite: -, Blended

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.

40342202, Databases, (3) Credit Hours, Prerequisite: 40512102 Fundamentals of Information Technology, Face-to-Face

Basic concepts of databases and the main topics such as: 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.

40342203, Laboratory of Database, (1) Credit Hours, Corequisite: 40342202, Face-to-Face

A practical laboratory in databases, covering practical exercises in database system and database management (relational database systems RDBMS, structured query language (SQL), and schema design techniques), the course includes complete a practical project or research by the students.

40311201, Discrete Mathematics, (3) Credit Hours, Prerequisite: 50221101 Calculus (1), Face-to-Face

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.

40322101, Websites Design, (3) Credit Hours, Prerequisite: 40321101 Fundamentals of Information Technology, Face-to-Face

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.

40321101, Introduction to Programming, (3) Credit Hours, Prerequisite: -, Face-to-Face

The fundamental concepts of programming using selected language. 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.

40321102, Laboratory of Introduction to Programming, (1) Credit Hours, Corequisite: 40321101,, Face-to-Face

A practical laboratory in programming using selected language, where it covers practical exercises in the basics of programming such as variables, data types, control statements, matrices, functions and indicators. In this course, students apply their knowledge through a series of practical assignments in the laboratory.

40322106, Visual Programming, (3) Credit Hours, Prerequisite: 40321203, Object Oriented Programming, Face-to-Face

Fundamental concepts of 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 (C#.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.

40352201, Fundamentals of Software Engineering, (3) Credit Hours, Prerequisite: 40342202 Systems Analysis and Design, Face-to-Face

Knowledge of the Information Systems environment and develops strong foundation by covering topics including: Planning, requirements, analysis and specification, design; testing; debugging; maintenance; and documentation, the course includes complete a practical project or research by the students.

40322202, Programming of Internet Applications, (3) Credit Hours, Prerequisite: 40322101 Websites Design + 40342202 Databases, Face-to-Face

The knowledge and the tools to design and implement internet web applications for desktop computers and smartphones 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 smartphones. The course includes complete a practical project or research by the students.

40332201, Digital Logic Design, (3) Credit Hours, Prerequisite: 40312101 Discrete Mathematics, Face-to-Face

Introductory knowledge and basic concept to Boolean logic and combinational circuits. Analysis of switching devices, minimization techniques, number systems and codes and logic design of functional digital units are also included. Furthermore, the use of LSI in logic design, an introduction to sequential circuits design of synchronous, asynchronous, and pulse sequential circuits, minimization of sequential circuits and state assignment are involved, the course includes complete a practical project or research by the students.

40332202, Computer Organization and Architecture, (3) Credit Hours, Prerequisite: 40332201 Digital Logic Design, Blended

Principles of computer organization and architecture concepts covers the following topics: computer system hardware organization and architecture; instruction set architectures; addressing modes; register transfer notation; processor design and computer arithmetic; memory systems; hardware implementations of virtual memory, and input/output control and devices, the course includes complete a practical project or research by the students.

40542101, Computer Networks, (3) Credit Hours, Prerequisite: 40332202 Fundamentals of Information Technology, Blended

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.

40571203, Communication and Writing Skills, (2) Credit Hours, Prerequisite: -, Blended

Concepts 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.

40342101, Systems Analysis and Design, (3) Credit Hours, Prerequisite: 40342202 Databases, Face-to-Face

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.

50221101, Calculus (1), (3) Credit Hours, Prerequisite: -, Blended

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.

50212104, Linear Algebra (1), (3) Credit Hours, Prerequisite: 50221101 Calculus (1), Blended

Matrices and matrix operations, transpose and inverse of a matrix, determinants and their properties, vector spaces and subspaces, linearly independent and linearly dependent, row space and column space, null space of a matrix, inner product space, system of linear equations, methods of solving system of linear equations.

50223121, Numerical Analysis, (3) Credit Hours, Prerequisite: 50221101 Calculus (1), Blended

Introduction 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.

50231101, Principle of Statistics and Probability, (3) Credit Hours, Prerequisite: 50221101-, Blended

Describing Statistical Data by tables, graphs and numerical Measures, Measures of Central Tendency and Deviation, counting methods, The Variance, binomial and Normal distribution, probabilities Laws, Random Variables, Sampling distributions, testing of statistical hypotheses for two populations, correlation and regression, correlation coefficient.

(50551101), General Physics (1), (3) Credit Hours, Prerequisite: (Non): Face-to-Face

Motion in One Dimension, Vectors, Motion in Two Dimensions, The Laws of Motion, Circular Motion and Other applications of Newton's Laws, Work and Kinetic Energy, Potential Energy and Conservation of Energy, Linear Momentum and Collisions, Rotation of a Rigid Object About a Fixed Axis, Rolling Motion and Angular Momentum.

(50551102), General Physics laboratory (1), (3) Credit Hours, Prerequisite: 50551101 (Co)
A practical laboratory in The Laws of Motion, Circular Motion and Other applications of Newton's Laws, Work and Kinetic Energy, Potential Energy and Conservation of Energy, Linear Momentum and Collisions, Rotation of a Rigid Object About a Fixed Axis, Rolling Motion and Angular Momentum.

40321203, Object Oriented Programming, (3) Credit Hours, Prerequisite: 40421108 Introduction to Programming, Face-to-Face
Object-oriented concepts (encapsulation, data abstraction, inheritance, and polymorphism) along with OO design using UML (unified modeling language). The OOP concepts covered using JAVA 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.

40321204, Laboratory of Object Oriented Programming, (1) Credit Hours, Corequisite: 40321203 (Co), Face-to-Face
A practical laboratory in object-oriented programming, covering practical exercises in object-oriented programming (encapsulation, data abstraction, inheritance, polymorphism). The course is concerned with applying concepts of classes (classes and templates, friendly classes, inheritance, abstract layer and virtual functions, exceptions and general programming in a practical way). Students will apply their knowledge through a series of practical assignments in the laboratory.

40612204, Algorithms Design and Analysis, (3) Credit Hours, Prerequisite: 40512102 Data Structures, Face-to-Face
Basic 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.

40744208, Information Security, (3) Credit Hours, Prerequisite: 50231101 probability and statistic , Blended
Information systems security and contemporary issues in information security and confidentiality problems, confidentiality models, methods to reduce risks and losses, information systems security within organizations, cryptography, information security control, information security programs, safe and reliable systems, user identification, network security case study. As you search on computer virus topics and methods of prevention, the course includes the implementation of an applied project or research by students.

40744202, Parallel and Distributed Computer Systems, (3) Credit Hours, Prerequisite: 40513103 Operating Systems, Face-to-Face
The principles and techniques of designing, implementing, and utilizing parallel and distributed computing systems. Students will learn about parallel architectures, algorithms, programming models, distributed systems, and interprocess communication. The course emphasizes topics such as synchronization, load balancing, fault tolerance, and distributed file systems. Through practical assignments and projects, students will gain hands-on

experience in programming and analyzing parallel and distributed algorithms, as well as exploring real-world applications and emerging trends in the field. By the end of the course, students will be equipped with the necessary knowledge and skills to develop efficient and scalable solutions for computationally intensive and large-scale problems in diverse domains.

40743101, Theory of Computation, (3) Credit Hours, Prerequisite: 40311201 Algorithms Design and Analysis, Blended

The purpose of this course is to provide an overview of fundamental ideas in computation theory. It will cover various topics including automata theory, deterministic and nondeterministic finite automata, regular expressions, properties of regular languages, context-free grammars, properties of context-free languages, pushdown automata, an introduction to Turing machines, as well as undesirability and intractable problems.

40743201, Compiler Design, (3) Credit Hours, Prerequisite: 40743101 Theory of Computation, Face-to-Face

The principles and techniques of designing and implementing compilers. In this course, students will gain a comprehensive understanding of the techniques and concepts used in various stages of the compilation process. The course covers topics such as lexical analysis, syntax analysis, both top-down and bottom-up parsing, semantic analysis, the synthesis stage of compilation, storage allocation, and code generation.

40742105, Computer Ethics, (1) Credit Hours, Prerequisite: 40511101 Fundamentals of information Technology, Face-to-Face

In this course, students will be introduced to the subject of ethics in information technology, which encompasses a range of topics. These include defining computer ethics, understanding rules and policies, exploring concepts such as hacking and viruses, delving into the realm of Internet ethics, examining issues related to freedom of expression on the Internet, considering the social responsibilities of computer professionals, exploring software copyright and intellectual property, discussing software piracy, analyzing cyber law, and addressing the important aspects of privacy and security in the realm of computerized information.

40513103, Operating System, (3) Credit Hours, Prerequisite: 40332202 computer organization and archecture, Face-to-Face

The definition and role of the operating systems. Topics spanned functionality and structuring methods of a typical operating system; Introduction to modern operating systems, including device control, interrupts, synchronization and inter-process communication, process scheduling, memory management and virtual memory, disk management, and security. The course includes complete a practical project or research by the students.

40632201, Artificial Intelligence, (3) Credit Hours, Prerequisite: 40612204 analysis and design algorithm, Blended

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.

40774101, Field Training of Computer Science, (3) Credit Hours, Prerequisite: Complete 80 Credit Hours, Blended

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

40784101, Applied Graduation Project (1), (1) Credit Hours, Prerequisite: Complete 90 Credit Hours, Blended

Project includes theoretical and practical aspects related to the design and analysis of recent applications in Computer Science, applied research-oriented, technical report, and presentation.

40784201, Applied Graduation Project (2), (2) Credit Hours, Prerequisite: Applied Graduation Project (1) 40784101, Blended

Project includes theoretical and practical aspects related to the implementation and visualization of recent applications in Computer Science, applied research-oriented, technical report, and presentation.

40763201, Special Topics in In Computer Science, (3) Credit Hours, Prerequisite: Complete 60 CH, Blended

Special topics of current trends in Computer Science, the course includes complete a practical project or research by the students.

40764203, Network Security, (3) Credit Hours, Prerequisite: 40542101 Computer Networks, Blended

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.

40764102, Mobile applications design and development, (3) Credit Hours, Prerequisite: 40322106, Visual Programming, Blended

The knowledge and skills required to create mobile applications for various platforms. Students will learn about topics such as mobile user interface design, app development frameworks (including iOS and Android), app architecture, data storage and synchronization, app security, and performance optimization. The course emphasizes designing user-friendly interfaces, utilizing popular development frameworks, implementing effective data storage and synchronization methods, and ensuring app security through secure data transmission and authentication. Students will also explore techniques for optimizing app performance by considering factors like memory usage, battery consumption, and network efficiency. Through practical projects and assignments, students will gain hands-on experience in developing mobile applications that adhere to best practices and industry standards.

40764202, Fundamentals of multimedia, (3) Credit Hours, Lecture: 3, Prerequisite: 40321203 Object Oriented Programming, Blended

The principles and techniques involved in multimedia systems and applications. Topics covered include multimedia data representation, compression algorithms, coding standards, networking, synchronization, and applications. Students will explore various multimedia data formats, such as images, audio, and video, and learn about compression techniques to efficiently store and transmit multimedia content. The course also addresses multimedia coding standards and protocols, enabling students to understand industry practices and standards. Through practical assignments and projects, students will gain hands-on experience in developing multimedia applications and applying techniques like data processing, compression, and networking. By the end of the course, students will have a solid understanding of multimedia fundamentals and the ability to design and develop multimedia systems and applications.

40764204, Digital image processing, (3) Credit Hours, Lecture: 3, Prerequisite: 40321203 Object Oriented Programming, Blended

This course introduces fundamental principles in digital image processing. It covers a range of topics, including image formation through sampling and quantization, various types of image resolution (spatial, grayscale, and color), and techniques for enhancing images in the spatial domain. Spatial domain enhancement covers point-to-point enhancement methods such as stretching, slicing, and thresholding, as well as area-to-point enhancement methods like smoothing, sharpening, and noise reduction. The course also explores enhancement techniques in the frequency domain, including sharpening and smoothing using the Fast Fourier Transform (FFT) theory in both one and two dimensions, in both continuous and discrete forms. Other topics covered include image restoration, image analysis, line detection, edge detection, segmentation techniques such as thresholding, splitting and merging, and region growing. Additionally, the course introduces image encoding methods such as Huffman and Run-length encoding.