

University of Aleppo

Faculty of Informatics Engineering



Modules Description of Courses in the Faculty of Informatics Engineering Departments

According to internal List issued by Ministerial Resolution No. /73/ date 26th Sep. 2006

HoD	HoD	HoD	HoD
Basic Science Department	Software Engineering and Information Systems Department	Systems and Computer Networks Department	artificial intelligence and natural languages Department

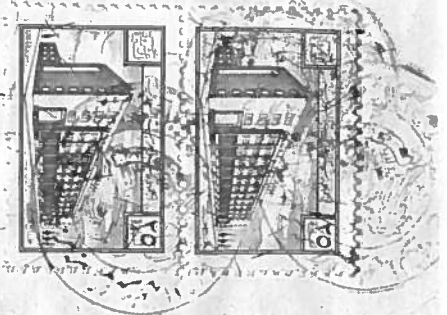
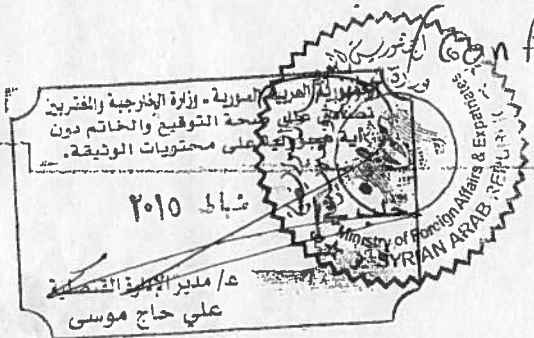
Vice Dean for Academic Affairs

Dean of Informatics Engineering Faculty

Najjar
Dr. Yahya Najjar

Khawatmi
Dr. Souheil Khawatmi

Confirmed by the dean



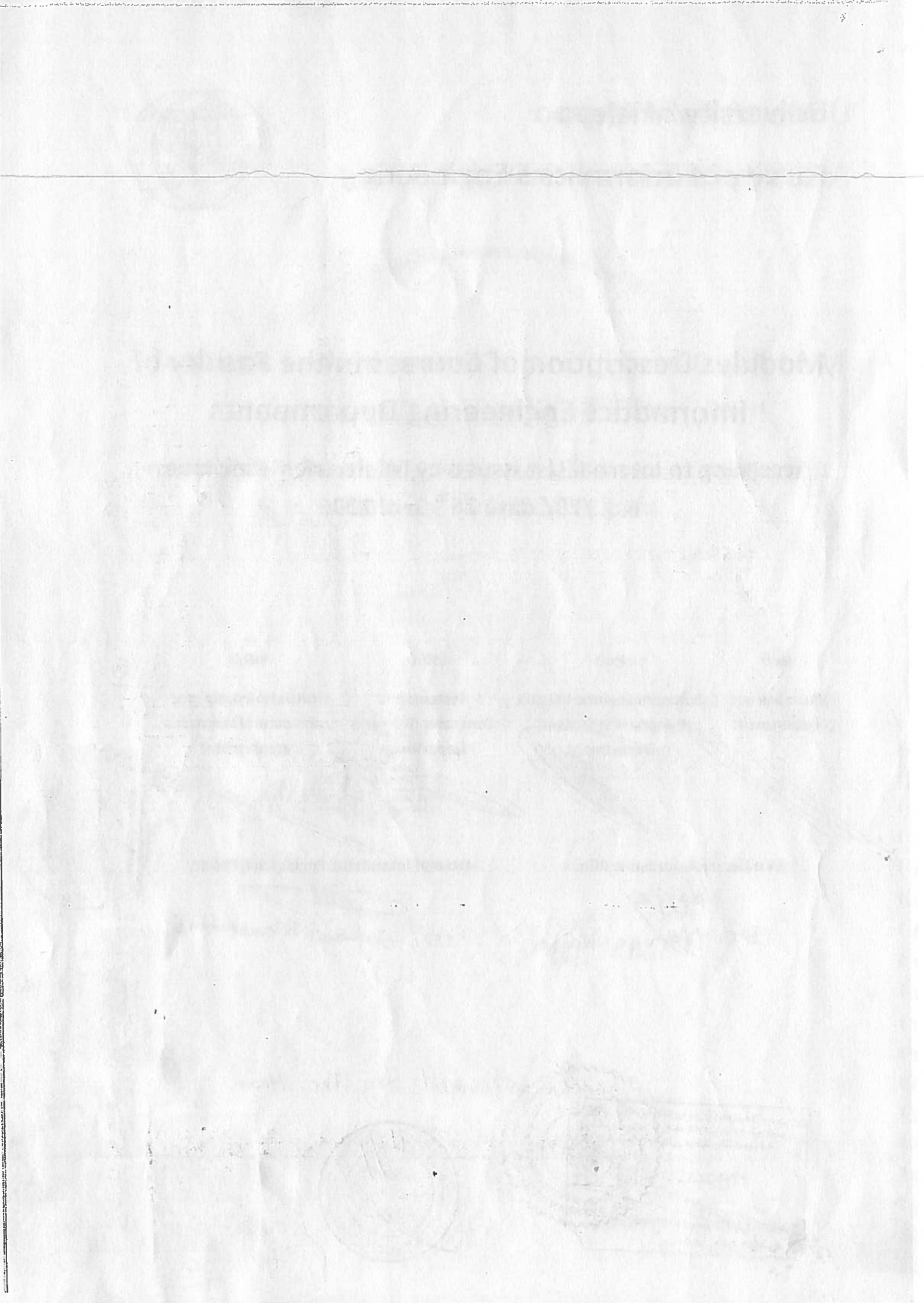


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1. Degree Description

The Faculty of Informatics Engineering was established on 07th of September, 2000 as a Faculty of Computer Science in University of Aleppo. It is addressed to the highest option of a science degree with excellent honours. Its objective is to provide adequate engineers in the fields of Artificial Intelligence, Software Engineering and Computer Networks. It qualifies engineers can draw integrated industrial engineered solutions that contribute in developing the national and productive sectors. It also teaches its engineers the ethics of the career and all the regular rules that control this career.

Moreover, the alumni and alumnae of the informatics engineering faculty have very powerful foundations in the basic sciences so that it allows them to design mathematical and engineered models as software systems that can meet the technological developments and needs in Syria and over world. Furthermore, the faculty communicates with local and global universities through conferences and workshops.

The studies take place in five years where the student can study in one of the three departments: Artificial Intelligence and Natural Languages, Software Engineering and Information Systems and Computer Networks Engineering. The first three years moves towards the preparation of the students in basic courses such as Mathematics, Physics, English for Information Technology, Basic Programming Concepts, Algorithms and Data Structures etc. At the end of the third year, the study moves toward a choice among three options based on the department.

At the end of fifth grade, students who have obtained all the values of units required to obtain a degree in computer science, they will get a Bachelor of Informatics Engineering degree that allows them to occupy job vacancies in this field and participate in the development process of this area.

Below, the program used during the five years is described thoroughly in terms of courses syllables and hours allocation.

2. Lectures and Laboratories Allocation

This section presents the number of lectures and laboratories hours allocated for every course per week.

2.1 First Year

First Semester			Second Semester		
Course Name	Lecture Hours	Lab Hours	Course Name	Lecture Hours	Lab Hours
Physics (1)	2	2	Physics (2)	2	2
Analysis (1)	3	1	Analysis (2)	3	1
Algebra (1)	3	1	Algebra (2)	3	1
Foundations of Computer Work	2	2	Boolean Algebra and Foundations of Logic	2	2
Programming (1)	3	2	Programming (2)	3	2
National Socialist Education	4	-	Communication Skills (1)	-	2
English Language (1)	4	-	English Language (2)	2	-
Arabic Language	2	-	English for Informatics (1)	2	2
Total Per Semester	23	8	Total Per Semester	17	12
Total	31		Total	29	

2.2 Second Year

First Semester			Second Semester		
Course Name	Lecture Hours	Lab Hours	Course Name	Lecture Hours	Lab Hours
Physics (3)	2	2	Physics (4)	2	2
Probability	2	1	Statistics	2	1
Analysis (3)	3	2	Signals Processing and Systems	3	2
Numerical Analysis	2	2	Electric Circuits	2	2
Algorithms and Data Structures (1)	3	2	Algorithms and Data Structures (2)	3	2
English Language (3)	4	-	Communication Skills (2)	-	2
			English for Informatics (2)	2	2
Total Per Semester	16	9	Total Per Semester	14	13
Total	25		Total	27	

2.3 Third Year

First Semester			Second Semester		
Course Name	Lecture Hours	Lab Hours	Course Name	Lecture Hours	Lab Hours
Theory of Information and Communications	3	2	Digital Communications	2	2
Logical Circuits	2	2	Software Engineering (1)	3	2
Electronic Circuits	2	1	Computer Architecture (1)	3	2
Communication Skills (3)	-	2	Automata and Formal Languages	2	2
Databases (1)	3	2	Operational Research (1)	2	1
Programming Languages	2	2	English for Informatics (4)	2	2
English for Informatics (3)	2	2	Programming Project	-	4
Total Per Semester	14	13	Total Per Semester	14	15
Total	27		Total	29	

2.4 Fourth Year

- Department of Artificial Intelligence and Natural Languages

First Semester			Second Semester		
Course Name	Lecture Hours	Lab Hours	Course Name	Lecture Hours	Lab Hours
Operating Systems (1)	3	2	Parallel Programming	2	1
Computer Networks (1)	4	2	Compilers	3	2
Foundations of Artificial Intelligence	2	1	Data and Computer Aided Engineering Graphics	3	2
Operational Research (2)	2	2	Economics and Management of Business	3	2
Computer and Outer Environment	3	2	Logical Programming	3	2
Fuzzy Logic and Neural Networks	4	2	English for Informatics (5)	2	2
			Programming Project	-	4
Total Per Semester	18	11	Total Per Semester	16	15
Total	29		Total	31	

- Department of Software Engineering and Information Systems

First Semester			Second Semester		
Course Name	Lecture Hours	Lab Hours	Course Name	Lecture Hours	Lab Hours
Operating Systems (1)	3	2	Parallel Programming	2	1
Computer Networks (1)	4	2	Compilers	3	2
Foundations of Artificial Intelligence	2	1	Data and Computer Aided Engineering Graphics	3	2
Operational Research (2)	2	2	Economics and Management of Business	3	2
Databases (2)	4	2	Software Engineering (2)	3	2
Multimedia Systems	3	2	English for Informatics (5)	2	2
			Programming Project	-	4
Total Per Semester	18	11	Total Per Semester	16	15
Total	29		Total	31	

- Department of Networks Engineering

First Semester			Second Semester		
Course Name	Lecture Hours	Lab Hours	Course Name	Lecture Hours	Lab Hours
Operating Systems (1)	3	2	Parallel Programming	2	1
Computer Networks (1)	4	2	Computer Networks (2)	3	2
Foundations of Artificial Intelligence	2	1	Data and Computer Aided Engineering Graphics	3	2
Operational Research (2)	2	2	Economics and Management of Business	3	2
Computer Architecture (2)	3	3	Operating Systems (2)	3	2
Digital Systems programming	2	2	English for Informatics (5)	2	2
			Programming Project	-	4
Total Per Semester	16	12	Total Per Semester	16	15
Total	28		Total	31	

2.5 Fifth Year

- Department of Artificial Intelligence and Natural Languages

First Semester			Second Semester		
Course Name	Lecture Hours	Lab Hours	Course Name	Lecture Hours	Lab Hours
Knowledge-based Systems	3	2	Natural Language Processing	4	2
Expert Systems	3	2	Computer Vision	3	2
Robotics	3	2	Marketing	2	1
Reliability and Quality	2	1	Projects Management	2	2
English for Informatics (6)	2	2	Computer and Ethics	3	-
Graduation Project	-	6	Graduation Project	-	6
Total Per Semester	13	15	Total Per Semester	14	13
Total	28		Total	27	

- Department of Software Engineering and Information Systems

First Semester			Second Semester		
Course Name	Lecture Hours	Lab Hours	Course Name	Lecture Hours	Lab Hours
Information Security	2	1	Distributed Systems and Applications	3	2
Software Engineering (3)	4	2	Knowledge-based Systems	2	2
Information Systems	4	3	Marketing	2	1
Reliability and Quality	2	1	Projects Management	2	2
English for Informatics (6)	2	2	Computer and Ethics	3	-
Graduation Project	-	6	Graduation Project	-	6
Total Per Semester	14	15	Total Per Semester	12	13
Total	29		Total	25	

- Department of Networks Engineering

First Semester			Second Semester		
Course Name	Lecture Hours	Lab Hours	Course Name	Lecture Hours	Lab Hours
Real Time Systems	4	2	Networks Management	2	2
Modelling and Simulation	4	2	Distributed Systems and Applications	3	2
Networks Security	2	1	Marketing	2	1
Information Security	2	1	Projects Management	2	2
Reliability and Quality	2	1	Computer and Ethics	3	-
English for Informatics (6)	2	2	Graduation Project	-	6
Graduation Project	-	6			
Total Per Semester	16	15	Total Per Semester	12	13
Total	31		Total	25	

3. Courses Description

This section presents the title, syllables and assessment types for every course studied to get this degree.

3.1 First Year

3.1.1 First Semester

Course Name	Physics (1)	
Course Title	Physics of Light	
Course Description	The aim of this course is explaining the light nature and its sources beside refraction, reflection, Lenses, mirrors, Interference and diffraction of the waves. In addition to LASER, Optical Fiber, and Sound.	
Assessment Types	One 3-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Analysis (1)	
Course Title	Numerical Sequences and Series	
Course Description	<p>The general idea about this course is:</p> <ul style="list-style-type: none"> - To learn about numerical sequences and series. - How the student studies its convergence in addition to sequences concepts and functional series. <p>Also the concepts of differential and derivative functions are thought in this book in an adept way.</p> <p>On the other hand the student will be taught about endless functions and how to study function changes.</p> <p>In the end of this book there is a look on mean-value theorem and its application a variety of functions.</p>	
Assessment Types	One 3-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Algebra (1)	
Course Title	Theory of Sets	
Course Description	<p>This course aims at introducing the students to the following concepts:</p> <ul style="list-style-type: none"> - Principles of sets theory (Sets Algebra, Binary Relationships). - Functions. - Normal Number Set N (Structure, Multiplication and Summation operations in N and their properties). - Number Set Z (Structure, Multiplication and Summation operations in Z and their properties). - Algebraic Structures (Field, Group, Circle). 	

	<ul style="list-style-type: none"> - Complex Numbers Field. - Polynomials. - Vectorial Spaces. 	
Assessment Types	One 3-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Foundations of Computer Work	
Course Title	Foundations of Computer Work	
Course Description	The course is intended to provide students with a thorough understanding of fundamental concepts in the computer and its hardware components and its operation and behavior with the peripheral devices. The course contains definitions and notions of many devices that will be needed for the students in the faculty and for professional career.	
Assessment Types	One 3-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Programming (1)	
Course Title	Foundations of Programming	
Course Description	<p>This Course aims at introducing the underlying concepts of programming and it contains the following topics:</p> <ul style="list-style-type: none"> o Programming concept and stages of Programming evolution. o Essential steps to write a program. o The Relation between Algorithms and programming. o Problems analysis and develop solutions them. o Flowcharts. o Essential components of Programming Language o Constants and variables. o Input/output statements. o Control statements: Conditions and Loops. o Arrays. o Subprograms: procedures, functions. o Writing software using well-known standards. 	
Assessment Types	One 3-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	English Language (1)	
Course Title	English Language	
Course Description	This course is an ESP course that aims at introducing student to different technical scientific terminology through covering specialized scientific articles related to Information Technology.	
Assessment Types	One 3-hours examination	100%

3.1.2 Second Semester

Course Name	Physics (2)	
Course Title	Electromagnetic Physics	
Course Description	This course aims to acquaint the students with the essential principles of electrostatic, electric current, electrical fields and some of their applications in the computer range. As well as magnetic fields and their sources and some applications and electromagnetic pollution.	
Assessment Types	One 3-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Analysis (2)	
Course Title	Mathematics of Integral	
Course Description	This course aims at giving the students an idea about the bounded and unbounded integral, in addition to Bilateral Integration and Integration tripartite, defective and curved integral. It also focuses on analytic geometry courses.	
Assessment Types	One 3-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Algebra (2)	
Course Title	Linear Algebra	
Course Description	This course aims at introducing the concepts: matrices, determinants and their applications. It aims also at introducing the most important courses of linear algebra and specially the solution of linear equation systems, linear functions and linear operators.	
Assessment Types	One 3-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Boolean Algebra and Foundations of Logic	
Course Title	Discrete Mathematics	
Course Description	This course needed for the students of computer science aims at introducing the concepts of sets theory, arithmetical logic, logic algebra basics and number systems.	
Assessment Types	One 3-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Programming (2)	
Course Title	Foundations of Programming	

Course Description	This Course aims at introducing more underlying concepts of programming and it contains the following topics:	
	<ul style="list-style-type: none"> • Complex Data Structures (Sets, Text files, Binary files, Records). • Pointers. • Procedural Programming. • Introduction to Object-Oriented Programming 	
Assessment Types	One 3-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Communication Skills (1)	
Course Title	Communication Skills	
Course Description	This course aims at introducing students to the term "Communicative Approach" and its different kinds as well as training them to communicate with different types of people. Furthermore, students will be trained practically in this course to write reports and give presentations in both English and Arabic.	
Assessment Types	One 90-Minutes examination	50%
	Presentation and Laboratory Work	50%

Course Name	English Language (2)	
Course Title	English Language	
Course Description	This course is also an ESP course that aims at introducing student to different technical scientific terminology through covering specialized scientific articles related to Information Technology.	
Assessment Types	One 3-hours examination	100%

Course Name	English for Informatics (1)	
Course Title	English for Informatics	
Course Description	This ESP course's good is to increase the ability of student to understand scientific terms and to study, analyze and comprehend articles related to their field of study well. By the end of the term, students must be able to communicate both orally and in writing with others using English.	
Assessment Types	One 3-hours examination	80%
	Laboratory Work and Tests	20%

3.2 Second Year

3.2.1 First semester

Course Name	Physics (3)	
Course Title	Quantum & Atomic Physics	
Course Description	The course consists of the following chapters: 1. Introduction to Quantum Physics 2. Quantum Mechanics 3. Atomic Physics 4. Molecules and Solids	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Probability	
Course Title	Probability	
Course Description	This course provides the student with the basic concepts of probability science i.e. Conditional Probability, Bayesian Theory, Dependent and Independent Events as well as the random variables and its applications. Also the student will have an idea about some famous probability distributions.	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Analysis (3)	
Course Title	Complex Analysis & Differential Equations	
Course Description	The course consists of the following chapters: 1. Complex Numbers 2. Complex Functions 3. Complex Integration 4. Complex Series 5. Residue Theorem 6. Conforming Mapping 7. Equation 1st Order and 1st Degree 8. Differential Equations & Partial Differential 9. Fourier Series 10. Vectorial Analysis	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Numerical Analysis	
Course Title	Numerical Analysis	

Course Description	<p>This course gives the student information about the basis of numerical analysis and its concepts in addition to that how to use the numerical methods in solving linear equations system. Moreover the student will have the chance to have an idea about interpolation and numerical methods in solving the derivative or integration.</p> <p>Literally, the course consists of the following chapters:</p> <ol style="list-style-type: none"> 1. Theory of Errors 2. Solutions for Systems of Linear Equations 3. Methods of Solving Non-Linear Equations 4. Interpolation and Extrapolation 5. Digital Integration and Differential 6. Approximate Solutions for Ordinary Differential Equations. 	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Algorithms and Data Structures (1)	
Course Title	Algorithms and Data Structures	
Course Description	<p>The course consists of the following chapters:</p> <ol style="list-style-type: none"> 1. Algorithms and Complexity <ul style="list-style-type: none"> • Introduction • Complexity of an Algorithm <ul style="list-style-type: none"> • Asymptotic Complexity • Best, Worst, and Average-Case Complexity • Big O, Ω and Θ Notation • Efficiency of Algorithms • Comparing & Computing Complexity • Recursion and Induction • Mathematical Background 2. Data Abstraction and Basic Data Structures <ul style="list-style-type: none"> • Introduction • Arrays, Records and Linked Lists • Stacks and Queues • Priority Queue 3. Non Linear Data Structures: Binary Trees <ul style="list-style-type: none"> • Introduction • Binary Trees and their Representations • Traversals: In-order, Preorder, Post-order • Huffman Codes 4. Graphs <ul style="list-style-type: none"> • Introduction • Graph Terminology: Degree, Path, Cycle, Connected Graph etc. • Graphs and their Representations: Adjacency Matrix, Adjacency List 	

	<ul style="list-style-type: none"> • Graph traversals: DFT, BFT • Shortest Path Problems • Traveling Salesman <p>5. Recursive Algorithms</p> <ul style="list-style-type: none"> • Introduction and Examples • von Koch curves • Hilbert curves • Sierpinsky curves <p>6. Backtracking Algorithms</p> <ul style="list-style-type: none"> • Introduction • Knight's Tour Problem • The Eight Queens Problem • The Optimal Selection Problem 	
Assessment Types	One 3-hours examination - <i>Open Book</i>	70%
	Laboratory Work and Tests	30%

Course Name	English Language (3)	
Course Title	English Language	
Course Description	This course is also an ESP course that aims at introducing student to different technical scientific terminology through covering specialized scientific articles related to Information Technology.	
Assessment Types	One 2-hours examination	100%

3.2.2 Second Semester

Course Name	Physics (4)	
Course Title	Electronic Physics	
Course Description	This course aims at introducing ideas about the connections in semiconductors and some applications of electronic circuits. It also presents clipping and rectification concepts. A detailed study of Zhener's diode and its applications in electronic circuits are included in this course, too.	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Statistics	
Course Title	Statistics	
Course Description	This course teaches the student some statistics science basis, concepts and their application that the student will be taught how to make statistics studies and analyze their results. This course consists of the following key points:	
	<ol style="list-style-type: none"> 1. Collection, Presentation and Classification of Data. 2. Measures of Central Tendency & Dispersion. 	

	<ol style="list-style-type: none"> 3. Probabilities and Sampling Distribution. 4. Interval Estimate & Statistical Hypothesis Testing. 5. Analysis of Variance. 6. Simple Linear Regression & Correlation. 7. Nonparametric Statistics. 8. Computer Applications. 	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Signal Processing & Systems	
Course Title	Signal Processing & Systems	
Course Description	The course is intended to provide students with principal information in the study and analysis of linear and none linear systems in the time and frequency domains. Also, this course helps to determine the response of first and second degree system, the impulse response transfer functions and the study of the response for discrete-time systems.	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Electrical Circuits	
Course Title	Foundation of Electrical Circuits	
Course Description	The course is intended to provide students with a thorough understanding of fundamental concepts related to electrical circuits with direct and alternative current and their analysis methods. Also, the course provides an introduction to the principal theories used in the electronic circuits analysis and analysis methods of 4 poles and their types.	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Algorithms and Data Structures (2)	
Course Title	Algorithms and Data Structures	
Course Description	<p>The course consists of the following chapters:</p> <ol style="list-style-type: none"> 1. Sorting Algorithms <ul style="list-style-type: none"> • Introduction • Internal Sorting Selection Sort, Bubble Sort, Insertion Sort, Fusion Sort, Quick Sort, Heap Sort • External Sorting Straight Merging Sort ,Natural Merge Sort, Balanced Merging Sort, Poly-phase Sort 2. Searching Algorithms <ul style="list-style-type: none"> • Introduction 	

	<ul style="list-style-type: none"> • Sequential Search • Binary Search • Interpolation Search • Hashing <ul style="list-style-type: none"> • Direct Chaining • Open Addressing • Collision Handling: Linear, Quadratic Probing, Double Hashing <p>3. Binary Search Trees</p> <ul style="list-style-type: none"> • Introduction • Basic Concepts and Definitions • Tree Search and Insertion • Tree Deletion <p>4. Balanced Trees</p> <ul style="list-style-type: none"> • Introduction • AVL Trees <ul style="list-style-type: none"> • AVL Tree Insertion • AVL Tree Deletion • Red and Black Trees <ul style="list-style-type: none"> • Red and Black Tree Insertion • Red and Black Tree Deletion <p>5. Multi way Trees</p> <ul style="list-style-type: none"> • Introduction • Multi way Search Trees • B-Trees • B-Tree Insertion • B-Tree Deletion • B⁺-Trees • B[*]-Trees 	
Assessment Types	One 3-hours examination - <i>Open Book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Communication Skills (2)	
Course Title	Communication Skills	
Course Description	<p>This course is an extension of the Communication Skills (1) course. It also aims at enhancing the students' knowledge about the term "Communicative Approach" and its different kinds as well as training them to communicate with different types of people.</p> <p>Furthermore, students will be trained practically in this course to write reports and give presentations in both English and Arabic.</p>	
Assessment Types	One 90-Minutes examination	50%
	Presentation and Laboratory Work	50%

Course Name	English for Informatics (2)	
Course Title	English for Informatics	
Course Description	This course is an extension for the English for Informatics (1) course. It aims to increase the ability of student to understand scientific terms and to study, analyze and comprehend articles related to their field of study well. By the end of the term, students must be able to communicate both orally and in writing with others using English.	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

3.3 Third Year

3.3.1 First Semester

Course Name	Theory of Information and Communications	
Course Title	Theory of Information and Communications	
Course Description	The course consists of the following chapters: Information theory: <ul style="list-style-type: none"> • Identifying information sources. • Entropy • Types of information sources • Information sources stability Communications: <ul style="list-style-type: none"> • Introduction to communication Importance. • Identifying wire and wireless communication systems. • Analog wireless communications. • Wire Communications. • Filters, amplifiers, Transferring lines, fibber optic. 	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Logical Circuits	
Course Title	Logical Systems and Circuits	
Course Description	The course is intended to provide students with a thorough understanding of fundamental concepts in logical gateways, combinational logical circuits and sequential logical circuits with storage components. The student will know the counters: their operation mode and design, shifting registers, logical circuits design for solving control problems based on truth tables to transform them into simplified functions and then to draw equivalent logical circuit.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Electronic Circuits	
Course Title	Electronic Circuits	
Course Description	<p>This course introduces students to the electronic engineering principles from operation Principe and types of diodes, transistors, transistor amplificatory and operational amplificatory with their applications.</p> <p>This course introduces a study for: signal generators and transient response. The digital electronic circuits chapter presents more information in digital electronic circuits and their logical families. Finally, the students study an introduction to capture analog signal form and to computer.</p>	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Communication Skills (3)	
Course Title	Communication Skills	
Course Description	<p>This course is an extension of the Communication Skills (2) course. The presentations in this course should be in specialized topics i.e. related to computer science domain.</p>	
Assessment Types	One 90-Minutes examination	50%
	Presentation and Laboratory Work	50%

Course Name	Databases (1)	
Course Title	Foundations of Databases	
Course Description	<p>This course consists of the following chapters:</p> <ol style="list-style-type: none"> 1. Introduction to Information Systems (Files Management, Databases). 2. Concept of Database Management Systems. 3. Data models. 4. Diagrams. 5. Databases Languages. 6. General Structure of Databases. 7. Conceptual Diagram for Data (ERD). 8. Logical Diagram for Data. 9. Physical Diagram for Data. 10. Relational Algebra. 11. Relational Calculus. 12. SQL. 13. Introduction to ORACLE. 	
Assessment Types	One 3-hours examination - <i>Open Book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Programming Languages	
Course Title	Object-Oriented Programming Using C++	

Course Description	<p>This course aims at introducing the student to the essentials of object-oriented model i.e. Objects and Classes concepts, Abstraction (properties, methods, behavior and state), data protection and encapsulation), relationships between classes, inheritance and polymorphism, virtual functions, abstract classes and interfaces. All these concepts are presented using C++ as following:</p> <ol style="list-style-type: none"> 1. The basics of programming in C++ 2. Objects, Constants and E/S Standards 3. Types of data 4. Conditionals Statements 5. Control Statements 6. Functions & Virtual Functions 7. The Pointers 8. Pointers and Linked List 9. The Object Oriented Programming <ul style="list-style-type: none"> • Classes • Objects and Encapsulation • abstract classes and interfaces • Inheritance & polymorphism 	
Assessment Types	One 3-hours examination - <i>Open Book</i>	70%
	Laboratory Work and Tests	30%

Course Name	English for Informatics (3)	
Course Title	English for Informatics	
Course Description	<p>This course is an extension for the English for Informatics (2). It aims to increase the ability of student to understand scientific terms and to study, analyze and comprehend articles related to their field of study well. By the end of the term, students must be able to communicate both orally and in writing with others using English.</p>	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

3.3.2 Second Semester

Course Name	Digital Communications	
Course Title	Digital Communications	
Course Description	<p>The course consists of the following chapters:</p> <ul style="list-style-type: none"> • Introduction to digital communication. • Simple comparison with analog communications. • Types of analog pulse modulation. • Stages of digital signal (Sampling, encoding, accumulating, coding ...). • Pulse coding modulation PCM. • Types of digital modulation ASK, FSK, PSK. 	

	<ul style="list-style-type: none"> • Error protected code. • Frequency Division Modulation FDM. • Time Division Modulation TDM. • Digital hierarchy asynchronous PDH, and digital hierarchy synchronous SDH systems. • Space communications. • Mobile communications. 	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Software Engineering (1)
Course Title	Foundations of Software Engineering
Course Description	<p>This course consists of the following chapters:</p> <ol style="list-style-type: none"> 1. Introduction 2. Software Engineering as a Science Engineer 3. Lifecycle: variety Theorem 4. Basics of Database Analysis 5. Basics of Database Design 6. Coding 7. Technical Test <ul style="list-style-type: none"> White Box Test Statistical Test 8. Software Reliability 9. Project Management <ol style="list-style-type: none"> I. Reminders II. Coast Estimation III. Project Planning IV. Project piloting 10. Software Maintenance <ol style="list-style-type: none"> I. Types of Maintenance II. Process of Maintenance III. Cost Estimation of Maintenance IV. Maintenance Effects V. Maintenance Scalable <ul style="list-style-type: none"> Techniques of restructuring Exercise for techniques of restructuring 11. Management Quality <ol style="list-style-type: none"> I. Definition II. Standardization III. Manual Quality <p>Lab : The lab for this course consist of two major sections: 1st section :</p>

	Project & Exercises for the previous concepts	
	2 nd section : <ul style="list-style-type: none"> • Java Introduction • The basic elements • Classes & Methods • Object-Oriented Programming <ul style="list-style-type: none"> ◦ Heritance, Abstraction, polymorphism, Interfaces • Java 2D • Java Applet 	
Assessment Types	One 3-hours examination - <i>Open Book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Computer Architecture (1)	
Course Title	Computer Architecture	
Course Description	<p>The course is intended to provide students with a thorough knowledge about hardware components. It consists of the following chapters:</p> <ol style="list-style-type: none"> 1) The computer system box diagram <ol style="list-style-type: none"> 1. Central processing unit CPU 2. Arithmetic and logical unit ALU 3. Control unit CU 4. Common bus flip-flop control 5. The memory structure and classification 6. interrupters 7. Inputs and Outputs I/O 2) Design of Control Circuits: Constructing a simple virtual computer existence and execution of precedent steps on it with applicative programs discussion using assembly language. 3) The 8086 microprocessor <p>Lab : Assembly language</p>	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Automata and Formal Languages	
Course Title	Automata and Formal Languages	
Course Description	<p>The course consists of the following chapters:</p> <ol style="list-style-type: none"> 1. Basic concepts <ol style="list-style-type: none"> a. Alphabets and series b. Languages c. Objectives 2. Finite Automaton 	

	<ul style="list-style-type: none"> a. deterministic finite Automaton b. non-deterministic finite Automaton c. non-deterministic finite Automaton with ϵ-transition d. Equivalence between Automata e. Regular Expressions <ul style="list-style-type: none"> 3. Properties of regular languages <ul style="list-style-type: none"> a. Theorem of iterations b. closure Properties c. NERODE Theorem d. Reduction of finite Automaton 4. Out of Context Grammars <ul style="list-style-type: none"> a. Simplifications b. Reducing unnecessary variables c. Chomsky d. Geribakh 5. Automaton with Stack <ul style="list-style-type: none"> a. non-deterministic Automaton with Stack b. deterministic Automaton with Stack c. Equivalence between non-deterministic Automaton with Stack and out of context Grammars 6. Turing Machine 	
Assessment Types	One 3-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Operational Research (1)	
Course Title	Mathematical Programming	
Course Description	The course consists of the following chapters: <ul style="list-style-type: none"> 1. The Concept of Operational Research 2. The Linear Programming 3. The Optimum Solution of Linear Programming 4. The Graphic Method 5. The Simplex Method 6. The Artificial Variables Method 7. Sensitive Analysis 8. Entire Programming 9. Games Strategic 10. Transport Problem 	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	English for Informatics (4)
Course Title	English for Informatics

Course Description	This course is an extension of the English for Informatics (3). It aims to increase the ability of student to understand scientific terms and to study, analyze and comprehend articles related to their field of study well. By the end of the term, students must be able to communicate both orally and in writing with others using English.	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Programming Project	
Course Title	Programming Project	
Course Description	This course allows the students to work in groups and experience the team work skills through programming projects that use the software engineering concepts and techniques. It also aims to give the students an opportunity to improve their programming skills and abilities. All these skills are grown under a direct supervision from one of the academic staff of the university.	
Assessment Types	Discussion Committee	60%
	Supervisor of the Project	40%

3.4 Fourth Year

3.4.1 First Semester

Course Name	Operating Systems (1)	
Course Title	Operating Systems	
Course Description	The course is intended to cover the principal notions of operating systems, memory organization and management, virtual memory, operations scheduling, synchronization of operations, memory protection and multiple programming.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Computer Networks (1)	
Course Title	Computer Networks	
Course Description	The course is intended to provide students with a thorough understanding of fundamental concepts in computer networks with different types, connection methods, their principle of functioning, their components, some principal protocols, addressing methods and naming system.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Foundations of Artificial Intelligence	
Course Title	Foundations of Artificial Intelligence	
Course Description	The course provides coverage of behavioral perspective of the 'human cognition' and in detail the tools and techniques required for its intelligent realization on machines. The classical topics on search, symbolic logic, planning and machine learning in sufficient details. Besides soft computing, the other leading aspects of current and temporal reasoning, knowledge acquisition, verification, validation and issues, realization of cognition on machines and the architecture of AI machines.	
Assessment Types	One 2-hours examination - <i>Open book</i>	60%
	Laboratory Work and Tests	40%

Course Name	Operational Research (2)	
Course Title	Operational Research	
Course Description	This course provides essential definitions in Graph theory; Students will learn how to model real problems with discrete natural Graphs. It presents some algorithms for exploration of a graph, circuit detection, layers division and some special classes of graphs like Eulerian graph, Hamiltonian graph etc.	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Computer and Outer Environment	
Course Title	Computer and Outer Environment	
Course Description	The course is intended to provide students with a thorough knowledge of fundamental concepts in computer and its hardware components and its operation and behavior with the peripheral devices. Moreover, to proceed to a large applications on them.	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Fuzzy Logic and Neural Networks	
Course Title	Fuzzy Logic and Neural Networks	
Course Description	This course gives an introduction to concepts in neural networks, definition of human intelligence, history, branches and applications. Architectures and algorithms for supervised learning, self-organization, reinforcement learning, and neuro-evolution are included. Types of NN, Static and Dynamic networks are discussed. Adaptive Resonance Theory (ART), components, concepts, mechanics, algorithm, and software are explored. The course provides Fuzzy set theory and applications. Also classical sets, fuzzy sets, fuzzification, Membership functions, types of fuzzy sets, operations on classical and fuzzy sets, properties of fuzzy sets, and defuzzification are	

	explained.	
Assessment Types	One 2-hours examination - <i>Open book</i>	60%
	Laboratory Work and Tests	40%

Course Name	Databases (2)	
Course Title	Advanced Databases	
Course Description	This Course contains the following topics: relational Databases, SQL (Queries, LMD /insert, update, delete, commit, rollback/, LDD, LCD, Constraints, Views, Generating of Script), DBMS Mechanisms, Data dictionary management procedures and relational diagram management procedures.	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Multimedia Systems	
Course Title	Multimedia Systems	
Course Description	Students, upon completion of this course, will be able to work with a number of media formats in a variety of new media tools. Students will learn design principles that can be incorporated for visual impact in print, animation, graphics, web, motion, sound and more	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Computer Architecture (2)	
Course Title	Computer Architecture	
Course Description	The course is intended to provide students with a thorough knowing of the digital programmable systems, their large using in different control systems based on microcontrollers study, their internal structure, their memory organization and their instructions. Rest of computer structure such as general registers organization, control words, such as organization, addressing modes and RISC computers. Moreover, we find pipelining and vector processing, arithmetic operation algorithms, peripheral devices knowing. Finally, the student will study multiprocessors computer systems.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Digital and Programmable Systems	
Course Title	Digital and Programmable Systems	
Course Description	The course is intended to provide students with a thorough knowledge of fundamental concepts in computer and its hardware components and its	

	operation and behavior with the peripheral devices. Moreover, to proceed to a large applications on them.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

3.4.2 Second Semester

Course Name	Parallel Programming	
Course Title	Parallel Programming	
Course Description	This course aims at introducing parallel programming principles and ways to achieve it on several hardware environments. It aims also to study parallel algorithms and the issues been resolved using them, comparing characteristics of parallel methods in programming with Sequential methods. Two programming environments (PVM and MPI) were adopted to implement the parallel algorithms. The PVM environments and MPI libraries are used to facilitate parallel programming using the selected hardware.	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Compilers	
Course Title	Compilers: Design and Implementation	
Course Description	<p>This Course contains the following topics:</p> <ol style="list-style-type: none"> 1. Lexical Analysis: <ul style="list-style-type: none"> • Regular Languages. • Regular Expressions. • Non Determinist Automaton (NFA). • Passing From Regular Expression to NFA. • Determination and Optimization of NFA. 2. Syntactic Analysis: <ul style="list-style-type: none"> • Normal form of Backus-Name. • Grammars. • Parsing Tree and Analysis. 3. Semantic Analysis: <ul style="list-style-type: none"> • Controlling Data Types. • Generating Temporary Code. • Generating Binary Code. <p>Eventually, it contains also a Compiler Construction project.</p>	
Assessment Types	One 2-hours examination - <i>Open book</i>	60%
	Laboratory Work and Tests	40%

Course Name	Data and Computer Aided Engineering Graphics	
Course Title	Data and Computer Aided Engineering Graphics	
Course Description	This course aims at introducing the concepts underlying Computer Graphics and it contains the following topics: Line equation in the plane, Geometrical transformations in the plane and in the space, General theory of second degree curves and Bezier curves (characteristics and applications).	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Logical Programming	
Course Title	Logical Programming: PROLOGO & LISP	
Course Description	This course covers concepts and skills required for logical programming. Topics include basic object-oriented programming design, graphical user interfaces (GUI5), and exception handling. LP shows classical procedural programming, functional programming (LISP) and object-oriented programming. The most important application of the LP techniques is the PROLOG programming language in which the resolution rule is applied to interpret programs written with Horn clauses (i.e. conditional statements).	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	English for Informatics (5)	
Course Title	English for Informatics	
Course Description	This course is an extension of the English for Informatics (4). It aims to increase the ability of student to understand scientific terms and to study, analyze and comprehend articles related to their field of study well. By the end of the term, students must be able to communicate both orally and in writing with others using English.	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Programming Project	
Course Title	Programming Project	
Course Description	This course allows the students to work in groups and experience the team work skills through programming projects that use the software engineering concepts and techniques. It also aims to give the students an opportunity to improve their programming skills and abilities. All these skills are grown under a direct supervision from one of the academic staff of the university.	
Assessment Types	Discussion Committee	60 %
	Supervisor of the Project	40 %

Course Name	Software Engineering (2)	
Course Title	Advanced Software Engineering	
Course Description	Using UML (Unified Modeling Language), this course aims to present the systems software modeling methods. It covers the different diagrams used during the design of systems software (Use Case diagram, Class diagram, Components diagram, Deployment diagram, Sequence diagram, Collaboration diagram) and Modern SDLC (MDA, XP).	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Operating Systems (2)	
Course Title	Operating Systems	
Course Description	The course is intended to cover the different methods using secondary memory, file systems and databases, system ability, processors management, multiprocessor systems, notions in the computer networks and distributed systems and information security.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Computer Networks (2)	
Course Title	Advanced Computer Networks	
Course Description	The course is considered as extension of computer networks one. This course helps the student to learn the advanced techniques of networks such as ISDN, Frame Relay, ATM, SONET, and DSL and to deepening in IP protocol and its related protocols such as Telnet, PPP, MLP, SMTP, PoP3, MIME and so one. The student will also know about routing algorithms and he will study the congestion control algorithm in the network. An introduction into Wireless networks is also presented in this course.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

3.5 Fifth Year

3.5.1 First Semester

Course Name	Knowledge-based Systems	
Course Title	Knowledge-based Systems	
Course Description	This course presents basic techniques used in Data mining for large databases using techniques of artificial intelligence. It contains the following topics: basic concepts, basic models, logical model, vectorial model, probabilistic model, linguistic model, indexing techniques, application of the data retrieval systems in the information systems and search engines on the Internet.	

Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Expert Systems	
Course Title	Expert Systems	
Course Description	This course covers basic foundations and techniques of ES. Evolution of ES, introduction to expert systems, knowledge representation, deep knowledge, formula for specification of surface knowledge are included. Components of inference engine and mechanism are explored. Knowledge acquisition, applications of deep knowledge, and structure of an ES are explained. Characteristics of suitable domains, forward and backward chaining, and search methods are discussed. Construction of ES, example systems, main players and types are viewed.	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Robotics	
Course Title	Robotics	
Course Description	This course provides fundamental concepts of robotics and introduces to its mechanics and differential equations. It focuses on: - Robot modeling & control - Robot programming & Task Modeling - Motion planning for mobile robot and application of intelligent research algorithms in robotics. - D-H equations - Dynamic robot description - Robot Feedback	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Reliability and Quality	
Course Title	Reliability and Quality	
Course Description	This course aims at introducing the concepts underlying reliability and it contains the following topics: General introduction to reliability, Estimation methods for reliability systems, Statistical methods to study reliability data, Forecasting product life, Reliability of systems coursed to errors, Simulation and representation of failures and Some types of tests.	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	English for Informatics (6)	
Course Title	English for Informatics	
Course Description	This course is an extension of the English for Informatics (5). It aims to increase the ability of student to understand scientific terms and to study, analyze and comprehend articles related to their field of study well. By the end of the term, students must be able to communicate both orally and in writing with others using English.	
Assessment Types	One 2-hours examination	80%
	Laboratory Work and Tests	20%

Course Name	Information Security	
Course Title	Information Security	
Course Description	This course aims at introducing the following concepts: fundamental information security, security services, policy, and procedures. It contains the following topics: Introduction, Information Security, Introduction to PGP, Security Policy and Procedures, Security Risk Management and General Security Issues.	
Assessment Types	One 2-hours examination	60%
	Laboratory Work and Tests	40%

Course Name	Software Engineering (3)	
Course Title	Software Engineering: Design Patterns	
Course Description	This course defines the design patterns are how they help to design object-oriented software. The majority of the course is about design patterns. It includes the three main types of design patterns: creational, structural, and behavioral. And how patterns relate to each other, how they can be combined with other patterns, and which patterns work well together.	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Information Systems	
Course Title	Information Systems	
Course Description	This course aims to define Information Systems describe the characteristics of these systems. Students will know how to design and model an information system and define the input and the manipulating process to figure out the output of the system. Then students will study common types of Information Systems such as Computer-Based Information Systems (CBIS), Business Information Systems (BIS), E-Commerce, Enterprise Resource Planning (ERP), Management Information Systems (MIS), and Information Retrieval IR.	
Assessment	One 2-hours examination	70%

Types	Laboratory Work and Tests	30%
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Course Name	Real Time Systems	
Course Title	Real Time Systems	
Course Description	This course will introduce students to real-time systems. At the end of this course, students will know (i) what makes a system "real-time", (ii) applications that require real-time systems, (iii) common models used to describe real-time systems, (iv) common techniques used to ensure a wide variety real-time systems satisfy their real-time requirements. Most of the course time will be spent on the fourth point (analysis techniques for real-time systems).	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Modelling and Simulation	
Course Title	Modelling and Simulation	
Course Description	This course provides some tools and techniques to formulate and solve mathematical models that represent real systems. It abstracts the essence of the problem and reveals its underlying structure, thereby providing insight into the cause-and-effect relationships within the system. Therefore, if it is possible to construct a mathematical model that is both a reasonable idealization of the problem and amenable to solution, this analytical approach usually is superior to simulation. However, many problems are so complex that they cannot be solved analytically and simulation often provides the only practical approach to a problem.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Networks Security	
Course Title	Computer Networks Security	
Course Description	This course covers the identification of network security from fundamentals and keys management, steganography algorithm, digital signatures and network viruses and finally fire walls.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

3.5.2 Second Semester

Course Name	Marketing
Course Title	Marketing for IT
Course	It contains the following topics: Introduction, Marketing Research Techniques,

Description	Marketing Audits, Direct Marketing Approaches, Marketing Intelligence Systems, Marketing Concepts, Sales Techniques and Practices and Promotion Methods.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Projects Management	
Course Title	Projects Management	
Course Description	It will help students understand the role of project management, and how to set and manage client expectations, develop a list of key tasks, assign responsibilities, track progress and get progress updates. It contains the following topics: Introduction, Developing a project plan, Tracking progress, Managing changes, Software tools and Communications Skills.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Natural Language Processing	
Course Title	Natural Language Processing (NLP)	
Course Description	This course provides a broad introduction to the kinds of applications that are developed within the field of Natural Language Processing, and the techniques and algorithms required to build these applications. Students acquire both theoretical background and practical experience in processing the syntax and semantics of natural language. Types of information system interface and their strengths and weaknesses. Natural language interfaces with examples (e.g. database query) are included. Historical developments in NLP and knowledge representation are covered in this course.	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Computer Vision	
Course Title	Computer Vision	
Course Description	The purpose of this course is to present all steps of image processing till decision making. It includes all geometric transformations of a picture, segmentation and identification, reconstruction of a picture and finally classification problem and decision making.	
Assessment Types	One 2-hours examination - <i>Open book</i>	70%
	Laboratory Work and Tests	30%

Course Name	Distributed Systems and Applications	
Course Title	Distributed Systems and Applications	

Course Description	This Course aims at introducing the concepts underlying distributed systems, their characteristics, their techniques. It aims also at introducing the concepts of distributed applications and their techniques (sockets, CORBA, etc.), and how Web Services work and their applications.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Networks Management	
Course Title	Computer Networks Management	
Course Description	This course aims to teach students in several network management systems. It makes the basic concepts of network management and some of the protocols used in the network administration.	
Assessment Types	One 2-hours examination	70%
	Laboratory Work and Tests	30%

Course Name	Graduation Project	
Course Title	Graduation Project	
Course Description	This course allows the students to work in groups and experience the team work skills through programming projects that use the software engineering concepts and techniques. It also aims to give the students an opportunity to improve their programming skills and abilities in research and writing technical reports. All these skills are grown under a direct supervision from one of the academic staff of the university. This course is essentially required to grant the students the bachelor of informatics engineering.	
Assessment Types	Discussion Committee	100%

- Standard EEE 802.11:
- Technique of infrared and Bluetooth
- Security In wireless network
- Modern techniques IEEE 802.16-4

Fifth Year:

❖ Graduation Project

HoD	HoD	HoD	HoD
Basic Science Department	Software Engineering and Information Systems Department	Systems and Computer Networks Department	artificial intelligence and natural languages Department

Vice Dean for Academic Affairs

Najjar
Dr. Yahya Najjar

Dean of Informatics Engineering Faculty

Dr. Saheer Khawatmi

/confirmed by the dean

