Computer Networking Program Plan

Year	First Semester				Second Semester			
	Course #	Course Title	Prerequisite	Cr	Course #	Course Title	Prerequisite	Cr
1	0911110	Introduction to Computing		3*	0911120	Fund. of Programming	0911110	3*
	0912111	Fundamentals of IS		3	0913121	Electronics	0814132	4*
	0817111	Calculus		3	0816152	Biology		4*
	0814132	Physics		4	0817208	Intro. to Statistics and Probability theory	0817111	3
	7401101	Islamic Creed & Contemporary Doctrines		2	7401301	Contemporary cultural issues	7401101	2
			Total	15			Total	16
	First Semester				Second Semester			
	Course #	Course Title	Prerequisite	Cr	Course #	Course Title	Prerequisite	Cr
2	0911210	Object Oriented Prog.(1)	0911120	3*	0911220	Object Oriented Prog.(2)	0911210	3*
	0911211	Data structure	0911120	2*	0911221	Operating Systems	0913213	3*
	0912212	Technical Reports	0912111	2	0912222	Dbase Concept & Design	0912111	3*
	0913213	Digital Hardware	0913121	3*	0914223	Net. Protocols & E-Commerce Technology	0914214	3*
	0914214	Com. & Network Fund.	0911110	3*	0622290	Business (1)	0912111	3
	0817301	Discrete Math	0817208	3				
			Total	16			Total	15
	First Semester				Second Semester			
	Course #	Course Title	Prerequisite	Cr	Course #	Course Title	Prerequisite	Cr
3	0914310	Mathematical Foundations of Computer Networking	0817301	3	0914320	Computer System Security	0911221	3
	0914311	Introduction to Routing and Switching	0914223	3*	0914321	Mobile and Wireless Networks	0914311	3*
	0912312	Professional Responsibility	0912212	2	0914322	Distributed Operating System	0911221	3
	0914313	System Administration	0911221	3*	0914323	Introduction to Network Programming	0911110	3*
	0914314	Telecommunication Networks	0914223	3	0914324	Network Simulation and Modeling	0914310	3*
	7401___	Univ. Requirement (3)	7401301	2				
			Total	16			Total	15
	0914330	**Practical (Co-op) Training**				3		
	First Semester				Second Semester			
	Course #	Course Title	Prerequisite	Cr	Course #	Course Title	Prerequisite	Cr
4	0914410	Project Proposal	Department Approval	2	0914420	Project Implementation	0914410	3
	0914411	Ad-hoc and Sensor Networks	0914321	3*	0914421	Selected Topics in CN	0914410	3
	0914412	Network Design	0914323	3	0914____	Elective Course		3
	0914____	Elective Course		3	0914____	Elective Course		3
	7401___	Univ. Requirement (4)		2				
			Total	13			Total	12

Total Number of Units (121)

* Lab courses

Elective Courses

Course #	Course Title	Prerequisite	Cr	Course #	Course Title	Prerequisite	Cr
0914413	High Speed Networks	0914223	3	0914422	Networks Forensics and Security	0914320	3
0914414	Optical Networks	0914314	3	0914423	Wireless Sensor Networks	0914321	3*
0914415	Multimedia Networks and Applications	0914214	3*	0914424	WiMax Networks	0914321	3*
0914416	Intrusion Detection and Forensics	0914320	3	0914425	Advanced Routing	0914311	3*

Course Description

Course Name	Introduction to Computing		مقدمة في الحوسبة			
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CS110	**0911110**	**3**		**3**	**1.5**	**4.5**

Track

☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free

☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	1st Semester	Prerequisite	

Course Description:

This course introduces the main concepts of computer science. It includes the basics of computing: hardware, Software, Connectivity, and users, the different types and features of computers. It presents also the data types and data Representation. A Simple Computer System architecture is presented so to emphasize on main components, secondary storage devices, types of memory, Hardware, software and people. The principal Peripheral Devices are also presented: Input, Output and storage, Data preparation, Factors affecting input, Input Devices, Output Devices, Secondary Storage devices, Communication between CPU and input/output devices. Software aspects are introduced like Problems-Solving and programming: Algorithm development, Flowcharts, Looping, Some programming Features, Pseudo code, Some structured programming concepts, Documentation, as well as Programming Languages: Machine language and assembly language, High-Level and Low-Level languages, assemblers, compilers and Interpreters. Finally, the course presents the computer and communication aspects, as well as different features of operating Systems.

Learning Outcomes:

After completing this course, students are expected to:

1. Have a complete background about the main aspects of computing systems especially for hardware and software,
2. Develop skills in hardware basics: computer architecture, peripheral devices,
3. Develop skills in software basics: data types and representations, problem solving concepts, compilers, assemblers, and programming languages,
4. Understand the main concepts of computer networking and communication,
5. Understand the main concepts of operating systems and their role in a computer system.

Teaching Methodology:

1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	**Mid-term**	**20%**	**Project**		**Quizzes**	**10%**
	Final	**40%**	**Lab**	**25%**	**Participation**	**5%**

Textbook:

G.Anderson, D.Ferro, R.Hilton, "*Connecting with Computer Science*" Course Technology, 1st ed. (January 6, 2005) – 061921290x

Reference Book:

Raymond P. Canale, "*Introduction To Computing for Engineers*", McGraw-Hill, 3rd ed., 2000, ISBN: 0079116094.

Course Name	Fundamentals of Information Systems			اساسيات نظم المعلومات				
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.	
	IS111	**0912111**	**3**		**3**	**0**	**3**	
Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free							
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.							
Level	1ˢᵗ Semester			**Prerequisite**				

Course Description:

This course aims to introduce students to the basic concepts and topics related to Information Systems (IS). It covers topics such as: systems concepts; system components and relationships; cost/value and quality of information; competitive advantages of information; specification, design, and re-engineering of IS; application versus system software; package software solutions; procedural versus non-procedural programming languages; object oriented design; database features, functions, and architecture; networks and telecommunication systems and applications; characteristics of IS professionals and IS career path; information security, crime, and ethics. Practical exercises may include developing macros, designing and implementing user interface and reports; developing a solution using database software.

Learning Outcomes:

On completion of this course, the student should be able to understand:

1. Introduction to the Organizational uses of information to improve overall quality.
2. Present hardware, software, and related information technology concepts.
3. Provide concepts and skills for the specification and design or the re-engineering of organizationally related systems of limited scope using information technology.
4. How information technology can be used to design, facilitate, and communicate organizational goals and objectives.
5. Explain the concepts of individual decision making, goal setting, trust worthiness, and empowerment.
6. Show career paths in information system. To present and discuss the professional and ethical responsibilities of the IS practitioner

Teaching Methodology:

    1. Face to face Lectures using power point slides; Tutorials and Seminars

Grading	Mid-term	30%	Project		Quizzes	15%
	Final	50%	Lab		Participation	5%

Textbook:

Ralph, M. Stair, " **Principles of Information Systems** ", Thomson Learning, 2003, ISBN 0619216077.

Reference Book:

1) Ralph, M. Stair, George W. Reynolds, and George Reynolds, "*Fundamentals of Information Systems*", Course Technology Inc, 2ⁿᵈ ed., 2003, ISBN 0619064919.
2) Steven A., "*Information Systems Foundation of E-Business*", 4ᵗʰ edition, 2002.

Course Name	Calculus				التفاضل والتكامل			
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.		Tot.
	Math111	**0817111**	**3**		**3**	**0**		**3**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	1st Semester	**Prerequisite**	

Course Description:

The limit. Continuity, the intermediate value theorem. Definition of derivatives. Rules for differentiation. Applications of the derivative. The mean value theorem. L'hospital rule. The definition of the integral. The indefinite integral and the of calculus. Applications of the integral. Sequences. Convergence and limits of sequences. Series. Convergence of series. Power series. The formal power series of rational functions

Learning Outcomes:

Upon completing this course the student should be able to:

1. Solve problems involving computing limits
2. Identify continuous functions and their properties
3. Understand and use the definition of derivate, and compute derivatives using the rules of differentiation
4. Apply the derivative in problems involving graphing and in problems involving maximization and minimization
5. Understand the concept of integral and use the basic techniques of integration to compute integrals
6. Apply integrals in solving some geometric problems
7. Understand the relationship between the integral and derivative (the fundamental theorem of calculus)
8. Understand the concept of sequence and compute limits of sequences
9. Understand the concept of series and some of the tests for convergence
10. Find the (formal) series expansion for rational functions

Teaching Methodology:
  1. **Face to face Lectures using power point slides; Tutorials and Seminars**

Grading	**Mid-terms**	30%	**Assignment**	10%	**Quizzes**	15%
	Final	40%	**Lab**		**Participation**	5%

Textbook:

Earl W. Swokowski " *Calculus* " Brooks/Cole, 5th edition, 1991 ISBN 0534924921

Reference Book:

George B. Thomas, " *Calculus* " Addison Wesley, 11th edition, 2008 ISBN 0321526791

Course Name	Physics				الفيزياء			

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	PHY132	**0814132**	**4**		**4**	**0**	**4**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	1st Semester	**Prerequisite**	

Course Description:

Charges and electrical forces. Charge quantization and conservation. Insulators, conductors and semiconductors. Electric field and principle of superposition for electric field. Electric dipoles and the effect of electric field on it. Electric potential due to charges and potential difference. Equipotential surfaces. Magnetic field and magnetic force. Introductory to modern physics and semiconductors. N-type and P-type crystals. Semiconductor carrier properties and action. Depletion layer and electric potential through it. Diode and types of diodes.

Learning Outcomes:

On completion of this course, the student should be able to:

1. Develop an understanding of electrical phenomena,
2. Develop an understanding of the magnetic phenomena,
3. Give the student the basic principles needed to study electronic courses, and
4. Give the student good background and experience in solving and dealing with problems.

Teaching Methodology:
   1. **Face to face Lectures using power point slides; Tutorials and Seminars**

Grading	**Mid-term**	**30%**	**Project**		**Quizzes**	**15%**
	Final	**50%**	**Lab.**		**Participation**	**5%**

Textbook:
 Haliday, Resnic and Walker, "*Fundamental of Physics*", 2002.

Reference Books:
1. John D. Cutnell ,"*Problems Version Physics*", Volume 1, 2003.
2. Haliday, Resnic and Walker "*Fundamentals of Physics*", Volume 1, Chapters 1 - 21, Enhanced, 2002.

Course Name	Fundamental of Programming				اساسيات البرمجة			

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CS120	**0911120**	**3**		**3**	**1.5**	**4.5**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	2nd Semester	**Prerequisite**	0911110

Course Description

This knowledge area consists of those skills and concepts that are essential to programming practice independent of the underlying paradigm and programming language. Specific topics covered include: an overview of algorithms and problem-solving (problem solving strategies, role of algorithms in the problem- solving process, etc), fundamental programming constructs (variables, types, expressions, simple I/O, conditional and iterative control structures, functions, recursion, pointers, etc.). The study of programming language features and programming paradigms. Control, run-time environments, and semantics are examples of procedural, functional, logical, and object oriented programming. In practice the programming language used is ANSI-C, the syntax aspect of language and some pragmatic aspects such as comparison of interpreters and compilers and language translation phases must be studied in laboratory.

Learning Outcomes:

On completion of this course, the student should be able to:

1. Discuss the importance of algorithms in the problem-solving process and using pseudo-code.
2. Describe the phases of program translation from source code to executable code and the files produced by these phases.
3. Designing, implementing, testing, and debugging a program that uses fundamental programming constructs.
4. Familiarizing students with the taxonomy of programming language characteristics and their effect upon the structure.
5. Familiarizing students with some accepted models of programming language semantics. This should include models for both an imperative and a functional language.
6. Acquiring a sound understanding of the theory and practice behind procedural, Object-oriented, functional and logic programming languages.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading						
	Mid-term	**20%**	**Project**		**Quizzes**	**10%**
	Final	**40%**	**Lab**	**25%**	**Participation**	**5%**

Textbook:

Robert Sedgewick, "*Algorithms in C: Fundamentals, data structures, sorting, searching, and graph algorithms*", Addison-Wesley 2001, ISBN: 0201756080

Reference Book:

Herbert Schildt, "*C: the complete reference*", McGraw-Hill 2000, ISBN:0-07-212124-6

Course Name	Electronics				الكترونيات			
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.	
	CE121	**0913121**	**4**		**4**	**1.5**	**5.5**	
Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free							
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.							
Level	2nd Semester			**Prerequisite**		0814132		

Course Description:

DC Circuits : Circuit Variables (Voltage, Current, Power, and Energy), DC Circuit Elements (Resistors, DC Voltage Sources), Simple Resistive Circuits(Resistors in Series, Resistors in Parallel, Voltage and Current Dividers) , Circuit Analysis (Ohm's Law, Kirchhoff Laws , Node-Voltage Method, Mesh Current Method, Source Transformation, Thevinin and Norton Equivalent), Maximum Power Transfer and Superposition. AC Circuits: AC Circuit Components and Simple AC Circuit Analysis . Diodes: Diode Structures, Diode Circuits, Diode Types (Zenner Diode, Varactor Diode, Schottky Diodes), Diode Clippers, Diode Limiters, Diode Clampers, and Diode Rectifications. Transistors: Bipolar Junction Transistors, N-P-N Structures, P-N-P Structures, Modes Of Operations (Active Mode, Reverse Mode and Saturation Mode), CB, CE, CC Connections, Field Effect Transistors (FET), (JFET, MESFET, MISFET, and MOSFET) , Transistor Circuits And Applications, Transistor Switching. Opto Electronics Devices: Photodiodes, LED, Lasers, Semiconductor Lasers. Integrated Circuits: Background, Advantages of Integration, Types of Integration, Monolithic And Hybrid Circuits, Evolution of Integrated Circuits, CMOS ICs, TTL ICs. Operational Amplifiers and applications**.** Student will be trained on the available software such as: Circuit maker 2000, EWB50a, MultiSim 6.01, CirCAD, DCCAD, and DCCHALING in addition with the products and components of Heathkit educational systems

Learning Outcomes:

On completion of this course, the student should be able to:

1. Understand the fundamentals of basic DC and AC circuit elements,
2. Be able to tackle the analysis of DC and AC circuits,
3. Study the basics of diodes, transistors, and optical devices,
4. Understand the principles and types of integration,
5. Study the evolution of integrated circuits, and
6. Understand the operational amplifies and their applications.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	**Mid-term**	**20%**	**Project**		**Quizzes**	**10%**
	Final	**40%**	**Lab.**	**25%**	**Participation**	**5%**

Textbook:

Thomas L. Floyd, " *Electronics Fundamentals: Circuits, Devices, and Applications*", Prentice Hall , 7th edition, 2006, ISBN 0-13-219709-0

Reference Books:

1.   Thomas L. Floyd ,"*Principles of Electric Circuits : Conventional Current Ve*rsion", 7th Edition, 2002.

2. Richard Drof," *Introduction to Electric Circuits*", John Wiley, 6th edition, 2004, ISBN 0471447951.

Course Name	Biology					الاحياء		
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.		Tot.
	Bio 101	**0816101**	**4**		**4**	**1.5**		**5.5**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	2nd Semester	**Prerequisite**	

Course Description:

Introduction to biology, structure, function and division of plant and animal cell. Classification of living beings into kingdoms. Study of biological activities (nutrition, digestion, respiration, reproduction and secretion).

Learning Outcomes:

On completion of this course, the student will gain knowledge and understanding of:

The information about the science of life and understand the activity of living beings.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	**Mid-term**	**20%**	**Project**		**Quizzes**	**10%**
	Final	**40%**	**Lab.**	**25%**	**Participation**	**5%**

Textbook:

Biology Sixth Edition
By: Campbell & Reece. Benjamin Cummings 2002 (www.aw.com)

Reference Books:

Biology Sixth Edition
By : Peter Raven & George Johnson. Wm. C. Brown Publishers, 2002

Course Name	Introduction to Statistics & Probability Theory		مقدمة في الاحصاء ونظرية الاحتمالات				

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	Math208	**0817208**	**3**		**3**	**0**	**3**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	2nd Semester	**Prerequisite**	0817111

Course Description:

Counting. Introduction to probability. Conditional probability and statistical independence. Bayes theorm. Random variables. Mathematical expectation. Variance. Covariance and the correlation coefficient for two random variables. Some important discrete distributions

Learning Outcomes:

On completion of this course, the student should be able to:

1. Identify some counting techniques

2. Know the concept of event and probability of events

3. Know the concept of conditional probability and statistical independence and apply Bays rule

4. Understand the concept of random variable , expectation, variance, and the covariance of two random variables

5. Know some of the important discrete distributions

Teaching Methodology:
  1. **Face to face Lectures using power point slides; Tutorials and Seminars**

Grading	**Mid-terms**	**60%**	**Project**		**Quizzes**	
	Final	**40%**	**Lab**		**Participation**	

Textbook:

David S. Moore: "*Introduction to the Practice of Statistics*"

Reference Book:

Arnold Allen:"*Probability, Statistics, and Queuing Theory with Computer Science Applications"*

Course Name	Object Oriented Programming (1)		البرمجة كائنية التوجه (1)				

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CS210	**0911210**	**3**		**3**	**1.5**	**4.5**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	3rd Semester	Prerequisite	0911120

Course Description:

The purpose of this course is to provide students with fundamental knowledge of object oriented programming (OOP). It emphasizes good software engineering principles and developing programming skills. Specific topics covered include: fundamental concepts of object oriented (classes, methods, instantiation communication by message, encapsulation, inheritance, overriding, dynamic dispatch, polymorphism, etc.), advanced techniques of OOP (exceptions, multithreaded programming, etc.) and some interesting packages (I/O, strings, etc.). As an OOP programmer, student will be able to translate solution problem into object oriented form, he should acquire some understanding of object oriented concepts and tools such as the Unified Modeling Language (UML), this will give student a firm foundation on which to build high-quality software systems. In practice the programming language used is JAVA, as an introduction to JAVA language; students should acquire some understanding of abstraction mechanisms, JAVA Virtual Machines (JVM) and the byte code notion.

Learning Outcomes:

On completion of this course, the student should be able to:

1. Describe the importance and power of abstraction in the context of virtual machines and

   explain the benefits of intermediate languages in the compilation process.

2. Justify the philosophy of object-oriented design and the concepts of encapsulation, inheritance and polymorphism.

3. Explain how abstraction mechanisms support the creation of reusable software components.

4. Acquire basics of how translate solution problem into object oriented form.

5. Design and implement simple programs in an object-oriented programming language.

6. Design and implement program that use exceptions and multithreads.

Teaching Methodology:
  1. **Face to face Lectures using power point slides; Tutorials and Seminars**
  2. **Lab (1.5 contact hours per week)**

Grading	Mid-term	20%	Project	15%	Quizzes	10%
	Final	40%	Lab	15%	Participation	

Textbook:

Bruce E. Wampler, "*Essence of Object Oriented Programming with JAVA and UML*", Addison Wesley 2001, ISBN: 0-201-73410-9

Reference Book:

Herbert Schildt, "*JAVA 2: The complete reference*", McGraw-Hill, 5th edition 2002, ISBN: 0072224207

Course Name	Data Structure				هياكل البيانات			

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CS211	**0911211**	**2**		**2**	**1**	**3**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	3rd Semester	**Prerequisite**	0911120

Course Description

This course is complementary to the course "Fundamentals of Programming". The aim of this course is to provide the fundamentals of data structures and algorithm design needed in the remainder of the curriculum, to introduce algorithm analysis tools, and to develop students' problem solving and computer programming skills. Topics covered include: basic elements, data types, internal representation (Arrays, records, strings, stacks, queues, trees, lists and linked lists, records and files, pointers) and data structure manipulation such as array manipulations, sorting, searching, trees and files manipulations, string processing, stacks ,queues, and list manipulations, pointer operations…The data structures representation and manipulations are exercised using ANSI-C language.

Learning Outcomes:

On completion of this course, the student should be able to:

1. Describe, construct, and use various implementations for fundamental data abstractions such as lists, stacks, queues, trees, and graphs.
2. Design and implement efficient algorithms for manipulating data Structures.
3. Compare the efficiency of various data structures and algorithms and to choose the most appropriate ones for a given application.
4. Describe the internal representation of numeric and nonnumeric data.
5. Describe the internal representation of basic and advanced data structures
6. Write programs by using fundamental and advanced data structures

Teaching Methodology:

1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	**Mid-term**	**20%**	**Project**		**Quizzes**	**10%**
	Final	**40%**	**Lab**	**25%**	**Participation**	**5%**

Textbook:

Robert Sedgewick, "*Algorithms in C: Fundamentals, data structures, sorting, searching, and graph algorithms",* Addison-Wesley 2001, ISBN: 0201756080

Reference Book:

Herbert Schildt, "*C: the complete reference*", McGraw-Hill 2000, ISBN:0-07-212124-6

Course Name	Technical Reports				التقارير الفنية			

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	IS212	**0912212**	**2**		**2**	**0**	**2**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	3rd Semester	Prerequisite	0912111

Course Description:

This course is designed to help students develop an effective method of planning and completing writing tasks so that student can meet professional writing demands. Since succeeding in the professional world requires not only technical knowledge but also effective writing skills. This course focuses on the writing skills necessary for advanced academic and professional writing, tailored specifically to student academic career work as professional in a technical field. Successful technical communicators know how to organize and present complex information so that the ideas are understandable to many readers, viewers, and listeners. In this course, students will complete several small technical and recommendation reports on a topics related to IT related majors. Indeed, this course requires intensive writing, reading, and peer commentary.

Learning Outcomes:

On completion of this course, the student will gain knowledge of:

1. Examining sources in your field for their relevance and credibility,
2. Identify and analyze different audiences for particular types of writing,
2. Organize and present arguments effectively,
3. Write memos, letters, abstracts, short reports, and long, formal reports ,
4. Edit your own work and the work of your peers for content, organization, and style,
5. Use graphics and page layout to support and enhance your written message,
6. Present your research findings to your peers.

Teaching Methodology:
  1. **Face to face Lectures using power point slides; Tutorials and Seminars**

Grading	Mid-term	25%	Project	20%	Quizzes		15%
	Final	35%	Lab		Participation		5%

Textbook:

Woolever, K., "*Writing for the Technical Professions*", N.Y., Fourth Ed.   Longman, 2007, ISBN: 0205597882.

Reference Books:

1. Hannigan Carrie, *"Kaplan Technical Writing: A Resource for Technical Writers at All Levels"*, Kaplan Pub, 2008, ISBN: 1427797218
2. Alred *, "Handbook of Technical Writing",* 7th ed., Published by Bedford, 1997

Course Name	Digital hardware				المعدات الرقمية			

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CE213	**0913213**	**3**		**3**	**1.5**	**4.5**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	3rd Semester	Prerequisite	0913121

Course Description:

Digital Systems: digital computer and digital systems, binary, decimal, octal and hexadecimal number systems, number base conversion, complements, signed and unsigned numbers, binary codes, binary storages and registers, and binary logic. Boolean algebra and logic gates: basic definitions, axioms definitions of Boolean algebra, basic theorem and properties of Boolean algebra, Boolean functions, canonical and standard forms, logic operations, and digital logic gates. Simplification of Boolean functions: the map methods, product of sum simplification, NAND and NOR implementation, and the tabulation method. Combinational logic circuits: adders, subtractors, decoders, encoders, multiplexers, de-multiplexers, look-up table, function implementation using multiplexers/ decoders and memories . Sequential logic circuits: flip-flops, synchronous and asynchronous circuits, counters (types of counters), registers, memories, design of counters, design of sequential circuits, analysis of counters, and analysis of sequential circuits. Analog-to-digital converters and digital-to-analog converters. Programmable logic devices (PLD) : PLA, PAL and FPGA. Student will be trained on the available software such as: Circuit maker 2000, EWB50a, and MultiSim 6.01 in addition with the products and components of Heathkit educational; systems (EWS-3700 analog modules)

Learning Outcomes:
On completion of this course, the student should be able to understand:

1. The fundamentals of digital systems, Boolean algebra, and logic expressions,
2. Simplify and implement Boolean functions using elementary logic gates,
3. Study the combinational and sequential digital circuits,
4. Design and analysis of combinational and sequential logic circuits, and study briefly the advanced mask and field programmable logic devices.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	Mid-term	20%	Project		Quizzes	10%
	Final	40%	Lab.	25%	Participation	5%

Textbook:
Ronald J, Tocci, Neal S. Widmer, and Gregory L. Moss, "*Digital Systems: Principles and Applications*", Prentice Hall, 10th edition, 2006, ISBN 0-13-172579-3

Reference Books:
M. Morris Mano,"*Logic Computer Design Fundamentals and Xilinx Student Edition 4.2 Package*", Prentice Hall, 3rd Edition, 2004, ISBN 0-13-124711-5.

Course Name	Communication and Network Fundamentals			اساسيات الاتصالات والشبكات				
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.	
	CN214	**0914214**	**3**		**3**	**1.5**	**4.5**	

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	3th Semester	**Prerequisite**	0911110

Course Description:

Fundamentals of data communications: Essential Elements Of Data Communications: Simplex, Half-Duplex and Full Duplex Transmission, Analogue And Digital Signals, Periodic and Non Periodic Signals , Signal Parameters, Time and Frequency Domains Concepts, Types of Channels, Transmission Impairment). Transmission Media: Guided Media, Unguided Media, and Types of Propagation. Basic concepts of networking: network concepts, network criteria, and network applications and benefits. Configurations, topologies and categories of networks: line configuration, network topologies (mesh, star, tree, bus, ring, hybrid), scopes of networks (LAN, WAN, MAN), internetwork or internet, types of network connection (peer-to-peer network, server based network, combined network), intranet and extranet. Introduction to OSI and TCP/IP models: The OSI Model The OSI layers, TCP/IP Protocol Suite. Error detection and correction techniques: VRC, LRC, CRC, Checksum, and Hamming code techniques. Circuit and packet switching. Data link layer control: framing, error control, and flow control. Networking and internetworking devices. Student will be trained on the existing components and product related to Cisco such as wireless networking, Switches, routers, etc. in addition with the products, components and software of Heathkit educational systems for wireless networking.

Learning Outcomes:

On completion of this course, the student should be able to understand:

1. Fundamentals of data communication, and transmission media,
2. Fundamentals of Networking, Network protocols, and networking devices,
3. Circuit and packet switching,
4. Data link layer concepts and control,
5. Error detection and correction techniques, and
6. Networking and internetworking devices.

Teaching Methodology:

1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	**Mid-term**	**20%**	**Project**		**Quizzes**	**10%**
	Final	**40%**	**Lab.**	**25%**	**Participation**	**5 %**

Textbook:

Behrouz A Forouzan, "*Data Communications and Networking*," 4th Edition, McGraw-Hill, 2007, ISBN 0072967757.

Reference Books:

1. William Stallings, "*Data and Computer Communication*", Pearson Education, 7th Edition, 2003, ISBN 0131006819.
2. Andrew S. Tanenbaum, "*Computer Networks*", Prentice Hall and Pearson Education, 5th edition, 2003, ISBN 0-13-066102-3.

Course Name	Discrete math				الرياضيات المتقطعة			
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.	
	Math301	**0817301**	**3**		**3**	**0**	**3**	

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	3rd Semester	**Prerequisite**	0817208

Course Description:

Integer functions. Equivalence modulo n, and its uses. The binomial theorem. Permutations and combinations. Counting methods: generating functions and recurrence relations. Computing generating functions. Using generating functions in counting. Graph theory. Paths and circuits. Shortest paths. Trees, binary trees, search trees, matrices and matrix operations concepts.

Learning Outcomes:

On completion of this course, the student should be able to:

1. Identify integer functions and some important relations on the integers

2. Know counting permutations and combinations

3. Know generating functions and their role in counting and the method for computing theses functions

4. Know graphs and paths and their applications

5. Know trees and their use in searching

6. Know the matrices and matrix operations

Teaching Methodology:
  1. **Face to face Lectures using power point slides; Tutorials and Seminars**

Grading	**Mid-term**	**30%**	**Assignments**	**10%**	**Quizzes**	**15%**
	Final	**40%**	**Lab**		**Participation**	**5%**

Textbook:

Seymour Lipschutz and Mark Lipson**,**" *Discrete Mathematics*" McGraw-Hill, second edition, 1997 ISBN 0070380457

Reference Book:

Kennetk Rosen "*Discrete Mathematics and its Applications*" , McGraw Hill, fourth edition, 1999, ISBN 0072899050

Course Name	Object Oriented Programming (2)				البرمجة كائنية التوجه (2)			

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CS220	0911220	3		3	1.5	4.5

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	4th Semester	Prerequisite	0911210

Course Description

Students should be able to move on to more advanced programming techniques after taking the first object oriented programming course. The main purpose of course consists of the advanced object-oriented programming techniques such as: applets, event-driven programming, application programming interfaces (APIs) and the object oriented graphical user interfaces using SWING. Students should acquire some understanding to create a simple application that supports a graphical user interface and implement simple procedures that perform simple graphical transformations (graphics API, color models, affine transformation), design and implement event-driven programs that respond to user events (event-handling methods, event propagation, exception handling). Finally, the software validation and the testing techniques is studied (test plan creation, test case generation, black-box and white-box testing techniques, object-oriented testing), emphasis will be placed on how create, evaluate, and implement a test plan for a medium-size object oriented code.

Learning Outcomes:

On completion of this course, the student should be able to:

1. Describe the appropriateness of graphics architectures for given applications.

2. Explain the value of APIs in software development and Create images using a standard graphics API.

3. Implement applets and programs that use large-scale API packages and create images using a standard graphics API.

4. Use SWING to create a simple application that supports a graphical user interface.

5. Distinguish between program validation and verification and between the different types and levels of testing.

6. Discuss the issues involving the testing of object-oriented software

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	Mid-term	20%	Project	15%	Quizzes	10%
	Final	40%	Lab	15%	Participation	

Textbook:

Kathy Walrath, "*The JFC Swing Tutorial: A Guide to constructing GUIs*", Addison-Wesley, 2nd edition 2004, ISBN: 0201914670

Reference Book:

Herbert Schildt, "*The Complete Reference JAVA 2*", McGraw-Hill, 5th edition 2002, ISBN: 0072224207

Course Name	Operating Systems				نظم التشغيل			

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CS221	**0911221**	**3**		**3**	**1.5**	**4.5**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	4th Semester	**Prerequisite**	0913213

Course Description:

In this course the student will study the basic concepts of operating systems (OS), the following concepts will be studied in this course**:** OS Overview (objectives, functions, evolution of OS, characteristics of modern OS), process description and control (process definition, process states, process description and process control), threads (definition, why use thread, relationship between processes and threads), microkernel (benefits of microkernel organization, microkernel design), uni-processor scheduling (types of scheduling, short term scheduling criteria, scheduling algorithms), memory management (memory management requirements, loading programs into main memory –fixed partitioning, dynamic partitioning, simple paging, simple segmentation-), virtual memory (paging, segmentation, combined paging and segmentation), operating system software (fetch policy, placement policy, replacement policy, resident set management, cleaning policy, load control), I/O management and disk scheduling (I/O devices, organization of I/O function, I/O buffering, disk I/O), and file management (file management system, file organization and access, file directories, secondary storage management).

Learning Outcomes:

On completion of this course, the student should be able to:

3. Understand the basic concepts underlying operating systems and how a typical operating system works.
2. Describe the functions and design of operating systems.
3. Understand the main concept behind traditional (non-distributed) operating systems.
4. Analyze and explain the Algorithms used in Virtual Memory Management.
5. Discuss the algorithms used in I/O and File Management.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	**Mid-term**	**20%**	**Project**		**Quizzes**	**10%**
	Final	**40%**	**Lab**	**25%**	**Participation**	**5%**

Textbook:

W. Stallings, "*Operating Systems: Internals and Design Princ**iples**"*, Prentice Hall International, 5th edition 2005, ISBN: 0-13-147954-7

Reference Books:

Jean Bacon, Tim Harris "*Operating Systems*", Addison-Wesley 2003, ISBN: 0321117891.

Course Name	Database Concepts and Design			مفاهيم وتصميم قواعد البيانات				
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.	
	IS222	**0912222**	**3**		**3**	**1.5**	**4.5**	

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	4th Semester	**Prerequisite**	0912111

Course Description:

This course aims to discuss the basic concepts and design of database. It covers topics such as: data model, levels of abstraction, data independence, and concurrency control. Focuses on how to design databases for given problems, and how to use database effectively, these including ER model, key and participation constraints, weak entities, class hierarchies, aggregation and conceptual DB design using the ER model. Relational model: creating and modifying relation using query language, enforcing integrity constrains, ER to relational and view. Schema refinement and normal forms: Functional dependencies, reasoning about functional dependencies, normal forms, decompositions and normalization. Relational Queries: Relation algebra and calculus and commercial query languages. Object database systems: User defined abstract data type, structured types, objects; object identity; and reference type, inheritance, and database design for an ORDBMS. Students will be trained on some software tools such as: Oracle, Sybase, DB2, and Informix.

Learning Outcomes:

On completion of this course, the student should be able to:

1. Describe and discuss the concepts of database design.
2. Students learn how to design a conceptual data model and logical database model, convert the logical database designs to physical designs and develop the physical database.
3. Students learn how to evaluate a set of query using relational algebra and calculus.
4. Students learn how to evaluate a set of query using query language.
5. Discuss and explain database design for an ORDBMS.

Teaching Methodology:
   1. **Face to face Lectures using power point slides; Tutorials and Seminars**
   2. **Lab (1.5 contact hours per week)**

Grading						
	Mid-term	20%	**Project**	15%	**Quizzes**	10%
	Final	40%	**Lab**	10%	**Participation**	5%

Textbook:

Elmasri, Ramez. Navathe, Shamkant B, "*Fundamentals of Database Systems*" Addison-Wesley, Fifth Edition 2006, ISBN: 0321369572

Reference Books:

1. Elmasri, R., Navath,S., and Navath, B.,"*Fundamentals of Database Systems*" , Addison-Wesley, 4th Ed., 2003, ISBN 0321122267.
2. Date, C. J., "*Introduction Database Systems*", Addison-Wesley, 8th ed., 2003, ISBN 0321197844.

Course Name	Network Protocols and E-Commerce Technology			بروتوكولات الشبكات والتجارة الالكترونية				
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.	
	CN223	**0914223**	**3**		**3**	**1.5**	**4.5**	
Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free							
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.							
Level	4th Semester			**Prerequisite**	0914214			

Course Description:

This course covers two parts. The first part of the course covers the principles underlying the interconnection of large numbers of computers and includes transmission technologies: Ethernet, optical fiber, gigabit networks, cellular transmission and infrared. This course covers also the network technologies: servers clients, access control, intranets, reliable message passing, and interoperability. The second part of the course covers the electronic commerce technology. Topics include: communication and networking, mobile E-Commerce, and architecture of Web systems, data interchange, electronic payments, and all relevant application tied to EC (virtual stores, electronic government, etc...) with appropriate EC suites relying on appropriate tools like php, asp, asp-net, etc. Student will be trained on the existing components and product related to Cisco such as wireless networking, Switches, routers, etc. in addition with the products, components and software of Heathkit educational systems for wireless networking

Learning Outcomes:

On completion of this course, the student should be able to:

1. Understand the software required to support a network,
2. Acquire knowledge underlying the interconnection of large number of computers and protocols that handle their interconnection,
3. Understand the hardware and interface components of a computerized communication network,
4. Understand most recent network technologies and underlying concepts such as servers clients, access control, intranets, reliable message passing, and interoperability,
5. Design efficient EC software (virtual stores, electronic government, etc) with appropriate EC suites relying on appropriate tools like php, asp, asp-net, etc.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	Mid-term	20%	Project		Quizzes	10%
	Final	40%	Lab	25%	Participation	5%

Textbooks:

1) B.A. Fourouzan, "*Data communication and networking*", 4th edition, 2004.
2) Jim A. Carter, "*Developing e-Commerce Systems*", Prentice Hall, 2002, ISBN: 0-130911127

Reference Books:

1. Hunt, Craig , "*TCP/IP Network administration*", Computers-O'Reilly programming series, Ed. Loukides,Mike, 1997, ISBN: 1565923227.
2. Harvey M. Deitel, Paul J. Deitel, Tem Nieto, Deitel, "*e-Business and e-Commerce How to Program*", Prentice Hall, 2001, ISBN: 0-13-028419-X .

Course Name	Business I (Management: Fundamentals and Skills)			اعمال -1 (الادارة : مفاهيم ومهارات)				
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.	
	MGT290	**0622290**	**3**		**3**	**0**	**3**	

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	4th Semester	**Prerequisite**	0912111

Course Description:

This course introduces the essentials of management as they apply within the contemporary work environment. It combines a focused overview of recent scholarship with a practical approach to key functional areas (planning, organizing, leading, and controlling). Topics include the dynamic new workplace, management- past to present, ethical behavior and social responsibility, environment, global dimension of management, entrepreneurship and small business, foundation of planning, mission, goal setting, strategy formulation and implementation, planning tools and techniques, managerial decision making, organizational design and processes, managing change and innovation, individual and group behavior, communication and information technology, interpersonal skills, managing personal stress, time management, and creativity, corporate culture, work teams, motivation and leadership, empowering and delegation, managing conflict, foundation of control and value chain management.

Learning Outcomes:

On completion of this course, the student should be able to understand the followings:

1. Foundations of planning and decision making,
2. Basic organization designs,
3. Leadership and fundamentals of individual & group behavior, and
4. Principles of control and value chain management.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**

Grading	**Mid-term**	30%	**Project**		**Quizzes**	15%
	Final	50%	**Lab**		**Participation**	5%

Textbook:

Robbins, S. and Coulter, M. *Management with One Key*, 8e, Prentice Hall, 2005. ISBN: 0-13-143994-4

Reference Book:

Schermerhorn, J. *Management*, 8, Wiley, John&Sons, Inc. 2004. ISBN: 0471454761

Course Name	Professional Responsibility			المسؤولية المهنية				

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	IS312	**0912312**	2		**2**	**0**	**2**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☒ Comp Science ☒ Information System ☒ Comp Network ☐ Comp Eng.

Level	5th Semester	**Prerequisite**	0912212

Course Description:

This course introduces the students to the legal, social, and ethical issues of information technology and use; information rights, property rights, liability, accountability, privacy, security, crime, ethical principles, codes of ethics, "the digital divide", role of PTTs, role of government, role of law enforcement, role of business and industry; professional conduct, social responsibility , and rigorous standards for software testing and reliability, students read, write, discuss, and present reports on these topics, fraud and abuse, electronic communication privacy, mail fraud, credit card abuse, privacy protection, copyright and patent statute, communication decency, law and computer, software engineering code of ethic, name dispute resolution policy.

Learning Outcomes:

After completion of this course, the student will be able to
1. Demonstrate the social and ethical impacts of information technology.
2. Make distinction between positive and negative rights.
3. Acquire knowledge regarding ethical issues generated by information technology.
4. Make distinction in crime fighting versus privacy and civil liberties.
5. Understand the concept of rights & laws related to Intellectual Property.
6. Make ethical guidelines for technology professionals.
7. Describe the impact of technology on employment.
8. Develop skills in clarifying and ethically analyzing realistic cases that involve information technology.
9. Exercise and improve skills in critical analytical writing.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**

Grading	**Mid-term**	30%	**Project**		**Quizzes**	15%
	Final	50%	**Lab**		**Participation**	5%

Textbook:

Ali Selehnia,." **Ethical Issues of Information Systems**", Idea Group Publishing, 2002, ISBN 01931777152.

Reference Book:

Ernest Kallman and John Grillo, "**Ethical Decision making &Information Technology: an introduction with cases**", 2nd edition, 2001.

Course Name	Mathematical Foundations of Computer Networking				الأساسات الرياضية لشبكات الكمبيوتر			
Course Information	Course Code	Course No	Credit Units	Contact Hours		Lec.	Lab.	Tot.
	CN310	**0914310**	**3**			**3**	**0**	**3**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.

Level	5th Semester	**Prerequisite**	Intro. to Statistics and Probability theory(0817208)

Course Description:

This course will cover five topics that are relevant in the area of computer networking: Optimization: System modeling, Optimization, Linear programming, Integer linear programming, Non-linear optimization - constrained and unconstrained, Lagrangian optimization, Hill-climbing, Simulated annealing, and Genetic algorithms Queueing Theory: Stochastic processes, Markov processes, Markov analysis, M/M/1 queues, Variations on the M/M/1 queue. Game Theory: Preferences and Utilities, Terminology, Solution concepts, Mechanism design Statistics.: Sampling a population, Describing a sample parsimoniously, Inferring population parameters, Comparing outcomes, Fitting a distribution, Inferring independence and dependence, Dealing with large data sets.

Learning Outcomes:

On completion of this course, the student will gain knowledge and understanding of:

1. Mathematical arguments and principles, and the basic mathematics of the strands he choose;

2. Knowledge of numerical analysis aspects of optimization methods

3. Understand the concepts of queuing theory

4. Understand the concepts of game theory

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**

Grading	☒ **Mid-term**	30%	☒ **Home Work**	10%	☒ **Quizzes**	15%
	☒ **Final**	40%	☐ **Lab**		☒ **Participation**	5%

Textbook:

1. Philip Gill, Walter Murray, and Margaret H. Wright, *Practical optimization*, Academic Press, ISBN: 0122839528

2. Martin J. Osborne and Ariel Rubinstein, *A Course in Game Theory,* MIT Press , ISBN: 0262650401

Reference Book:

1. Leonard Kleinrock, *Queueing Systems*, *Volume 1: Theory*, Wiley-Interscience, ISBN: 0471491101

2. William Navidi, *Principles of Statistics for Engineers and Scientists* , Mc-Graw Hill, I Edition, 2009, ISBN 0077209315.

3. Dimitris Bertsimas and John N. Tsitsiklis, *Introduction to Linear Optimization*, Athena Scientific ISBN:1886529191

4. Mario Lefebvre, *Applied Probability And Statistics*, Springer-Verlag, ISBN: 0387284540

Course Name	Introduction to Routing and Switching					مقدمة في التوجيه والتبديل		

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CN311	**0914311**	**3**		**3**	**1.5**	**4.5**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.

Level	5th Semester	**Prerequisite**	Net. Protocols & E-Commerce Technology (0914223)

Course Description:

ARP, Ethernet, IP Addressing, & Subnetting Review, CISCO IOS Basics, Bridge & Switch Operations Bridge Types, Bridge Enhancements, Bridging Loops & Spanning Tree Algorithm(802.1d) Network Layer/Routing Basics, Routing Tables Workstation Decision Process, ICMP & ICMP Redirect, Basic Router Configuration, Convergence, Static vs. Default Routes vs. Dynamic, Router Discovery Protocol, Routing Protocols, RIP Version 1, Routing Loops & Solutions – Count to Infinity, Maximum, Split Horizon, Poison Reverse, Hold Down Timers, Triggered Updates, RIP V2, Routing vs. Routed Protocols, Autonomous Systems, Exterior and Interior Gateway Protocols, OSPF, VLANs, VTP, STA implementation with VLANS, Trunking, Access Control Lists

Learning Outcomes:

On completion of this course, the student should be able to:

1. Understand fundamental principles of Implementation for a LAN and WAN approved network design.
2. Configure a switch with VLANs and inter-switch communication.
3. Create and Implement access lists to permit or deny specified traffic.
4. Implement WAN links.
5. Configure routing protocols on network devices.
6. Perform LAN, WAN, and VLAN troubleshooting using a structured methodology and the OSI mode.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	☒ **Mid-term**	**20%**	☐ **Project**		☒ **Quizzes**	**10%**
	☒ **Final**	**40%**	☒ **Lab**	**25%**	☒ **Participation**	**5%**

Textbook:

Cisco Network Academy, *CCNA Discovery Course Booklet: Introducing Routing and Switching in the Enterprise*, Version 4.0, Cisco, ISBN: 1587132567

Reference Book:
1. Mark Sportack, *IP Routing Fundamentals*, Cisco Press, ISBN: 157870071X
2. Matthew J. Castelli, *LAN Switching first-step*, Cisco Press, ISBN: 1587201003

Course Name	System Administration				إدارة الأنظمة		
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CN313	**0914313**	**3**		**3**	**1.5**	**4.5**
Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free						
	☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.						
Level	5th Semester			**Prerequisite**	Operating Systems(0911221)		

Course Description:

Introduction to basic system administration of networked UNIX systems, Review of UNIX and & Hardware, Overview of basic PC hardware, Essential Administrative Tools and Techniques, Startup and Shutdown- system boot process, administration utilities, and management of user accounts and groups, Sharing System Files, Security, Print Services, Backup and restore, basic networking.

Learning Outcomes:
After successful completion of this course students will be able to:
1. Describe the role/scope of a system and network administrator
2. Install various operating systems
3. Manage computer systems and undertake operational tasks
4. Provide network services to users
5. Identify security policies and to apply necessary preventive & corrective steps
   to secure a system/network
6. Apply scripting tools for automating system administration

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	☒ **Mid-term**	20%	☐ **Project**		☒ **Quizzes**	10%
	☒ **Final**	40%	☒ **Lab**	25%	☒ **Participation**	5%

Textbook:
Frisch, A Eleen, *Essential System Administration*, 3rd Edition, O'Reilly, ISBN: 0596003439

Reference Book:
1. Evi Nemeth, Snyder, Seebass, Hein, *Unix System Administration Handbook*, 3rd Edition, Prentice Hall PTR, ISBN: 0-13-020601-6
2. Evi Nemeth, Snyder, Hein, *Linux Administration Handbook*, Prentice Hall PTR, ISBN: 0-13-008466-2
3. Thomas A. Limoncelli, Christina J. Hogan, Strata R. Chalup, *The Practice of System and Network Administration*, Second Edition, Addison Wesley, ISBN:0321492668

Course Name	Telecommunication Networks				شبكات الاتصالات			

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CN314	**0914314**	**3**		**3**	**0**	**3**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.

Level	5th Semester	**Prerequisite**	Net. Protocols & E-Commerce Technology (0914223)

Course Description:

Analog and digital transmission, modulation and demodulation, transmission media, data encoding, synchronous and asynchronous transmission, digital carriers, error control, multiplexing, circuit and packet switching, open system standards. PDH and SDH multiplexing structures, network elements, network management.

Learning Outcomes:
On completion of this course, the student should be able to understand:

1. General architecture of a Telecommunication Network and its importance in society.
2. Essential features of PCM including delta modulation, nyquist sampling and encoding.
3. The concepts of timing and multiplexing in the context of Plesiochronous digital hierarchy (PDH)
4. Multiplexing method of PDH and its multiplexing mountain problem
5. The architecture of Synchronous digital hierarchy (SDH) and multiplexing structure of SDH.
6. Elements of SDH networks and their management.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	☒ **Mid-term**	**20%**	☒ **Project**	**25%**	☒ **Quizzes**	**10%**
	☒ **Final**	**40%**	☐ **Lab**		☒ **Participation**	**5%**

Textbook:
1. Roger L. Freeman, *Fundamentals of Telecommunications*, 2nd Edition, 2005, Wiley-IEEE press, ISBN: 0471710458
2. Behrouz A. Forouzan, *Data Communications and Networking* , 4th Edition, 2007, McGraw-Hill**,** ISBN: 0072967757

Reference Book:
1. William Stallings, *Data & Computer Communications*, 8th Ed, Prentice-Hall 2006, ISBN: 0132433109
2. Sheram Hekmat, *Communication networks,* Pragsoft corporation, http://www.pragsoft.com

Course Name	Computer System Security			أمن أنظمة الحاسب			

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CN320	**0914320**	**3**		**3**	**0**	**3**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.

Level	6th Semester	**Prerequisite**	Operating Systems (0911221)

Course Description:

Introduction: Basic concepts: threats, vulnerabilities, controls; risk; confidentiality, integrity, availability; security policies, security mechanisms; assurance; prevention, detection, deterrence Basic cryptography: Basic cryptographic terms, Historical background' Symmetric crypto primitives, Modes of operation, Cryptographic hash functions, Asymmetric crypto primitives Program security: Flaws: Malicious code: viruses, Trojan horses, worms, Program flaws: buffer overflows, time-of-check to time-of-use flaws, incomplete mediation, Defenses: Software development controls, Testing techniques. Security in conventional operating systems: Memory, time, file, object protection requirements and techniques, Protection in contemporary operating systems, Identification and authentication. Trusted operating systems: Assurance; trust, Design principles, Evaluation criteria, Evaluation process. Database management systems security: Database integrity, Database secrecy, Inference control, Multilevel databases. Network security : Network threats: eavesdropping, spoofing, modification, denial of service attacks, Introduction to network security techniques: firewalls, virtual private networks, intrusion detection, Management of security: Security policies, Risk analysis, Physical threats and controls. Miscellaneous: Legal aspects of security, Privacy and ethics.

Learning Outcomes:

On completion of this course, the student should be able to:
1. Critically analyze and describe elements of Computer System Security.
2. Critically analyze and describe a selection of hardware and physical layer security solutions.
3. Research and analyze network security issues and solutions from the LAN and WAN (Internet) perspectives. (Students will submit and present a minor assignment based on a hypothetical or real life network system design)
4. Critically evaluate platform specific operating systems and application security issues and solutions. (Range: security issues of popular (e.g. Linux, Windows and significant Proprietary OSs) including multi tier client server architecture systems, networking devices etc.)
5. Analyze a given case study with a view to determining and evaluating possible security solutions.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**

Grading	☒ **Mid-term**	**30%**	☐ **Project**		☒ **Quizzes**	**15%**
	☒ **Final**	**50%**	☐ **Lab**		☒ **Participation**	**5%**

Textbook:
1. Charles P. Pfleeger and Shari L. Pfleeger, *Security in Computing* , 4th edition, Prentice-Hall,2006, ISBN: 0132390779

Reference Book:
1. Matt Bishop, *Introduction to Computer Security*, Addison Wesley; ISBN 0-321-24744-2
2. Gildas Avoine, Pascal Junod and Philippe Oechslin, *Computer System security - Basic Concepts and Solved Exercises,* EPFL Press, 2007, ISBN: 978-2-940222-14-8

Course Name	Mobile and Wireless Networks			الشبكات اللاسلكية والمتحركة				

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CN321	0914321	3		3	1.5	4.5

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.

Level	6th Semester	Prerequisite	Introduction to Routing and Switching (0914311)

Course Description:

The purpose of this course is to develop advanced network building skills and to study performance issues in advanced wireless and mobile networks. It covers current topics in wireless and mobile networks, including wireless media access control protocols, wireless network routing, congestion control, location management, mobile transport protocols and quality of service in wireless networks. It also investigate other areas important in the design of wireless and mobile networks required for supporting mobile distributed application, including mobile middleware and object architecture, mobile transaction, remote execution and mobile RPC, cache strategies for wireless networks. Other recent areas that are increasingly important are wireless ATMs and multimedia communication support.

Learning Outcomes:

On completion of this course, the student should be able to understand:

1. Wireless communications technologies and basic architecture of wireless communication system.
2. The challenges in wireless communication such multipath, media access control, wireless network routing, congestion control and quality of service.
3. Wireless LAN networks using IEEE 802.11 standard.
4. Cellular networks in terms of evolution, architecture and standards i.e. GSM.
5. Principles of addressing and routing to mobile users; Mobile IP, handling mobility in networks and higher layer protocols.
6. Wireless ATM and multimedia communication support.

Teaching Methodology:
  1. **Face to face Lectures using power point slides; Tutorials and Seminars**
  2. **Lab (1.5 contact hours per week)**

Grading	☒ Mid-term	20%	☐ Project		☒ Quizzes	10%
	☒ Final	40%	☒ Lab	25%	☒ Participation	5%

Textbook:
  1. Kaveh Pahlavan, Prashant Krishnamoorthy, *Principles of Wireless Networks - A united approach* –John Wiley & Sons Inc., 2nd Revised edition, ISBN: 0470697083.

Reference Book:
  1. Mazliza Othman, Principles of Mobile Computing & Communications, Auerbach 2007, ISBN: 1420061585.
  2. David Tse, Fundamentals of Wireless Communication, Cambridge University Press, 2005, ISBN: 0521845270.
  3. Amitabh Kumar, Mobilebroadcasting with WiMAX:Priciples Technology and Applications, Focal Press, 2008, ISBN: 0240810406
  4. John Ross, The Book of Wireless: A Painless Guide to WiFi and broadband Wireless, Starch Press, 2008, ISBN: 1593271697.

Course Name	Distributed Operating System			نظم التشغيل الموزعة			
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CN322	**0914322**	**3**		**3**	**0**	**3**
Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free						
	☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.						
Level	6th Semester			**Prerequisite**	Operating Systems (0911221)		

Course Description:
Characterization of distributed systems, architectural models of distributed models, inter process communication, distributed objects and remote invocation, name services, time and global states, coordination and agreement, transactions and concurrency control, distributed transactions, replication, and distributed algorithms. One or more of the following case studies: Peer-to-Peer Systems, Distributed File Systems, Distributed Shared Memory, Web Services, and CORBA.

Learning Outcomes:
On completion of this course, the student should be able to:
1. Understand the different distributed architectures such as peer-to-peer, client server
2. Understand the different protocols that control the operation of distributed systems such as: inter-processes communication protocols, distributed objects and remote invocation, time synchronization protocols.
3. The student will be able to characterize the different distributed architectures
4. The student will be able to differentiate between different distributed architectures

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**

Grading	☒ **Mid-term**	30%	☐ **Project**		☒ **Quizzes**	15%
	☒ **Final**	50%	☐ **Lab**		☒ **Participation**	5%

Textbook:
1. Andrew Tannenbaum and Maarten van Steen, *Distributed Systems: Principles and Paradigms*, 2nd edition, Prentice Hall, 2006, ISBN: 0132392275 .

Reference Book:
1. Jean Dollimore, Tim Kindberg and George Coulouris , *Distributed Systems: Concepts and Design*, 4th Edition, Addison Wesley, 2005, ISBN: 0321263545.
2. Andrew S Tanenbaum, *Modern Operating Systems*, Prentice Hall, 3rd Edition, 2007, ISBN: 0136006639

Course Name	Introduction to Network Programming			مقدمة في برمجة الشبكات				

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.	
	CN323	**0914323**	**3**		**3**	**1.5**	**4.5**	

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.

Level	6th Semester	**Prerequisite**	Introduction to Computing (0911110)

Course Description:

Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application. Sockets : Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.TCP client server : Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt() and setsockopt() functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options. Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP. Elementary name and Address conversions: DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.IPC : Introduction, File and record locking, Pipes, FIFOs streams and messages, Name spaces, system IPC, Message queues, Semaphores. Remote Login: Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC Transparency Issues.

Learning Outcomes:

Having successfully completed this course, the student should be able to:

1. Understand advanced knowledge of networking
2. Develop an appropriate client/server model for an internet aware application.
3. Critically analyze the sockets interface requirements of a given application.
4. Design, write and test, programs that use the POSIX socket API.
5. Discuss applications, protocols or algorithms of current interest to the network application development research community.

Teaching Methodology:

1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	☒ **Mid-term**	**20%**	☐ **Project**		☒ **Quizzes**	**10%**
	☒ **Final**	**40%**	☒ **Lab**	**25%**	☒ **Participation**	**5%**

Textbook:

1. W.Richard Stevens, *UNIX Network Programming*, Vol. I, Sockets API, 3rd Edition. - PearsonEdn. Asia, ISBN: 0131411551
2. W.Richard Stevens, *UNIX Network Programming*, 1st Edition, PHI, ISBN: 0139498761

Reference Book:

1. T Chan, *Unix Systems Programming Using C++*, Phi ,ISBN: 0133315622
2. Graham Glass, King Ables, *Unix for Programmers and Users, 3RD Edition*, Pearson Education, ISBN: 0130465534
3. M J Rochkind, *Advanced UNIX programming, 2nd edition*, Pearson education, ISBN: 0131411543
4. D. E. Comer, *Computer Networks and Internets*, Prentice Hall, Englewood Cliffs, NJ, USA, 5th Edition, 2008, ISBN: 0136061274

Course Name	Network Simulation and Modeling				محاكاة ونمذجة الشبكات			
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.	
	CN324	**0914324**	**3**		**3**	**1.5**	**4.5**	

Track

☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free

☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.

Level	6th Semester	Prerequisite	Mathematical foundations of computer Networking (0914310)

Course Description:

Introduction to simulation concepts, discrete event simulation, random number generation, input modeling; statistical analysis of simulation, computer networks simulation, Discrete time Markov chains (DTMC), Continuous time Markov chains (CTMC), Queuing models (M/M/1, M/M/c/k, M/G/1). Well-known network simulation packages such as ns2 and/or OPNET, are considered.

Learning Outcomes:

On completion of this course, the student should be able to understand:

1. How to quantity traffic and understand traffic models (queuing theory).

2. Discrete event simulation concept and develop examples.

3. Queuing models such as M/M/1, M/D/1/ and M/M/c/k, calculations of service time, mean waiting time and other performance parameters.

4. Network simulation packages such as NS-2 and Opnet and develop simulation models.

5. Basic aspects of network simulation and modeling.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	☒ **Mid-term**	**20%**	☐ **Project**		☒ **Quizzes**	**10%**
	☒ **Final**	**40%**	☒ **Lab**	**25%**	☒ **Participation**	**5%**

Textbook:
1. Matthew N. O. Sadiku and Mohammad Ilyas, *Simulation of Local Area Networks*, CRC Press, Inc.**,** ISBN: 0849324734

Reference Book:
1. Raj Jain, *The Art of Computer Systems Performance Analysis: Techniques of Experimental Design, Measurement, Simulation, and Modeling*, New York: John Wiley and Sons, Inc., ISBN: 0471503363

2. Emad Aboelela, *Network Experiments Manual for Peterson/Davie Computer Networks,* 4/*e*, Morgan Kaufmann; 2nd edition, 2007, ISBN: 0123739748

Course Name	Adhoc and Sensor Networks				شبكات الاستشعار والشبكات غير المنظمة			

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CN411	**0914411**	**3**		**3**	**1.5**	**4.5**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.

Level	7th Semester	**Prerequisite**	Mobile and Wireless Networks (0914321)

Course Description:

The goal of this course is to understand the challenges and latest solutions in wireless and mobile networks ad-hoc and wireless sensor networks. The focus will be on routing, auto-configuration, clustering, topology management, quality of service (QoS) reliable transport, energy conservation, mobility management, MAC, and service discovery. Both existing and proposed standards will be covered as well as current research projects in this field. Students are expected to read articles, make presentations, and participate in discussions. fundamental security issues in wireless networks security topics includes: confidentiality, Privacy, Integrity, Spoofing signal Intercept, Key management and distribution and control of fraudulent usage of networks.

Learning Outcomes:

On completion of this course, the student should be able to:

1. Know the protocols that control the operation of Ad-Hoc networks such as : routing protocols, auto-configuration protocols, clustering, topology management and mobility management, MAC, and service discovery.
2. Know the main standards that control the operation of the Ad-hoc networks
3. Know the distinguished issues in the sensor networks such energy conservation and routing protocols.
4. Know the fundamental security issues in ad-hoc and sensor networks such as confidentiality, Privacy, Integrity, Spoofing signal Intercept, Key management and distribution and control of fraudulent usage of networks.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**
2. **Lab (1.5 contact hours per week)**

Grading	☒ **Mid-term**	20%	☐ **Project**		☒ **Quizzes**	10%
	☒ **Final**	40%	☒ **Lab**	25%	☒ **Participation**	5%

Textbook:
1. Shih-Lin Wu, Yu-Chee Tseng, *Wireless Ad Hoc Networking: Personal-Area, Local-Area, and the Sensory-Area Networks*, Auerbach Publications 2007, ISBN: 0849392543

Reference Book:
1. Ke-Lin Du, M. N. S. Swamy, Wireless Communication Systems: From RF Subsystems to 4G Enabling Technologies, Cambridge University Press, 2010, ISBN: 0521114039
2. Carlos De Morais Cordeiro, Dharma Prakash Agrawal, *Ad Hoc and Sensor Networks: Theory and Applications,* World Scientific Publishing Company, Incorporated, 2006, ISBN: 9812566813

Course Name	Network Design					تصميم الشبكات		

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CN412	**0914412**	**3**		**3**	**0**	**3**

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.

Level	7th Semester	**Prerequisite**	Network Simulation and Modeling (0914324)

Course Description:

Types of computer networks: LANs, VLANs, and WANs. Routing algorithms and routing protocols, The network development life cycle, Network analysis and design methodology, Network design issues: Manageability; Node placement and sizing; Link topology and sizing; Routing; Reliability, Data in support of network design, Structured enterprise network design, Hierarchical tree network design: Terminal assignment; Concentrator location, Mesh topology optimization, Traffic flow analysis, Analysis of loss and delay in networks, Network reliability issues

Learning Outcomes:

Having successfully completed this course, the student should be able to:

1. know the main components of the network such as : switches, routers, gateways
2. know the different topologies of the network such as : structured enterprise network and hierarchical tree network
3. know Types of computer networks: LANs, VLANs, and WANs
4. know The network development life cycle.
5. Analysis different networks in terms of Traffic flow analysis. Analysis of loss and delay in networks.
6. Design different network architectures.

Teaching Methodology:
1. **Face to face Lectures using power point slides; Tutorials and Seminars**

Grading	☒ **Mid-term**	**25%**	☒ **Project**	**20%**	☒ **Quizzes**	**15%**
	☒ **Final**	**40%**	☐ **Lab**		☒ **Participation**	**5%**

Textbook:
1. James D. McCabe, *Network Analysis, Architecture, and Design*, Third Edition, Morgan Kaufmann Publishers, Inc. 3rd Edition, 2007, ISBN: 0123704804
2. Shaun Hummel, *Network Planning and Design Guide*, Shaun Lloyd Hummel, 2006, ISBN: 0973379804

Reference Book:
1. P. Oppenheimer, *Top-Down Network Design*, Cisco Press, 2nd edition, ISBN: 1587051524
2. T. Quinn-Andry and K. Haller, *Designing Campus Networks*, Cisco Press, ISBN: 1578700302
3. Peter Rybaczyk, *Cisco Network Design Solutions for Small-Medium Businesses*, CISCO Press, ISBN: 1587055341

Course Name	Project Proposal					مقترح مشروع		
Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.	
	CN 410	0914410	2		2	**0**	2	

Track	☐ University Requirement ☐ Common ☐ Core ☐ Elective ☐ Free
	☐ Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.

Level	7ᵗʰ Semester	**Prerequisite**	Department Approval

Course Description:

In this course, students choose a project subject and define the objectives of the project under the supervision of a faculty member, and prepare the project proposal including: defining the statement of the problem, defining system requirements, defining different candidate solutions for the problem of study, making feasibility study for different candidate solutions, defining the best candidate solution, defining time table schedule. Students should present the project interim report at the end of the semester, grading will be obtained by oral examination to be held by a committee from faculty members. Students will be allowed to work individually or in groups .

Learning Outcomes:

1. Formulate a real-world problem and develop its requirements.
2. Develop a design solution for a set of requirements.
3. Work as a responsible member, and possibly a leader, of a team in developing software solutions.
4. Express technical ideas, strategies and methodologies in written form.
5. Express technical and behavioral ideas and thought in oral settings and prepare and conduct oral presentations.
6. Self-learn new tools, algorithms, and/or techniques that contribute to the software solution of the project.

Teaching Methodology:
1. **Regular meetings (the Time of meeting is decided by the student and the supervisor)**

Grading	**Supervisor**	30%
	Final discussion (panel)	**70 %**

Textbook:

Reference Book:
Lynn E. Miner & Jeremy T. Miner , "**Proposal Planning and Writing**", Greenwood Publishing Group; 3ʳᵈ edition (February 28, 2003), ISBN 1573564982.

Course Name	Project Implementation					تنفيذ مشروع		

Course Information	Course Code	Course No	Credit Units	Contact Hours	Lec.	Lab.	Tot.
	CN 420	0914420	3		3	**0**	3

Track	☐ University Requirement ☐ Common ☒ Core ☐ Elective ☐ Free
	☐Comp Science ☐ Information System ☒ Comp Network ☐ Comp Eng.

Level	8th Semester	Prerequisite	0914410

Course Description:

Project implementation course offers students an opportunity to assemble their knowledge acquired throughout their BS curriculum to realize a final project. This would require them to gather information about the proposed subject and realize a final report as well as to develop a system practically. At this stage, students must carry on all phases of system analysis, design, and implementation of the subject already defined in the precedent course (Project proposal), and under the supervision of the same supervisor. At the end of the semester, students are asked to make an oral presentation with the presence of faculty members as referees.

Learning Outcomes:

1.   acquire new knowledge and skills and apply them in a real life project.
2.   implement the selected solution
3.   learn how to test the implementation
4.   readjust and make the necessary changes on the implemented system.
5.   make and write the necessary documentation
6.   present project work.

Teaching Methodology:

1.   **Regular meetings (the Time of meeting is decided by the student and the**

Grading	**Supervisor**	30%
	Final Discussion (panel)	70 %

Textbook:

Reference Book:
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