Courses descriptions

Courses of Semester 1

Course Name	Computer Skills	Course Code	English	Arabic
			CIS 101	حسب101
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	0	2
Category	☒University	☐College	☐ Department	
Type	☒ Required	☐ Elective		
Level	1st	Prerequisite		

Course Description:

This course gives a definition of components and units of computers and their functions, input and output units, main and secondary memory, computer types, operating systems, and data processing. Also This course gives a tough knowledge of office applications such as MS-Word, MS-Excel, spreadsheets, graphs, networks and the internet.

Grading						
	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	50	☒ Lab	10		

Text Book:

1. Computer skills (windows 7, Microsoft office 2010, Hardware and Software) by M. B. AL- Zoub with others, 8th edition.

References and Supplemental Materials:

Course Name	English Language (1)	Course Code	English	Arabic
			ENGL 001	انجل 001

Credit Hours	6	Contact Hours	Lec	Tut	Lab
			5	10	5

Category	☒University	☐ College	☐ Department
Type	☒ Required	☐ Elective	
Level	1st	Prerequisite	

Course Description:

This course introduces the students to an integrated language program in which the four language skills (listening, speaking, reading, and writing) are developed together with grammar and vocabulary. The course also provides students with social English (getting to know each other, greetings, friendship, etc.,)

Grading	☒ Mid-term 1, 2	25	☐ Project		☒ Assignments	15
	☒ Final	60	☐ Lab			

Text Books:

New Headway Elementary, students book
New headway Elementary, workbook,
New headway Elementary , students book
New headway Elementary CD

References and Supplemental Materials:

Course Name	Introductory Mathematics	Course Code	English	Arabic
			MTH 101	ريض 101

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	2	0

Category	☐University	☒College	☐Department
Type	☒ Required	☐ Elective	
Level	1st	Prerequisite	

Course Description:

Review of Basic concepts of Algebraic Operations, Equations and Inequalities, transformation and rotation of axes. Functions, Polynomials and Rational Functions, complex numbers, partial fractions; inverse, Exponential and Logarithmic Functions. Trigonometric and inverse Trigonometric Functions ,circular functions and their graphs, Trigonometric Identities and Equations, Systems of linear Equations and Matrices. Analytic geometry: line, pair of lines, circle, conic sections: parabola, ellipse, hyperbola.

Grading	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Books:

1. Introduction to Math 1, MostafaZahri, Pearson, 2013.
2. Introduction to Math 2, MostafaZahri, Pearson, 2013.
3. Calculus: The Classic Edition by Earl W. Swokowski
4. Calculus_Early_Transcendentals,Howard_Anton,_Irl_C._Bivens,_Stephen_Davis" 10th edition; Wiley, 2012

References and Supplemental Materials:

Course Name	University Life Skills	Course Code	English	Arabic
			EDU 101	ترب 101
Credit Hours	2	Contact Hours	Lec	Tut	Lab
			2	0	0
Category	☒University	☐ College	☐ Department	
Type	☒ Required	☐ Elective		
Level	1st	Prerequisite		

Course Description:

تنمية المهارات المعرفية و الأدائية التى تتعلق بالحياة الجامعية، من حيث الأنظمة واللوائح المتعلقة بها، بالإضافة إلى مهارات عملية التفكير و عادات العقل ، و مهارات البحث العلمي ومهارات الاتصال، و كل ما يساعد على صقل الشخصية و تنمية مهارات الذات.

Grading						
	☒ Mid-term 1, 2	25	☐ Project		☒ Assignments	15
	☒ Final	60	☐ Lab			

Text Books:

مهارات الحياة الجامعية

References and Supplemental Materials:

Courses of Semester 2

Course Name	Problem Solving and Programming	Course Code	English	Arabic
			CIS 102	102 حسب
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	0	2
Category	☐University	☒ College	☐ Department	
Type	☒ Required	☐ Elective		
Level	2nd	Prerequisite	CIS 101	

Course Description:

This course gives the students an introduction to computers and programs; Problem solving and algorithm development; Simple engineering and scientific problems; Introduction to the modular programming paradigm. Programming with emphasis on modular and structured programming technique: primitive data types, variables and constants, operators (arithmetic, assignment, increment, decrement, logical and relational); basic statements (Input and output); Boolean expressions; Control structures (conditional statements and loop statements); functions and parameter passing; Arrays (usefulness of arrays, declaration of arrays, access to array elements and operations on arrays); String(Declaration, initialization, access and defined functions).

Grading						
	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	50	☒ Lab	10		

Text Book:

- Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, by Charles Dierbach, Wiley India (2015). ISBN: 10-8126556013, 13-9788126556014

References and Supplemental Materials:

Course Name	English Language (2)	Course Code	English	Arabic
			ENGL 002	انجل 002
Credit Hours	6	Contact Hours	Lec	Tut	Lab
			5	10	5
Category	☒University	☐ College	☐ Department	
Type	☒ Required	☐ Elective		
Level	2nd	Prerequisite	ENGL 001	

Course Description:

This course introduces the students to an integrated language program in which the four language skills (listening, speaking, reading, and writing) are developed together with grammar and vocabulary. The course also provides students with social English (getting to know each other, greetings, friendship, etc.,)

Grading						
	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Books:

Liz and John Soars .Special Edition New Headway Pre-Intermediate, students book. Oxford

Liz and John Soars .Special Edition New headway Pre-Intermediate, workbook. Oxford

References and Supplemental Materials:

Course Name	Differential Calculus	Course Code	English	Arabic
			MTH 102	ريض 102

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	2	0

Category	☐University	☒College	☐ Department
Type	☒ Required	☐ Elective	

Level	2nd	Prerequisite	MTH 101

Course Description:

Real numbers, Limits, Continuity and its Consequences, domain and range of functions, hyperbolic and inverse hyperbolic functions, Differentiation, The Chain Rule, Derivatives of polynomial, Exponential and Logarithmic Functions, Trigonometric and Inverse Trigonometric Functions, hyperbolic and inverse hyperbolic functions, Implicit Differentiation, Higher Order Derivatives and, Indeterminate Forms and L'Hopital's rule, local extrema, concavity, horizontal and vertical asymptotes, graphing curves, applications of extrema, related rates, Rolle's theorem,mean value theorem,Taylor and Maclorine series in one variable.

Grading	☒ Mid-term 1, 2	40	☐ Project		☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Books:

1. Introduction to Math 1, MostafaZahri, Pearson, 2013.
2. Introduction to Math 2, MostafaZahri, Pearson, 2013.
3. Calculus: The Classic Edition by Earl W. Swokowski
4. Calculus_Early_Transcendentals,Howard_Anton,_Irl_C._Bivens,_Stephen_Davis" 10th edition; Wiley, 2012.

References and Supplemental Materials:

Course Name	Principles of Chemistry	Course Code	English	Arabic
			CHM 103	كيم 103
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	2	0
Category	☐University	☒College	☐ Department	
Type	☒ Required	☐ Elective		
Level	2nd	Prerequisite		

Course Description:

Students will learn details about concepts and specific chemical information that will be applied within the context of a variety of chemistry related applications. We will also introduce the applications that will be investigated highlight contemporary social, technological, and scientific issues. The bulk of the course will be devoted to a discussion of the fundamental principles of properties of solutions, acid/base and aqueous equilibria, organic, polymer, and biological chemistries.

Grading						
	☒ Mid-term 1, 2	20	☐ Project		☒ Assignments	10
	☒ Final	40	☒ Lab	30		

Text Books:

1. Introductory Chemistry (6th Edition) Nivaldo J. Tro, 2017 (Pearson Publisher)
2. General Chemistry (DoverBooks on Chemistry) 3rd Revised ed. Edition, Linus Pauling, 1988 (Dover Publications)

References and Supplemental Materials:

Courses of Semester 3

Course Name	Computer programming (1)	Course Code	English	Arabic
			CIS 203	203 حسب
Credit Hours	4	Contact Hours	Lec	Tut	Lab
			3	0	2
Category	☐University	☒ College	☐ Department	
Type	☒ Required	☐ Elective		
Level	3rd	Prerequisite	CIS 102	

Course Description:

This course covers topics such as object-oriented programming concepts, objects, classes, anatomy of classes, constructors, state, behavior, methods, fields, constructors, scope, lifetime, abstraction, modularization, encapsulation, and method overloading. It covers also inheritance and polymorphism.

Grading						
	☒ Mid-term 1, 2	20	☒ Project	10	☒ Assignments	10
	☒ Final	40	☒ Lab	20		

Text Book:

An Introduction to Object-Oriented Programming with Java, 4th edition, by C. Thomas Wu (Otani), McGraw-Hill Higher Education, 2006.

References and Supplemental Materials:

Course Name	Discrete Maths	Course Code	English	Arabic
			CIS 211	حسب211
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	1	0
Category	☐University	☒College	☐ Department		
Type	☒ Required	☐ Elective			
Level	3rd	Prerequisite	MTH 102		

Course Description:

This course introduces the applications of discrete mathematics in the field of computer science. It covers sets, logic, proving techniques, combinatory, functions, relations, graph theory and algebraic structures. These basic concepts of sets, logic functions and graph theory are applied to Boolean Algebra and logic networks, while the advanced concepts of functions and algebraic structures are applied to finite state machines and coding theory.

Grading						
	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Books:

Rosen, Kenneth H. Discrete Mathematics and Its Applications, 7th Edition Global Ed. 2013.

References and Supplemental Materials:

Hein, James L. Discrete structures, logic, and computability *3rd ed.* 2010.

Course Name	General Physics (1)	Course Code	English	Arabic
			PHS 101	فز 101
Credit Hours	4	Contact Hours	Lec	Tut	Lab
			3	0	2
Category	☐University	☐College	☒ Department	
Type	☒ Required	☐ Elective		
Level	3rd	Prerequisite		

Course Description:

Mechanics: Physical units, Vectors, Motion in 1 dimension, Motion in 2 dimension, Newton's laws and its applications, Hooke's law, work and energy, energy conservation laws, Linear momentum, collisions. Properties of matter: elasticity, fluid mechanics, surface tension, viscosity. Temperature: temperature concepts and its measurements, quantity of heat, specific heat, Newton's law of cooling, heat transfers by conduction, convection and radiation. Waves and sound.

Grading						
	☒ Mid-term 1, 2	20	☐ Project		☒ Assignments	10
	☒ Final	50	☒ Lab	20		

Text Books:

Physics for scientists and engineers; Raymond A. Serway and John W. Jewett; Cengage Learning; 9th edition; (2013).

References and Supplemental Materials:

Fundamentalsof Physics; Halliday and Resnick Wiley, 10th edition; (2015).

Course Name	Integral Calculus	Course Code	English	Arabic
			MTH 203	ريض 203

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	2	0

Category	☐University	☒College	☐ Department
Type	☒ Required	☐ Elective	

Level	3rd	Prerequisite	MTH 102

Course Description:

The definite integral, fundamental theorem of calculus, the indefinite integral, change of variable, integration of trigonometric and inverse trigonometric functions. Integration of the hyperbolic and inverse hyperbolic functions. Techniques of integration: substitution, by parts, trigonometric substitutions, partial fractions, indeterminate forms, improper integrals, numerical integration. Application of definite integral: Area, volume of revolution, work, arc length. Polar coordinates.

Grading	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Books:

- Calculus" Early Transcendental".J. Stewart, Brooks/cole, 2008.
- Calculus with Analytical geometry, Howard Anton, John Wiley &Son,1995.

References and Supplemental Materials:

Courses of Semester 4

Course Name	Digital & Logic design	Course Code	English	Arabic
			CNE 101	101 هال

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	1	0

Category	☐University	☐ College	☒ Department
Type	☒ Required	☐ Elective	

Level	4th	Prerequisite	CIS 211

Course Description:

This course provides students with basic knowledge on Combinational machines. Firstly recalling Boolean algebra Rules and Logic Gates to attack after Topics lied to combinational circuits such as but not limited to: Adders (Half and Full Adders), Substractors, Multipliers, Coder/Decoders, Multiplexors, Parity Generators, Comparators.

Grading	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	20
	☒ Final	50	☐ Lab			

Text Book:

1. Introduction to Logic Design, 3rd (third) edition by Alan B. Markowitz, McGraw Hill, 2010.

References and Supplemental Materials:

Course Name	Computer programming (2)	Course Code	English	Arabic
			CIS 204	حسب 204
Credit Hours	4	Contact Hours	Lec	Tut	Lab
			3	0	2
Category	☐University	☒ College	☐ Department	
Type	☒ Required	☐ Elective		
Level	4th	Prerequisite	CIS 203	

Course Description:

This course is the third course on computer programming; it deals with the application of advanced object-oriented concepts using java. Emphasizes graphical user interface, event-driven programming, error handling, database connectivity, inner classes, collection classes, networking, and threads. We will learn to solve problems for which these are the primary tools.

Grading						
	☒ Mid-term 1, 2	30	☒ Project	10	☒ Assignments	10
	☒ Final	40	☒ Lab	10		

Text Book:

Harvey M. Deitel & Paul J. Deitel. "Java How to Program", Prentice Hall, 10th Edition, 2015.

References and Supplemental Materials:

Horstmann, Cay S., "Core Java" Prentice Hall, 2013.

Course Name	General Physics (2)	Course Code	English	Arabic
			PHS 202	فز 202
Credit Hours	4	Contact Hours	Lec	Tut	Lab
			3	0	2
Category	☐University	☐College	☒ Department		
Type	☒ Required	☐ Elective			
Level	4th	Prerequisite	PHS 101		

Course Description:

This course aims to study the basic physical notions of the electrostatic and magnetostatic laws, geometrical optics, oscillations and waves.

Grading						
	☒ Mid-term 1, 2	20	☐ Project		☒ Assignments	10
	☒ Final	50	☒ Lab	20		

Text Books:

David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics Extended, 8th Edition, Wiley, 2007

References and Supplemental Materials:

Course Name	Advanced Calculus	Course Code	English	Arabic
			MTH 204	ريض 204
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	2	0
Category	☐University	☐College	☒ Department		
Type	☒ Required	☐ Elective			
Level	4th	Prerequisite	MTH 203		

Course Description:

Cartesian, cylindrical and spherical coordinates. functions of several variables, limits, continuity, Partial differentiation, harmonic and homogenous functions, Euler's theorem for homogenous function, definition of Jacobian, extrema of functions in two variables, Taylor and Maclaurin series, in two variables, Lagrange multiplayers, Double integral and its applications to area, volume, moments and centre of mass. Double integrals in polar coordinates. Triple integral in rectangular, cylindrical and spherical coordinates and applications to volume moment and centre of mass. Vector fields, line integrals, surface integrals, Green's theorem, the divergence theorem, Stoke' theorem. Infinite series, convergence and divergence of infinite series, integral test, ratio test, root test and comparison test. Conditional convergence and absolute convergence, alternating series test, Power series.

Grading	☒ Mid-term 1, 2	40	☐ Project		☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Books:

1. Calculus" Early Transcendental".J. Stewart, Brooks/cole, 2008.
2. Calculus with Analytical geometry, Howard Anton, John Wiley &Son,1995.

References and Supplemental Materials:

Course Name	Principles of Linear Algebra	Course Code	English	Arabic
			MTH 285	ريض 285

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	2	0

Category	☐ University	☐ College	☒ Department
Type	☒ Required	☐ Elective	

Level	4^{th}	Prerequisite	MTH 203

Course Description:

This course aims to make the student aware of basics of linear algebra and how they can apply them to solve linear equations, Gauss elimination method, identifying the concepts of matrices and matrix operations, providing the concept of determinants and properties of determinants; Cramer's rule, understanding real vector spaces, subspaces, coordinates and basis, determining the rank of the matrix, providing the concepts of linear transformations.

Grading	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Books:

Element Linear Algebra with supplemental Applications; Howard Anton, Chris Rorrers, 10th Edition, 2011.

References and Supplemental Materials:

1. Introduction to Linear Algebra; G. Stang, Wellesley Cambridge, 4th Edition, 2009.
2. Linear Algebra; R. Allenby, Edward Arnold, London Sydney; 1995.
3. Matrices and Vector Spaces; Blyth, T. S, and Robertson; Chapman and Hall, London; 1989.

Courses of Semester 5

Course Name	Advanced Digital & Logic Design	Course Code	English	Arabic
			CNE 202	202 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0
Category	☐University	☐ College	☒ Department		
Type	☒ Required	☐ Elective			
Level	5th	Prerequisite	CNE 101		

Course Description:

This course provides students with basic knowledge on synchronous sequential machines. Topics include but not limit : Sequential circuits analysis, Sequential circuits design, all kinds of Flip-Flops (RS, JK, D, T…), Synchronous and asynchronous inputs and controls, Registers and Counters, Memory and Programmable Logic Devices, Programmable Logic Devices (PLDs): architecture, features, timing parameters, configuration.

Grading						
	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Books:

Introduction to Logic Design, 3rd Edition by Alan B. Markowitz, McGraw Hill, 2010

References and Supplemental Materials:

Course Name	Digital & Logic Design Lab	Course Code	English	Arabic
			CNE 203	هال 203
Credit Hours	1	Contact Hours	Lec: 0	Tut: 0	Lab: 2
Category	☐University	☐ College	☒ Department	
Type	☒ Required	☐ Elective		
Level	5th	Prerequisite	Co-Req CNE 202	

Course Description:

This lab helps students deepening their understand of the content of Logic Design II, where advanced digital design techniques are utilized in a practical way to develop, design, analyze, simulate and implement logic digital circuits. Memory elements, all kinds of Flip-Flops (RS, JK, D, T…), Synchronous and asynchronous inputs and controls, Registers and Counters, Memory and Programmable Logic Devices, Register Transfers and Data paths, Sequencing and Control.

Programmable Logic Devices (PLDs): architecture, features, timing parameters, configuration.

Grading						
	☐ Mid-term 1, 2		☒ Project	40	☒ Assignments	10
	☐ Final		☒ Lab	50		

Text Book:

Lab manual provided by the instructor.

References and Supplemental Materials:

Course Name	Differential Equations	Course Code	English	Arabic
			MTH 305	ريض 305
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	2	0
Category	☐University	☐ College	☒ Department		
Type	☒ Required	☐ Elective			
Level	5th	Prerequisite	MTH 204		

Course Description:

Various types of first order equations and their applications. Linear equations of higher order. Systems of linear equations with constant coefficients, reduction of order. Power series methods for solving second order equations with polynomial coefficients. Fourier series, Fourier series for even and odd functions. Complex Fourier series. The Fourier integral. Laplace Transform – Applications of Laplace transform to solve ordinary differential equations. Bessel functions and its kinds.

Grading	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Books:

1. Elementary Differential Equations with Boundary Value Problems, Sixth Edition, C. H. Edwards & D. E. Penney, Pearson Prentice Hill, 2008.
2. Fundamentals of differential equations& boundary value problems, six edition, R. K. Nagle, Edward B. Saff,Arthur David Snider , Pearson Prentice Hill, 2011.

References and Supplemental Materials:

1. Differential Equations, 3rd ed., P. Blanchard, R. Devaney and G. Hall, Thomson Brooks/Cole, Boston University, 2006.
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley &Sons, 2006.

Course Name	Data Structures	Course Code	English	Arabic
			CIS 205	205 حسب
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			4	1	0
Category	☐University	☒ College	☐ Department	
Type	☒ Required	☐ Elective		
Level	5th	Prerequisite	CIS 203	

Course Description:

This course explores the definitions and implementations of basic data structures such as stacks, queues, linked lists, binary trees, graphs, etc.; internal searching and sorting algorithms. Design of sort and search algorithms and introductory analysis associated with the basic data structures, as well as recursive algorithms, are discussed.

Grading						
	☒ Mid-term 1, 2	40	☒ Project	10	☒ Assignments	10
	☒ Final	40	☐ Lab			

Text Book:

Data Structures and Algorithms in Java, M. T. Goodrich and R. Tamassia, 2006, Jon Wiley & Sons Inc.

References and Supplemental Materials:

Java how to program, Deitel&Deitel, Prentice Hall, 2010.

Course Name	Statistics and Probabilities	Course Code	English	Arabic
			MTH 281	ريض 281

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	2	0

Category	☐University	☒ College	☐ Department
Type	☒ Required	☐ Elective	

Level	5th	Prerequisite	MTH 203

Course Description:

Fundamentals of probability theory. Single and multiple discrete and continuous random variables. Probability density function. Joint and conditional probabilities. Moments and statistical averages. Central limit theorem, Data description techniques, Estimation, testing of hypothesis, Regression and correlation.

Grading	☒ Mid-term 1,2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Books:

1. Probability, Random Variables, and Random Signal Principles 4th edition, Peyton Z Peebles McGraw-Hill, 2002.
2. Applied Statistics and Probability for Engineers 6th Edition, D.C. Montgomery & G. C. Runger, Wiley, 2011.

References and Supplemental Materials:

Course Name	Electrical & Electronic Circuits	Course Code	English	Arabic
			ELE 262	262 هكه
Credit Hours	4	Contact Hours	Lec	Tut	Lab
			3	1	2
Category	☐University	☐ College	☒ Department		
Type	☒ Required	☐ Elective			
Level	5th	Prerequisite	PHS 202		

Course Description:

Basic circuit elements and concepts, Basic laws of circuit theory, Ohm's law, Kirchhoff's law, Circuit Theorems: superposition principle, Thevenin and Norton theorems, maximum power transfer theorem, Techniques of circuit analysis: Nodal and Mesh analysis, Direct current, and Alternating current.

Semiconductors, PN junction diode: basic structure, I-V characteristics, Diode applications: rectifiers, clipping, and clamping. Bipolar junction transistor (BJT): basic structure, modes of operation, Field effect transistor (FET): structure and operation of enhancement MOSFET, I-V characteristics.

Grading	☒ Mid-term 1, 2	16	☒ class activities	6	☐ Assignments	8
	☒ Final	50	☒ Lab	20		

Text Books:

1. Charles K. Alexander, and Matthew N. O. Sadiku," Fundamentals of Electric Circuits " Prairie View A&M University, fifth Edition, McGraw-Hill, 2013.
2. Robert L. Boylestad, and Louis Nashelsky ," Electronic Devices and Circuit Theory " Eleventh Edition, Pearson Education Inc., 2013.

References and Supplemental Materials:

Courses of Semester 6

Course Name	Software Engineering	Course Code	English	Arabic
			CIS 321	321 حسب

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0

Category	☐University	☒ College	☐ Department
Type	☒ Required	☐ Elective	

Level	6^{th}	Prerequisite	CIS 204

Course Description:

Software engineers apply the principles and techniques of computer science, engineering, and mathematical analysis to the design, development, testing, and evaluation of the software and the systems that enable computers to perform their many applications. As a software engineer, student can use their expertise in computer science, engineering, and math to design, develop, and evaluate software for companies that configure and install computer systems. Specific tasks software engineers perform evolve quickly, reflecting changes in technology, as well as the needs of employers. They work as members of teams that may include engineering, marketing, manufacturing, and design professionals who work together to create new products.

Grading	☒ Mid-term 1, 2	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

- Software Engineering 10th Edition, Ian Sommerville , April 2015

References and Supplemental Materials:

- Software Engineering: A Practitioner's Approach 8^{th} Edition, Roger S. Pressman, 2014.

Course Name	Concepts of Database Systems	Course Code	English	Arabic
			CIS 322	322 حسب

Credit Hours	4	Contact Hours	Lec	Tut	Lab
			3	0	2

Category	☐University	☒ College	☐ Department
Type	☒ Required	☐ Elective	

Level	6th	Prerequisite	CIS 205

Course Description:

The objective of this course is to introduce students to database management systems. Topics includes: Data, information, file system, database and database Users, database system concepts and architecture, data modeling using the Entity Relationship (ER) Model, the relational data model and relational database constraints. Functional dependencies and normalization for relational databases. The relational algebra and relational calculus. Relational database design by ER and EER to Relational Mapping, SQL-99 Schema Definition, Constraints, Queries and Views (DDL and DML).

Grading	☒ Mid-term 1, 2	30	☒ Project	10	☒ Assignments	10
	☒ Final	40	☒ Lab	10		

Text Book:

Fundamentals of Database Systems, ELMASRI & NAVATHE, 7-Edition, Pearson, 2016

References and Supplemental Materials:

- An introduction to database systems , C.J. Date, 8th edition , Addison Wesley,2004
- Fundamentals of Database Systems, ELMASRI & NAVATHE, 6-Edition, Pearson, 2006

Course Name	Numerical Methods	Course Code	English	Arabic
			MTH 382	ريض 382

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	2	0

Category	☐University	☐ College	☒ Department
Type	☒ Required	☐ Elective	
Level	6th	Prerequisite	MTH 305

Course Description:

Solution of non-linear equations in one variable; Solution of linear systems of equations by direct methods and iterative methods; Interpolation; Curve fitting; Numerical differentiation and Numerical integration. Numerical solution of ordinary differential equations. Students write programs in C++ or Matlab using methods presented in class.

Grading	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Book:

- Numerical Methods for Engineers, 6th edition, S.C. Chapra and R.P. Canale, McGraw-Hil,2009.-
- Numerical Methods, Software, and Analysis, 2nd edition, J.R. Rice, McGraw-Hil,1992.

References and Supplemental Materials:

Course Name	Computer Architecture & Organization	Course Code	English	Arabic
			CNE 204	204 هال

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0

Category	☐University	☐ College	☒ Department
Type	☒ Required	☐ Elective	

Level	6th	Prerequisite	CNE 202

Course Description:

Machine organization; arithmetic operations, numeric representation of the data, IEEE 754 representation, Memory Hierarchy and Cache memory; Pipeline Design Techniques; Super-scalar architecture; Parallel Architectures, CU and ALU structure. Internal memory volatile and non-volatile memory cell and chip structure. External memory magnetic and optical disks. input/output interfacing modules. DMA. UASRT.USB. Motherboard buses.

Grading	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Book:

1. Computer Organization and Architecture by William Stallings, 10th Edition, PEARSON, 2016.

References and Supplemental Materials:

Course Name	Signals and Systems	Course Code	English	Arabic
			CNE 211	هال 211
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	1	0
Category	☐University	☐ College	☒ Department		
Type	☒ Required	☐ Elective			
Level	6th	Prerequisite	MTH 204		

Course Description:

The concept of signals and systems, both continuous and discrete-time; signal manipulation; signal symmetry and orthogonality; system linearity and time invariants; system impulse response and step response; frequency response, sinusoidal analysis, convolution, and correlation; sampling in time and quantizing in amplitude; Laplace transform; Fourier analysis, filters; analysis of discrete time signals and systems using z-transforms; inverse transformation procedures.

Grading	☒ Mid-term 1, 2	30	☐ Project		☐ Assignments	10
	☒ Final	60	☐ Lab			

Text Books:

1. Signals and Systems (Oxford Higher Education) Publisher: Oxford University Press, 2010
2. Fundamentals of Signals and Systems Using the Web and Matlab, 3rd Edition by E. W. Kamen and B. S. Heck., Prentice Hall, 2007

References and Supplemental Materials:

Courses of Semester 7

Course Name	Operating Systems	Course Code	English	Arabic
			CIS 342	342 حسب

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	1	0

Category	☐University	☒ College	☐ Department
Type	☒ Required	☐ Elective	

Level	7th	Prerequisite	CIS 205

Course Description:

This is an introductory course in Operating Systems. As such, it is intended to cover many of the concepts related to most of the actual Operating Systems. We will cover computer system and operating system structures, processes and threads (concepts of, communication, synchronization and deadlocks), CPU scheduling, memory management, virtual memory, protection, and security. This course will give the students an overview of the Unix OS, basic concepts, usage of the help and man and info commands. Unix file system and basic commands.

Grading	☒ Mid-term 1, 2	30	☒ Project	20	☐ Assignments	
	☒ Final	50	☐ Lab			

Text Book:

1. Operating System Concepts, by A. Silberschatz, P. Galvin and G Gagne. John Wiley and Sons Inc; 9th Edition (2012). ISBN-10: 1118063333, ISBN-13: 978-1118063330.

References and Supplemental Materials:

Course Name	Microprocessor Systems	Course Code	English	Arabic
			CNE 305	305 هال

Credit Hours	4	Contact Hours	Lec	Tut	Lab
			3	0	2

Category	☐University	☐ College	☒ Department
Type	☒ Required	☐ Elective	

Level	7th	Prerequisite	CNE 204

Course Description:

Introduction to internal microprocessors, Microprocessor internal architecture, software models, addressing Mode, Assembly language programing and debugging, Instruction sets. Memory mapping. Input and output instructions, Input/output Interfacing, Introduction to interrupts, Basic Microcontroller programming.

Grading	☒ Mid-term 1, 2	20	☐ Project		☒ Assignments	10
	☒ Final	50	☒ Lab	20		

Text Books:

1. Inside the Machine, An Illustrated Introduction to Microprocessors and Computer Architecture"- by Jon Stokes, 2006,
2. The 8088 and 8086 Microprocessors: Programming, Interfacing, Software, Hardware and Applications, (4th Edition) by Walter A. T. & Avtar S., Prentice Hall 1999.

References and Supplemental Materials:

Course Name	Data & Computer Communications	Course Code	English	Arabic
			CNE 312	312 هال
Credit Hours	4	Contact Hours	Lec	Tut	Lab
			3	1	2
Category	☐University	☐ College	☒ Department		
Type	☒ Required	☐ Elective			
Level	7th	Prerequisite	CNE 211		

Course Description:

Information representation and signals. Introduction to data communication. Frequency response, bandwidth, filtering, and noise. Information theory concepts such as Nyquist theorem, Shannon theorem, and Sampling theorem. Analog and digital modulation techniques. Pulse Code Modulation (PCM). Communication systems circuits and devices. Transmission media. Data encoding. Physical Layer Protocols. Data Link Control (point to point communication; design issues; link management; error control; flow control). Multiplexing Techniques.

Grading	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Book:

1. Stallings, W; "Data and Computer Communications, 10/E ", Prentice Hall, 2014.
2. Cover, T and Joy T; "Elements of Information Theory, 2/E", NY: Wiley-Interscience, 2006.
3. Gallager, R; "Principles of Digital Communication", NY: Cambridge University Press, 2008.

References and Supplemental Materials:

Course Name	Computer Networks (1)	Course Code	English	Arabic
			CNE 313	313 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	1	0
Category	☐University	☐ College	☒ Department		
Type	☒ Required	☐ Elective			
Level	7th	Prerequisite	Co-Req CNE 312		

Course Description:

This course intends to introduce the principle, design and implementation of computer networks. It covers fundamental concepts of computer communication networks and associated protocols. It also include the major building blocks of computer networks such as layered network architecture, Network Models, Data Link Control, Ethernet, Virtual Circuit Networks (i.e. Frame Relay & ATM), Internet Protocol, and Transport protocols.

Grading						
	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Book:

- Stallings, W; "Data and Computer Communications, 10/E ", Prentice Hall, 2014.

References and Supplemental Materials:

- Tanenbaum, A; "Computer Networks Andrew 5/E ", Prentice Hall, 2011.
- Farouzan, A; "Data Communications and Networking 3/E ", McGraw Hill, 2004.

Course Name	Automatic Control Systems	Course Code	English	Arabic
			CNE 321	321 هال

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	1	0

Category	☐University	☐ College	☒ Department
Type	☒ Required	☐ Elective	

Level	7th	Prerequisite	CNE 211

Course Description:

Introduction to control systems. Mathematical modeling of physical systems. Transfer Functions of Linear systems. Block diagram and signal flow graph representation. Time-domain and frequency-domain analysis tools and performance assessment. Proportional, integral, and derivative control. Stability of linear control systems. Introduction to state-space modeling and analysis. Analysis and design of digital control systems.

Grading	☒ Mid-term 1, 2	30	☐Project		☒ Assignments	10
	☒ Final	60	☐Lab			

Text Books:

1. Modern Control Systems 12th edition, by R. Dorf, R. Bishop, Pearson, 2011.

References and Supplemental Materials:

1. Control Systems Engineering by N.S. Nise, Sixth Edition, Wiley, 2010.
2. Automatic Control Systems, by Benjamin Kuo, Prentice-Hall edition, John Wiley and Sons, 2002.

Courses of Semester 8

Course Name	Software Project Management	Course Code	English	Arabic
			CIS 323	323 حسب

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	1	0

Category	☐University	☒ College	☐ Department
Type	☒ Required	☐ Elective	

Level	8th	Prerequisite	CIS 322

Course Description:

This course covers the process, methods, techniques, and tools that organizations use to manage their information systems projects. The course covers a systematic methodology for initiating, planning, executing, controlling, and closing projects. It assumes that project management in the modern organization is a complex team-based activity, where various types of technologies (including project management software as well as software to support group collaboration) are an inherent part of the project management process. This course also acknowledges that project management involves both the use of resources from within the firm, as well as contracted from outside the organization.

Grading	☒ Mid-term 1, 2	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

- Kathy Schwalbe, Information Technology Project Management 8th edition, ISBN: 978-1285452340, Course Technology, 2015.

References and Supplemental Materials:

ourse Name	Embedded Systems	Course Code	English	Arabic
			CNE 307	307 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0
Category	☐University	☐ College	☒ Department		
Type	☒ Required	☐ Elective			
Level	8th	Prerequisite	CNE 305		

Course Description:

This course will cover topics such as micro controller architecture, memory map, interrupts, and programmable parallel and serial interfaces. Instruction set. Programming with Assembly and C programming includes dealing with Timers, ADC, PWM. Applications involving interfacing microcontroller with sensors, switches, LCD, motors, and communication modules

Grading						
	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Books:

1. Designing Embedded Systems with PIC Microcontrollers, Principles and Applications, Second Edition, Tim Wilmshurst, ACM Digital Library, Edited By Newnes-Elsiever, 2010.
2. Designing Embedded Systems with Arduino: A Fundamental Technology for Makers ,Tianhong Pan, Yi Zhu, Springer Publishing Company, Incorporated ©2017, ACM Digital Library, 2017.

References and Supplemental Materials:

Course Name	Embedded Systems Lab	Course Code	English	Arabic
			CNE 308	308 هال
Credit Hours	1	Contact Hours	Lec: 0	Tut: 0 / Lab: 2
Category	☐University	☐ College	☒ Department	
Type	☒ Required	☐ Elective		
Level	9th	Prerequisite	Co-Req CNE 307	

Course Description:

This lab includes several experiments that are related to latest embedded systems technology. The experiments include: writing C code and debugging it using the simulator and the emulator, Timers, Interrupts, Serial EEPROM memory interface and programming, LCD module interface and programming, Keypad interface and programming, Serial communication and Analog-Digital module . The experiments are based on PIC16F876 processors and Arduino Board.

Grading						
	☐ Mid-term 1, 2		☒ Project	40	☒ Assignments	10
	☐ Final		☒ Lab	50		

Text Book:

Lab manual provided by the instructor.

References and Supplemental Materials:

Course Name	Computer Networks (2)	Course Code	English	Arabic
			CNE 314	314 هال
Credit Hours	3	Contact Hours	Lec: 3	Tut: 0 / Lab: 0
Category	☐University	☐ College	☒ Department	
Type	☒ Required	☐ Elective		
Level	8th	Prerequisite	CNE 313	

Course Description:

Layer Protocols: Optimality principle, Routing Algorithms: Flow based, Distance Vector, Shortest Path, Broadcast; Congestion control Algorithms: Leaky Bucket, Traffic Shaping, congestion control in ATM; Internetworking Protocols: The Internet Network layer, IP Tunneling and Concatenated Virtual Circuits, IP datagram forwarding, encapsulation, fragmentation, and reassembly; Transport Layer Protocol : TCP and UDP , AAL layer in ATM. Internet protocols: IP, ARP, RARP, BOOTAP, Error reporting mechanism (ICMP), OSPF routing, BGP, CDIR, IPv6; TCP and UDP; Addressing schemes.

Grading						
	☒ Mid-term 1, 2	30	☐ Project		☒ Assignments	10
	☒ Final	60	☐ Lab			

Text Book:

- Stallings, W; "Data and Computer Communications, 10/E ", Prentice Hall, 2014.

References and Supplemental Materials:

- Tanenbaum, A; "Computer Networks Andrew 5/E ", Prentice Hall, 2011.
- Farouzan, A; "Data Communications and Networking 3/E ", McGraw Hill, 2004.

Course Name	Computer Networks Lab	Course Code	English	Arabic
			CNE 315	315 هال

Credit Hours	2	Contact Hours	Lec	Tut	Lab
			0	0	4

Category	☐University	☐ College	☒ Department
Type	☒ Required	☐ Elective	

Level	8th	Prerequisite	Co-Req CNE 314

Course Description:

Peer-to-Peer and Server-based networks; LAN components and their Interaction; Common Transport Protocols; Router configuration; Bridged networks; Performance analysis of LANs; Virtual networks; Network security, Wireless networks.

Grading	☐ Mid-term 1, 2		☒ Project	40	☒ Assignments	10
	☐ Final		☒ Lab	50		

Text Book:

Lab manual provided by the instructor.

References and Supplemental Materials:

Course Name	Automatic Control Systems Lab	Course Code	English	Arabic
			CNE 322	هال 322

Credit Hours	1	Contact Hours	Lec	Tut	Lab
			0	0	2

Category	☐University	☐ College	☒ Department
Type	☒ Required	☐ Elective	

Level	8th	Prerequisite	CNE 321

Course Description:

Lectures and Experiments introduce the students to the practical aspects of automatic control systems techniques. Demonstration of control system analysis and design techniques with experience both in real hardware and simulation using (MATLAB/SIMULINK) software. Implementation of digital control via personnel computer using C/C++ or software acquired with experiments.

Grading	☒ Mid-term 1, 2	20	☒Project	20	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

Lab manual provided by the instructor

References and Supplemental Materials:

1. Modern Control Systems 12th edition, R. Dorf, R. Bishop, Pearson, 2011.
2. N.S. Nise, Control Systems Engineering, Sixth Edition, Wiley, 2010.

Course Name	Field Training	Course Code	English	Arabic
			CNE 391	391 هال

Credit Hours	1	Contact Hours	Lec	Tut	Lab
			-	-	-

Category	☐University	☐ College	☒ Department
Type	☒ Required	☐ Elective	

Level	Between 8th and 9th	Prerequisite	110 credit hours of the plan, any additional departmental prerequisites and passing all 8th courses

Course Description:

8 weeks of supervised hands-on work experience at a recognized firm. The student applies his engineering knowledge and acquires professional experience in his field of Computer Engineering and Networks.

Grading	☐ Mid-term 1, 2		☐ Project		☐ Assignments	
	☐ Final		☐ Lab			

Text Book:

References and Supplemental Materials:

Courses of Semester 9

Course Name	Principles of wireless Communication Networks	Course Code	English	Arabic
			CNE 416	416 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0
Category	☐University	☐ College	☒ Department		
Type	☒ Required	☐ Elective			
Level	9th	Prerequisite	CNE 313		

Course Description:

Introduction to design, analysis, and fundamental limits of wireless networking and wireless communication. Foundation for the more detailed, technical and practical discussion of the local, personal and metropolitan areas scales of wireless networking.

Grading						
	☒ Mid-term 1, 2	20	☒ Project	20	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Books:

1. Stallings, W; "Wireless Communications & Networks 2/E", Pearson, 2013.

References and Supplemental Materials:

1. Rackley, S; "Wireless Networking Technology From Principles to Successful Implementation", Newnes, Elsevier, 2007.
2. Stallings, W; "Data and Computer Communications, 10/E ", Prentice Hall, 2014.

Course Name	Networks & Information Security	Course Code	English	Arabic
			CNE 417	417 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	1	0
Category	☐University	☐ College	☒ Department		
Type	☒ Required	☐ Elective			
Level	9th	Prerequisite	CNE 315		

Course Description:

This course aims to provide students with an overview of information and network security with a focus on basic knowledge of the technical and operational issues of modern cryptosystems, security protocols, operating systems and their related standards. It is intended for undergraduate students who have some understanding of networks, but not necessarily any background in security.

Grading						
	☒ Mid-term 1, 2	20	☒ Project	20	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

Information Security: Principles and Practice, Mark Stamp, Wiley, 3rd Edition, 2018.

References and Supplemental Materials:

Cryptography and Network Security, Principles and Practices, Willam Stalling,7th edition, 2016.

Course Name	Introduction to VLSI Design	Course Code	English	Arabic
			CNE 406	406 هال

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0

Category	☐University	☐ College	☒ Department
Type	☒ Required	☐ Elective	
Level	9th	Prerequisite	ELE 262

Course Description:

Discrete and integrated circuit technology, logic families, A/D-D/A circuits, comparators, Schmitt triggers State-of-the-art MOS Transistors, their operation and limitations. CMOS digital circuits, static & dynamic logic, Circuit design and propagation delay. CMOS fabrication technology, layout and design rules, IC Design and Verification Tools, subsystem design and case studies, and practical considerations.

Grading	☒ Mid-term 1, 2	20	☐ Project		☐ Assignments	20
	☒ Final	60	☐ Lab			

Text Book:

1. "SEDRA/SMITH Microelectronic Circuits", Adel S. Sedra, 7th Ed Oxford University Press (2014).
2. Digital integrated circuits: analysis and design ", John E. Ayers, University of Connecticut, CRC PRESS, 2005.

References and Supplemental Materials:

Course Name	Graduation project (1)	Course Code	English	Arabic
			CNE 492	492 هال
Credit Hours	2	Contact Hours	Lec: 2	Tut: 0 / Lab: 0
Category	☐University	☐ College	☒ Department	
Type	☒ Required	☐ Elective		
Level	9th	Prerequisite	110 credit hours of the plan, any additional departmental prerequisites	

Course Description:

The student should take a B.Sc. project in related area to his specialization and with technical merit. This project is for two semesters, it is counted as one hour in the first semester. At the end of the semester the student submits a report describing his projects and the parts he completed in the first semester and proposed parts in the 2nd semester.

Grading						
	☐ Mid-term 1, 2		☐ Project		☐ Assignments	
	☒ Final	100	☐ Lab			

Text Book:

References and Supplemental Materials:

Courses of Semester 10

Course Name	Graduation project (2)	Course Code	English	Arabic
			CNE 493	493 هال
Credit Hours	3	Contact Hours	Lec: 1	Tut: 0	Lab: 4
Category	☐University	☐ College	☒ Department	
Type	☒ Required	☐ Elective		
Level	10th	Prerequisite	CNE 492	

Course Description:

In this semester the student continues his work in the project. This may require the student to present his progress monthly. At the end of the semester the student presents a detailed report of developed project and oral presentation. The report should indicate that the student understands the topic and his specific implementation. Any hardware or software should be documented in detail. The students grade is based on his work during the project and commitment to fullfil objectives, on the report, and on his oral presentation.

Grading						
	☐ Mid-term 1, 2		☐ Project		☐ Assignments	
	☒ Final	100	☐ Lab			

Text Book:

References and Supplemental Materials:

Elective Courses

Course Name	Selected topics in Computer Engineering	Course Code	English	Arabic
			CNE 494	494 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0
Category	☐University	☐ College	☒ Department	
Type	☐ Required	☒ Elective		
Level	9th or 10th	Prerequisite	110 credit hours of the plan, any departmental prerequisites	

Course Description:

Selected topics to develop knowledge and skills in a given field of Computer Engineering and Networks.

Grading						
	☒ Mid-term 1, 2	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Books:

Books, Journals and Magazines relevant to the topic covered.

Course Name	Selected topics in Networks	Course Code	English	Arabic
			CNE 495	495 هال
Credit Hours	3	Contact Hours	Lec: 3	Tut: 0 / Lab: 0
Category	☐University	☐ College	☒ Department	
Type	☐ Required	☒ Elective		
Level	9th or 10th	Prerequisite	110 credit hours of the plan, any departmental prerequisites	

Course Description:

Selected topics to develop knowledge and skills in a given field of Computer Engineering and Networks.

Grading						
	☒ Mid-term 1, 2	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Books:

Books, Journals and Magazines relevant to the topic covered.

Course Name	Heterogeneous Networks	Course Code	English	Arabic
			CNE 481	481 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0
Category	☐ University	☐ College	☒ Department		
Type	☐ Required	☒ Elective			
Level	9th or 10th	Prerequisite	CNE 313		

Course Description:

This course covers aspects related the heterogeneous communication networking. It provides in details the explanation of the following topics :

- Introduction to Heterogeneous Networks,
- Fundamentals of LTE
- LTE signal structure and physical channels,
- Physical layer signal processing in LTE
- Coordinated multi-point transmission reception
- Future trends in heterogeneous networks

Grading						
	☒ Mid-term 1,2	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

Joydeep Acharya and Long Gao, Sudhanshu Gaur, Heterogeneous Networks in LTE-Advanced, first Edition, Wiley, 2014.

References and Supplemental Materials:

Journals such as IEEE/ACM Transactions on Networking, IEEE Journal on Selected Areas in Communications, IEEE Network, IEEE Communications Magazine, IEEE/OSA Journal of Lightwave Technology.

Course Name	Optical Networks	Course Code	English	Arabic
			CNE 482	482 هال

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0

Category	☐ University	☐ College	☒ Department
Type	☐ Required	☒ Elective	
Level	9th or 10th	Prerequisite	CNE 313

Course Description:

The optical layer and the WDM concept, Understanding and appreciation the design, operation and performance of both optical fiber communication systems (digital and analogue), Dynamic provisioning in optical networks, Optical network survivability, Control and management for optical networks, Optical access networks , The limitations of system components (laser diodes, optical modulators, optical fiber, optical amplifiers and optical receivers) , The factors that affects the performance of optical Communication systems.

Grading	☒ Mid-term 1,2	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

Rajiv Ramaswami, Kumar Sivarajan, and Galen Sasaki, Optical Networks: A Practical Perspective, 3rd Edition, Morgan Kaufman Publishers, 2010.

References and Supplemental Materials:

Journals such as IEEE/ACM Transactions on Networking, IEEE Journal on Selected Areas in Communications, IEEE Network, IEEE Communications Magazine, IEEE/OSA Journal of Lightwave Technology.

Course Name	Wireless Sensor Networks	Course Code	English	Arabic
			CNE 483	483 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0
Category	☐ University	☐ College	☒ Department	
Type	☐ Required	☒ Elective		
Level	9th or 10th	Prerequisite	CNE 313	

Course Description:

Wide range of applications such as disaster management, military and security have fueled the interest in sensor networks during the past few years. Sensors are typically capable of wireless communication and are significantly constrained in the amount of available resources such as energy, storage and computation. Such constraints make the design and operation of sensor networks considerably different from contemporary wireless networks, and necessitate the development of resource conscious protocols and management techniques. This course provides a broad coverage of challenges and latest research results related to the design and management of wireless sensor networks. Covered topics include network architectures, node discovery and localization, deployment strategies, node coverage, routing protocols, medium access arbitration, and fault-tolerance.

Grading						
	☒ Mid-term 1	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

- Ian F. Akyildiz, Mehmet Can Vuran, Wireless Sensor Networks, Wiley, ISBN 978-0-470-03601-3 (H/B), 2010.

References and Supplemental Materials:

- Holger Karl, Andreas Willig, Protocols and Architectures for Wireless Sensor Networks, Wiley, ISBN 0-470-09510-5, 2005

- A. M. Viswa Bharathy, K. JayabalajI, Design of Underwater Wireless Sensor Networks, LAP LAMBERT Academic Publishing, ISBN 978-620-2-07959-4, 2018.

Course Name	Digital Image Processing	Course Code	English	Arabic
			CNE 484	484 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0
Category	☐ University	☐ College	☒ Department		
Type	☐ Required	☒ Elective			
Level	9th or 10th	Prerequisite	CIS 205		

Course Description:

This course gives the students an Introduction to digital image; Image Sensing and Acquisition; Some Basic Gray Level Transformations for Image Enhancement.; Image Contrast Enhancement Using Histogram Processing; Image Smoothing Using Spatial Filters; Image Sharpening Using Spatial Filters; Point, Line and Edge Detection; Basic image compression procedures; Basic Global and Adaptive Thresholding for Image Segmentation; Optimal Global and Adaptive Thresholding for Image Segmentation; Region-Based Image Segmentation and Edge-Based Segmentation; Image Restoration in the Presence of Noise-Spatial Filtering; Image Enhancement in Frequency Domain; Objects Representation and Description; introduction to Object Recognition.

Grading						
	☒ Mid-term 1	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

Rafael C Gonzalez, Richard E Woods, "Digital Image Processing" – 4th Edition, Pearson Education, ISBN-13: 978-0133356724, 2017

References and Supplemental Materials:

Course Name	Parallel Architecture Computing	Course Code	English	Arabic
			CNE 485	485 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0
Category	☐ University	☐ College	☒ Department		
Type	☐ Required	☒ Elective			
Level	9th or 10th	Prerequisite	CNE 305		

Course Description:

Organization of high performance computer: inside a processor (pipeline, vector processor, array processor, superscalar). Multiprocessors (UMA, NUMA, COMA, PRAM). Multi Computers (Node configuration – Cluster configuration), Flynn Classification, performance (speed factor). Parallel Computing Networks (static – Dynamic). Parallel computing operating system (for multi processors – for Multi computers). Parallel computing programming Models (Global variable model and Compiler - Passing message model and MPI)

Grading						
	☒ Mid-term 1	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

1. Distributed systems principles and paradigms, Andrew S. Tanenbaum and Maarten van Steen, Second Edition, Published By Maarten van Steen, 2016.

References and Supplemental Materials:

1. Advanced Computer Architecture and Parallel Processing, Hisham El-Rewini and MostafaAbd El Bar, (Editor John Wiley & Sons Inc.), 2005.

Course Name	Network Security Practice	Course Code	English	Arabic
			CNE 472	472 هال

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	0	2

Category	☐ University	☐ College	☒ Department
Type	☐ Required	☒ Elective	
Level	9th or 10th	Prerequisite	Co-Req CNE 417

Course Description:

This course aims to provide students with a deep knowledge and practice of network security with a focus on technical and operational issues of modern network architectures, security protocols, wireless and mobile networking and their related standards. It is intended for undergraduate students who have are familiar with networks, information security, and cryptography.

Grading	☒ Mid-term	30	☒ Project	10	☒ Assignments	10
	☒ Final	40	☒ Lab	10		

Text Book:

Network Security Essentials: Applications and Standards, William Stallings, 6th edition, 2016.

References and Supplemental Materials:

Course Name	Testing of Digital Circuits	Course Code	English	Arabic
			CNE 473	473 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	0	2
Category	☐ University	☐ College	☒ Department		
Type	☐ Required	☒ Elective			
Level	9th or 10th	Prerequisite	CNE 203		

Course Description:

Fault modeling: taxonomy of failures (single and multiple, structural and functional, permanent and temporal), stuck-at faults, delay and transition faults, Test pattern generation: delay fault model, at-speed tests, sequential test generation. Fault simulation: parallel simulation, deductive fault simulation, parallel-pattern single-fault propagation, concurrent fault simulation, critical path tracing, statistical fault analysis. Design for testability (DFT): controllability and observability, ad hoc techniques, scan-based designs, scan-based test application, launch and capture techniques, complex capture windows, test point insertion, clock gating, level-sensitive scan design, boundary scan, low power scan operations.

Grading	☒ Mid-term 1,2	30	☒ Project	10	☒ Assignments	10
	☒ Final	40	☒ Lab	10		

Text Book:

1. L.-T. Wang, C.-W. Wu, X. Wen, VLSI test principles and architectures, Elsevier, Amsterdam 2006.

References and Supplemental Materials:

1. H. Jha, S. Gupta, Testing of digital systems, Cambridge University Press, Cambridge 2003.

Course Name	Pattern Recognition	Course Code	English	Arabic
			CNE 474	474 هال

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	0	2

Category	☐ University	☐ College	☒ Department
Type	☐ Required	☒ Elective	
Level	9th or 10th	Prerequisite	Finish 90 Credit Hours

Course Description:

Machine learning or statistical learning, the field of study of artificial intelligence, concerns the design, analysis, development and implementation of a machine (in a broad sense) to evolve through a systematic process, and thus to perform difficult or problematic tasks by more conventional algorithmic means. Pattern Recognition Covers basic concepts of pattern recognition systems, application examples, PDF estimation, maximum likelihood estimation, Bayesian estimation, KNN estimation, parzen windows estimation, expectation maximization algorithm, feature reduction, supervised classification, Bayesian classification, discriminant functions, classifier combination, Markov random fields, Artificial neural networks, support vector machines.

Grading	☒ Mid-term 1	30	☒ Project	10	☒ Assignments	10
	☒ Final	40	☒ Lab	10		

Text Book:

Pattern Recognition, Edition 4 by S. Theodoridis and K. Koutroumbas, New York, NY: Academic, 2009.

References and Supplemental Materials:

IEEE Transactions on Pattern Analysis and Machine Intelligence.

Course Name	Digital and Fuzzy Control	Course Code	English	Arabic
			CNE 475	475 هال

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	0	2

Category	☐ University	☐ College	☒ Department
Type	☐ Required	☒ Elective	
Level	9th or 10th	Prerequisite	CNE 322

Course Description:

Sampled Data Systems, The z-Transform and Inverse Z transform, Mapping between the s plane and the z plane, Closed loop Feedback Sampled-Data Systems and second order system, Closed–Loop Systems with Digital computer compensation, Stability analysis in z plane, controllability, observability, The Root Locus of Digital control Systems, Example of Design of digital controllers. Fuzzy set theory, Elements of a Fuzzy Logic System, Fuzzification Linguistic Variables & Values, Fuzzy inference Rules, Aggregation, Composition, Defuzzification, Examples of Design Fuzzy controller.

Grading	☒ Mid-term 1,2	30	☒ Project	10	☒ Assignments	10
	☒ Final	40	☒ Lab	10		

Text Book:

- Discrete Control Systems by Okuyama, Yoshifumi, 2014, ISBN: 9781447156673

References and Supplemental Materials:

- Fuzzy Control and Identification, by John H. Lilly, Edited By John Wiley & Sons Inc., 2010. ISBN: 9780470542774

Course Name	Modern Sensors	Course Code	English	Arabic
			CNE 476	476 هال

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	0	2

Category	☐ University	☐ College	☒ Department
Type	☐ Required	☒ Elective	

Level	9^{th} or 10^{th}	Prerequisite	Finish 90 Credit Hours

Course Description:

The course focuses on the underlying physics principles, design, and practical implementation of sensors and transducers including piezoelectric, acoustic, inertial, pressure, position, and flow, capacitive, magnetic, optical, and bioelectric sensors.

Established as well as novel sensor technologies as well as problems of interfacing various sensors with electronics are discussed.

Grading	☒ Mid-term 1,2	30	☒ Project	10	☒ Assignments	10
	☒ Final	40	☒ Lab	10		

Text Book:

1. Handbook of Modern Sensors, (Physics, Designs, and Application), By Jacob Fraden, Springer, 2016

References and Supplemental Materials:

Course Name	Digital Design using VHDL	Course Code	English	Arabic
			CNE 477	477 هال
Credit Hours	3	Contact Hours	Lec: 2	Tut: 0 / Lab: 2
Category	☐ University	☐ College	☒ Department	
Type	☐ Required	☒ Elective		
Level	9th or 10th	Prerequisite	CNE 203	

Course Description:

Advanced methodologies in the design of digital systems. Hardware Description Languages (HDLs). Architecture and characteristics FPGAs, Simulation, synthesis, verification of digital system designs using FPGAs. FPGA placement, routing, and timing analysis tools.

Grading						
	☒ Mid-term 1,2	30	☒ Project	10	☒ Assignments	10
	☒ Final	40	☒ Lab	10		

Text Book:

RTL HARDWARE DESIGN USING VHDL ,Coding for Efficiency, Portability, and Scalability", PONG P. CHU, Cleveland State University, John Wiley & Sons, 2006

References and Supplemental Materials:

Andrew Rushton, "VHDL FOR LOGIC SYNTHESIS", Third Edition, John Wiley & Sons Ltd., 2011.

Course Name	Intelligent Systems and Robotics	Course Code	English	Arabic
			CNE 478	478 هال
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			2	0	2
Category	☐ University	☐ College	☒ Department		
Type	☐ Required	☒ Elective			
Level	9th or 10th	Prerequisite	Finish 90 Credit Hours		

Course Description:

This course consists of two parts. The first part deal with the study of intelligent systems which includes Introduction to AI and Intelligent Agents, Solving Problems by Searching, Knowledge Representation, Reasoning and Decision Making, Introduction to Learning Methods. The second part deals with the study of Robotics which includes an Introduction, Robot Hardware, Robotic Perception, Planning, and Applications.

Grading						
	☒ Mid-term 1,2	30	☒Project	10	☒ Assignments	10
	☒ Final	40	☒ Lab	10		

Text Book:

- Introduction to Robotics: mechanics & control 4th Edition, by John J. Craig, Pearson, 2017.

References and Supplemental Materials:

- Artificial Intelligence; A Modern Approach, 3rd Edition, by Russell & Norvig, Pearson, 2016

Course Name	Artificial Intelligence	Course Code	English	Arabic
			CIS 313	313 حسب
Credit Hours	3	Contact Hours	Lec: 3	Tut: 0 / Lab: 0
Category	☐ University	☐ College	☒ Department	
Type	☐ Required	☒ Elective		
Level	9th or 10th	Prerequisite	CIS 205	

Course Description:

The course aims to prepare you to understand what AI is and how it is used in its expanding areas of application. It will help you to understand how AI can be used in your own work, to take advanced courses in the field, and to begin working on AI research projects. You will be able to recognize when AI techniques are necessary to solve a problem. You will be able to apply standard AI techniques to solve problems. You will be able to evaluate new techniques you encounter. Topics include advanced techniques for symbolic processing, uninformed and informed search, knowledge representation, uncertainty, probabilistic reasoning, and learning.

Grading						
	☒ Mid-term 1	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

Artificial Intelligence; A Modern Approach; Russell &Norvig, 3rd Edition, PEARSON (editor), Paperback edition from Pearson International, 2016.

References and Supplemental Materials:

Course Name	Design and Analysis of Algorithms	Course Code	English	Arabic
			CIS 414	414 حسب
Credit Hours	3	Contact Hours	Lec: 3	Tut: 1 / Lab: 0
Category	☐ University	☐ College	☒ Department	
Type	☐ Required	☒ Elective		
Level	9th or 10th	Prerequisite	CIS 205	

Course Description:

This course will include the design and analysis of algorithms. Algorithms that manipulate data structures such as lists, stacks, queues, trees, and graphs are discussed in terms of efficiency and existence. Algorithms for data compression, memory management, and advanced hashing techniques will be studied. Topics also include balancing algorithms, divide-and-conquer algorithms, dynamic programming, the greedy approach, backtracking, branch-and-bound, advanced search/sort techniques, the P and NP problem, parallel algorithms, and newly promoted algorithms will be studied and researched.

Grading						
	☒ Mid-term 1	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

- Introduction to the Design & Analysis of Algorithms, by Anany Levitin. Pearson; 3rd Edition (2011). ISBN-10: 0132316811, ISBN-13: 978-0132316811.

References and Supplemental Materials:

- Steven S. Skiena The Algorithm Design Manual Second Edition, Springer-Verlag London Limited 2008, ISBN: 978-1-84800-069-8e-ISBN: 978-1-84800-070-4
- Michael Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis, and Internet Examples, John Wiley, 2002

Course Name	Advance Software Engineering	Course Code	English	Arabic
			CIS 426	426 حسب

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0

Category	☐ University	☐ College	☒ Department
Type	☐ Required	☒ Elective	

Level	9^{th} or 10^{th}	Prerequisite	CIS 321

Course Description:

This course aims in giving students an insight of modern processes and methods for development and quality assurance of software systems, understanding of strengths and weaknesses of various techniques and choosing the appropriate one depending on the context. A deep understanding the relationship between requirements specification, design, and testing.

After completion of this course, students will be able to make appropriate and well-argued choices of processes and techniques based on the project context. They will be able to handle the transition between various subtasks and collaboration between various actors in the software development process.

Grading	☒ Mid-term 1	30	☒Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

- "Software Engineering" by Ian Sommerville ,10th Edition, Addison-Wesley, 2015.
- "Software Engineering: A Practitioner's Approach" 8th Edition by Roger S. Pressman, 2014.

References and Supplemental Materials:

Course Name	Cloud Computing	Course Code	English	Arabic
			CIS 434	434 حسب
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0
Category	☐ University	☐ College	☒ Department		
Type	☐ Required	☒ Elective			
Level	9th or 10th	Prerequisite	Finish 90 Credit Hours		

Course Description:

In this course the different types of features, standards, services, and security issues in cloud computing will be discussed. This course offers students the opportunity to study this new paradigm of computing in which dynamically scalable and often virtualized resources are offered as services over the internet. The course will also cover some of the autonomic computing aspects which provide solutions to the challenges of cloud management.

Grading						
	☒ Mid-term 1	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

- Cloud Computing for Science and Engineering, by Ian Foster and Dennis B. Gannon. MIT Press; 1st Edition (2017). ISBN-10: 0262037246, ISBN-13: 978-0262037242.

References and Supplemental Materials:

Course Name	Applied Cryptography	Course Code	English	Arabic
			CIS 442	442 حسب
Credit Hours	3	Contact Hours	Lec: 2	Tut: 0 / Lab: 2
Category	☐University	☐ College	☒ Department	
Type	☐ Required	☒ Elective		
Level	9th or 10th	Prerequisite	Finish 90 Credit Hours	

Course Description:

This course introduces the concepts of modern cryptographic algorithms and protocols and explores how they can be effectively used within larger security systems. Topics covered include cryptographic primitives such as symmetric encryption, public key encryption, digital signatures, and message authentication codes; cryptographic protocols, such as key exchange, remote user authentication, and interactive proofs; cryptanalysis of cryptographic primitives and protocols, such as by side-channel attacks, differential cryptanalysis, or replay attacks.

Grading						
	☒ Mid-term 1, 2	20	☒ Project	10	☒ Assignments	10
	☒ Final	40	☒ Lab	20		

Text Book:

- Introduction to Modern Cryptography, by Jonathan Katz and Yehuda Lindell. Chapman and Hall/CRC; 2nd Edition (2014). ISBN-10: 1466570261, ISBN-13: 978-1466570269.

References and Supplemental Materials:

Course Name	Natural Language Processing	Course Code	English	Arabic
			CIS 462	462 حسب
Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0
Category	☐ University	☐ College	☒ Department		
Type	☐ Required	☒ Elective			
Level	9th or 10th	Prerequisite	Finish 90 Credit Hours		

Course Description:

Structure in NLP and probabilistic Grammar Formalisms, natural language data, Identify parts of speech, Operation of a finite-state machine, Coding regular expressions, Regular grammars, Past tense forms, Automatic Speech Recognition, Machine Translation, Entities named, Syntactic Parsing, Statistically-based techniques for text analysis, Semantics, Taxonomies, ontology, Human-like Dialog, Natural Language Understanding, Learning in incomplete and irrelevant domains.

Grading						
	☒ Mid-term 1	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

1. Handbook of Natural Language Processing, Second Edition by NitinIndurkhya (Editor), Ralf Herbrich (Contribution by), Fred J. Damerau (Editor), ThoreGraepel (Contribution by)- CRC Press (2010).
2. Linguistic Structure Prediction, Synthesis Lectures on Human Language Technologies, Morgan and Claypool; By Noah Smith (2011).

References and Supplemental Materials:

Course Name	Bioinformatics	Course Code	English	Arabic
			CIS 463	463 حسب

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	1	0

Category	☐ University	☐ College	☒ Department
Type	☐ Required	☒ Elective	
Level	9th or 10th	Prerequisite	Finish 90 Credit Hours

Course Description:

This course teaches the application of computational and modeling thinking to the biological sciences. It change the way scientific problems are approached, and increase the scale and complexity of the problems that should be solved. It introduces the students to the principles and methods that enable them to search and compare sequences and give answers to fundamental biological questions important to fields such as protein structure and folding. The course also covers the public data banks that provide details of biological systems and components

Grading	☒ Mid-term 1	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

1. Arthur Lesk, Introduction to Bioinformatics, Fourth Edition, Oxford University, 2014

References and Supplemental Materials:

Course Name	Expert Systems	Course Code	English	Arabic
			CIS 465	465 حسب

Credit Hours	3	Contact Hours	Lec	Tut	Lab
			3	0	0

Category	☐ University	☐ College	☒ Department
Type	☐ Required	☒ Elective	
Level	9th or 10th	Prerequisite	Finish 90 Credit Hours

Course Description:

The course will be composed of a brief introduction to expert systems followed by a presentation of knowledge representation paradigms (the emphasis will be put on rule-based systems). The inference rules, rules resolution and basic aspects of reasoning under uncertainty shall also be presented. During the course some case studies using: MYCIN - CLIPS will be analyzed and an Application Modeling Project requested to be implemented using CLIPS.

Grading	☒ Mid-term 1	30	☒ Project	10	☒ Assignments	10
	☒ Final	50	☐ Lab			

Text Book:

1. Expert Systems: Principles and Programming, Giarrantano and Riley, Thomson, 2005.

References and Supplemental Materials: