University of Mosul / College of Engineering / Courses

The Second level for the academic year 2020-2021

Computer Department Engineering

						Course Name			
Notes	Course Code	prerequisite	Number of units	The number of working hours	Theoretical number of hours	In English	In the Arabic language	Requirement type Compulsory-(optional)	Requirement name
The student studied 3 units in the first level		-	1	-	1	English Language-Pre-intermediate	اللغة الانكليزية ما قبل المتوسط	Mandatory	University requirements
Compulsory for students of the department	ENGE229	Calculus I,II	3	-	3	Engineering Mathematics I	رياضيات هندسية I	Optional	college requirements
	ENGC226	-	2	-	2	Engineering Economics	اقتصاد هندسي	Mandatory	
	ENGC227	-	2	-	2	Statistics	إحصاء	Mandatory	
	ELCI202	Electrical circuit analysis	4	2	3	Electronics Circuits	دوائر الكترونية	Mandatory	Department requirements
	DAST203	Object- oriented programming in C++	3	2	2	Data Structures	هياكل بيانات	Mandatory	
	MIPR204	Digital logic	3	2	2	Micro-Processor I	معالجات دقيقة I	Mandatory	
	PLDE205	Digital systems design	2	-	2	Programmable Logical Design	تصميم منطق قابل للبرمجة	Mandatory	
			20	6	17	Total hours and units of the first semester			

The second academic level (first semester)

Course Objectives:	
English Language will be covered during this course. It focuses on developing communication between teacher and students to give them more opportunities to show their own thoughts and opinion. The course includes activities and exercises that guide students to support their skills in conversation. Students also learn how to manage correct language by using correct grammar. The efforts will be directed towards teaching students how to think beyond common classroom tasks and awaken their desire to excel in English. Four skills will be focused on: reading, writing, listening and speaking.	

Course Details:	
Article	**Week**
Tenses: present and past. Future form. Questions+Form/ exercises	1 – 2
Present simple: form+use. Present continuous:form+use Have/have got exercises	3 – 4
Past simple: form+use. Past continuous:form+use exercises	5
Expressions of quantity: much/many, some/any, a lot/lots of exercises	6
Verb patterns: like doing and would like to do, will/going to exercises	7 – 8
What….like? comparative and superlative exercises	9
Present perfect: form/use, present perfect and past simple exercises	10
Have to: introduction to modal auxiliary verbs exercises	11 – 12
Time tenses, first condition exercises	13
Verb patterns: used to, form/use, with past tense exercises	14
The passive + Second conditional exercise	15

Text Books
Text Book: Pre-Intermediate Student's Book - New Headway Plus by John and Liz Soars

Course Objectives:
i) To develop logical understanding of the subject. ii)To develop **mathematical** skill so that students are able to apply **mathematical** methods & principals in solving problem from **Engineering** fields. iii) To make aware students about the importance and symbiosis between **Mathematics** and **Engineering**

Course Details:	
Article	**Week**
Function of two or more variables	1 – 2
Limits & Continuity	
Partial derivatives (definitions, functions of more than two variables)	
Second order partial derivatives	
Chain rule for functions of two or three variables	
Maxima and minima and saddle point	
Multiple integral	3 – 7
Double integral	
Properties of double integral	
Double integral over regions	
Iterated or revised integrals-finding the limits of integration	
Average Value ,Areas, moments, and center of mass	
Double integrals in polar form	
Integrals in polar coordinates	
Limits of integration In polar form	
Changing Cartesian integrals into polar form	

Triple integrals	
Properties of triple integrals	
Fourier Analysis	8 – 11
Trigonometric form of Fourier Series	
Wave form Symmetry	
Odd and Even Functions	
Half Wave Symmetry	
Sum and Shift of function	
Line Spectrum (harmonic) the Fourier Series	
Complex Exponential form of the Fourier Series	
Fourier Transformation	
Vector analysis	12 – 15
Introduction to Vectors: definition, notation, properties Vector algebra: addition, subtraction, multiplications Vector functions: lines, planes, fields	
Vector differential calculus: derivative, Gradient, Laplacian, divergence, curl. Eigen values and Eigen vectors. Applications	
Vector analysis	
Text Books	
[1] E. Transcendentals, G. B. Thomas, M. D. Weir, J. Hass, and C. Heil, *Calculus*, 13th ed. 2014. [2] E. Kreyszig, *Advance Engineering Mathematics*, 10 th. 2011.	

Course Objectives:	
The lectures include introducing engineering economics, project evaluation, and how to use engineering to reduce cost and achieve quality	

Course Details:	
Article	**Week**
الاقتصاد الهندسي (تعاريف ، مصطلحات ومفاهيم) Engineering Economics (Definitions, Concepts)	1 – 2
الفائدة والعلاقات الاقتصادية Interest and Economic relationships	2 – 3
Cash flow التدفق النقدي	
capital time value والقيمة الزمنية لرأس المال	
Comparison between alternatives المقارنة بين البدائل	3 – 4
present value Concept طريقة القيمة الحالية	
Equivalent annual cost الكلفة السنوية المكافئة	
discount Rate سعر الخصم Economic Appraisal التقييم الاقتصادي	5
Payback period فترة الاسترداد	
internal rate of return معدل العائد الداخلي	
Replacement الاستبدال	6
Depreciation الاندثار	7 – 8
(SOYDD) طريقة جمع ارقام السنوات	
(DBD) القسط الثابت	9
inflation التضخم	10
Breakeven Point نقطة التعادل	11 – 12
sensitivity analysis تحليل الحساسية	13
feasibility Study الجدوى الاقتصادية والفنية	14 – 15

Text Books	

Course Objectives:	
The main objective of this course is to provide students with the foundations of probabilistic and statistical analysis mostly used in varied applications in engineering and science.	

Course Details:	

Article	Week
Role of statistics in science, types of statistics (Descriptive and Inferential), data presentation (Arithmetic mean, Median, Mode).	1
Descriptive statistics, histogram frequency distribution, data limits, data tabulations, polygon, ogive.	2
Basic Concepts of Probability Theory (random events and sample space), relationship between statistics and probability.	3
Sets and probabilistic models, axioms of probability, rule of Probability	4
The definition of conditional probability and their properties	5
Multiplication rule, total probability theorem, Bayes' theorem.	6
Three events, mutually and non-mutually events	7
Counting, permutation, combination	8
The definition and classification of random variable (Discrete and Continuous), type of discrete distribution.	9
Discrete probability distributions, Binomial and Poisson Distribution.	10
Continuous distribution , normal distribution	11
Test of hypothesis, types of errors in hypothesis testing, hypothesis tests of means.	12
Test of the mean with unknown population variance, hypothesis test of two means with known population variance.	13
The principles design of experiments, one way and two way ANOVA (ANOVA: the Analysis of Variance).	14
Final Exam.	15

Text Books
1- Introduction to Probability and Statistics for Engineers, Holický**,** Milan.

2- Introduction to Statistics, K. M. AL_Rawi, Second Edition, 2000.
3- Statistics and Probability for Engineering Applications With Microsoft« Excel, W.J. De Coursey.
4- Probability and Statistics for Engineering and the Sciences, Jay Devore.
5- Fundamentals of Probability and Statistics for Engineers, T.T. Soong

Course Objectives:	
To introduce the analysis and design of analog electronic circuits and subsystems using BJT, FET transistors, operational amplifiers.	

Course Details:	
Article	**Week**
Amplifier: bipolar transistors: Biasingcct. AC cct,, frequency response	1 – 4
Field Effect Transistors : JFET, MOSFET, Biasing and AC cct.	5 – 6
Feed Back: a- Negative b- Positive	7 - 8
Operational Amplifiers	9 – 12
Power Amplifiers	13 – 14
Introduction to IC fabrication	15
Text Books	
1-Electronic devices and circuit theory' Robert L. Boylestad' Louis , Nashelsky, Prentice Hall, 1991. 2-Electronic Devices. By Floyd.2012. Prentice Hall .	

Course Objectives:
Review algorithms for solving problems that use data structures such as arrays linked lists, stacks, queues, graphs and trees, and those that are used for list manipulation, graph manipulation (e.g., depth-first search), and tree traversals. Moreover, implementing algorithms in C++ using good programming style for data structures.

Course Details:

Article	Week
Introduction and review	1
Information hiding, Encapsulation, Design and implementation of list ADTS using arrays and linked lists	2
Recursion in Programming and Problem Solving Recursive valued functions: Factorial, Classical problems: Ackermann's function, 8-Queens problem, Towers of Hanoi, detecting palindromes Relation to mathematical induction	3 – 4
Stacks: Stack ADT, implementation using arrays, linked lists, and list ADTS, Applications: Checking balanced braces, recognizing strings, depth-first searches on graphs	5 – 6
Queues: Queue ADT, implementation using arrays, linked lists, and list ADTS, Applications: breadth-first searches, recognizing palindromes.	7 – 8
Trees : Introduction, Terminology, Traversals, Applications: Binary Trees, Tree ,Huffman's algorithm	9 - 10
Introduction to Graph theory	11
Hashing Techniques	12
Speed memory Trade off	13

Text Books

1- M.A. Weiss, Data structure and algorithm analysis in C++ Addison Wesley, 2006.
2- Michael T. Goodrich, Roberto Tamassia, David M. Mount , Data structure and algorithm in C++,2011

Course Objectives:	
gives the students the ability to understand the basics of the Microprocessors, through studying the 8086 Microprocessor's architecture, instructions, writing programs in assembly, and design the basic interfacing circuits.	
Course Details:	
Article	**Week**
Introduction to Microprocessors	1
The Architecture and Buses of the 8086 Microprocessor	2
The 8086 Microprocessor's Addressing modes	3
The 8086 Microprocessor Instruction set, Debug, and MASM software	4
The Data-transfer instructions' group	5
The Logical and Shift & Rotate instructions' group	6
The Loop and Branching instructions' group	7
The Arithmetic instructions' group	8
The String instructions' group	9
The Control instructions' group	10
Evaluation Exam	11
The BIOS and DOS Interrupts	12
The BIOS and DOS Interrupts	13
Machine language coding	14
Machine language coding	15
Text Books	
1) The 8088 and 8086 Microprocessors: programming, Interfacing, software, Hardware, Applications, by: Walter Triebel and Avtar Singh, 4th edition, prentice-Hall, 2002. 2) The Intel microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-bit extensions: architecture, programming, and interfacing by: Barry B. Brey—8th ed.	

Course Objectives:
To instruct the student in the use of VHDL (very high speed Circuit hardware description language) for designing the behavior of digit systems

Course Details:

Article	Week
Basic principles of digital Systems, PAL., PLD review	1
FPGA structure	2
VHDL Language	3 – 4
Circuit Design in VHDL	5
code structure of VHDL	6
Data type of VHDL	7 – 8
Operator and attributes of VHDL	9
Concurrent statement of VHDL	10
Sequential statement of VHDL	11 – 12
State machine of VHDL	13
System design of VHDL	14

Text Books

1- Voinci A. pedroni, "Circuit design with VHDLL", MIT press, Cambridge, London 2004.
2- Thom A.S. "digital with CPLA application and VHDL.
3- Brain Hold : "digital logic Design", 4th Edition, Newmans, 2002