MENG Program Course Syllabi

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FACULTY OF ARTS & HUMANITIES - DEPARTMENT OF ARABIC LANGUAGE
COURSE SYLLABUS

ARAB 101 Arabic Language (1)

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Arabic Language (1)	ARAB 101	عرب 101	3			3
Pre-requisites:	None					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: The main focus of this course is to improve students' vocabulary, grammar and reading skills through in-class learning activities and self-study. The course aims to give students a firm grounding in the basic language structure by covering syntax, word morphology, spelling and punctuation. The course also focuses on how students can become effective writers and editors by evaluating their own writing.						

***Textbooks*:**

1. Salem S. Al-Khammash (2008) Arabic Language skills, Jeddah, King Abdulaziz University, Centre for Scientific Publications. (In Arabic)

***Supplemental Materials*:**

1. Mohammad S. Al-Shanti (1994) Arabic Language skills, Dar Al-Andalous, Hail, Saudi Arabia. (In Arabic).

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Communicate simply but effectively in Arabic
2. Appreciate the importance of Arabic for personal enrichment and professional success
3. Gain knowledge of basic grammatical and sentence structures.
4. Distinguish and pronounce all Arabic alphabet and sounds.
5 Demonstrate accurate spelling by writing from dictation
6. Write accurately from dictation.
7. Recognize and use properly ancient and modern dictionaries to look up words and meanings.

***Topics to be Covered*:**	***No. of Weeks***
1 Importance of learning Arabic / language & communication / Importance of Reading	1
2. Basic grammatical rules: Syntactic rules: Parts of speech / Case: The dynamic (Mu'rab) & Indeclension (Mabni)	1
3. Nouns & Pronouns / Enclitic Pronouns Grammatical cases	1
4. Overt verbs	1
5. The Imperfective Tense / Strong, sick and imperfective verbs (five verbs)	1

6.	The Dual & Plural / Unnonated Nouns Types of declension Diptotes & Triptotes	1
7.	Subject & Predicates / Weak verbs	1
8.	The doer / The Accusative object	1
9.	Subject of the predicate	1
10.	Morphology / auxiliary consonants	1
11.	Plural & dual formation / Spelling rules for ‘Hamza’ (medial & final)	1
12.	Types of ‘Hamza’/ Punctuation rules	1
13.	Texts & Dictionaries	1

FACULTY OF ARTS & HUMANITIES - DEPARTMENT OF ARABIC LANGUAGE
COURSE SYLLABUS

ARAB 201 Arabic Language (2)

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Arabic Language (2)	ARAB 201	201 عرب	3			3
Pre-requisites:	ARAB 101					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: This curriculum aims to make deep instructor of Linguistic knowledge (dictionary) and grammatically and morphological and rhetoric , for students and developing the sense of Arts at them, and methods of formulating and Arabic editing , and ability to use the modern technical educational aids, and to practice on them through the selection texts not through the direct delivery.						

***Textbooks*:**

1. Dr. Hamdan Bin Atteyah, Alzahram. Dr. Fahad Bin Mused Alluhibi, and Dr. Saeed Bin Tayeb Almutrifi, "Arabic Editing 2nd level", King Abdulaziz University.

***Supplemental Materials*:**

1.

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Demonstrate the language skills necessary for Arabic language speaking , reading and writing, and demonstrate that the student has strong relation with his Arabic Culture and civilization.
2. Demonstrate ability to write story, play, and oratory
3. Prepare official speaking.
4. Demonstrate ability to benefit from modern technology in writing.

	***Topics to be Covered*:**	***No. of Weeks***
1	**First Unit : Text Constructions Elements**	1
1	• Vocabulary and Reading text.	1
2.	• Text Construction Elements- pronunciation- sentence – paragraph-connection articles.	1
3.	• Office and Management writing (report, management message, minutes, autobiography)	1
	Second Unit: Types of Office Writing	1

4.	• Autobiography: Its need and its importance, selecting the data, way of its arrangement.	1
5.	• Management Message: its need, its important, its frame (design and concept) Message Language and its dialect, the grammar that must consider in writing, pattern for Management messages.	1
6.	• Report: its importance, its field, its purpose, and how to write it.	1
7.	• Minutes (record) what it is, the skills that must be available in the record writers.	1
	Third Unit: Type of Arts Writing	
9.	• Essay	1
10.	• Idea (notion)	1
11.	• Story	1
12.	• Play	1
	Fourth Unit: Writing & Search	
13.	• Search	0.5
14.	• Summary	0.5
15.	• Punctuation Mark.	0.5
16.	• Common Mistake in writing.	0.5
17.	• Writing and internet.	0.5
18	• Samples and Applying	0.5
	Fifth Unit : Rhetoric &	
19.	• From Rhetoric: simile ,hidden metaphor ,implied metaphor	0.5
20.	• From Rhetoric: Antithesis , paronomasia , equivocation ,	0.5
21.	• Samples & applying.	1

FACULTY OF SCIENCES - DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE SYLLABUS

BIO 110 General Biology (1)

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
General Biology (1)	BIO 110	أح 110	3			3
Pre-requisites:	None					
Course Role in Curriculum	*Required or Elective:*		Required			

Catalogue Description:
Getting Acquainted with Biology- What is Biology \ Branches of Biology-Historical Development of Biology-Characteristics of Life-How Biological studies Are Conducted-Applications of Biology \ Relations with other Sciences-Careers for Biology Majors-Chemical Basis of Life-Inorganic Components of Living Organisms-Organic Components of Living Organisms-Biological Reactions and Enzymes-Cells and Tissues: Structure and Functions – Prokaryotic Cells-Eukaryotic cells-Replication of cells: Mitosis and Meiosis-Plant and Animal Tissues-Biodiversity-Principles of Taxonomy and Classification-Viruses, Bacteria, Algae and Fungi-Plants-Animals-Nutrition- Metabolism and Bioenergetics-Photosynthesis: Fixation of Sun Energy-Synthesis of Biological Macromolecules, Energy Storage-Breakdown of Biological Macromolecules, Energy Release- Excretion-Excretion in Simple Forms of Life-Excretion in Plants-Excretion in Animals-Respiration-Circulatory System-Blood: Composition & Functions-Heart & Vessels-Lymph & Lymphatic System-Reproduction, Fertilization and Development-Simple Forms of Life-Plants- The Basic Genetic Mechanisms-Classic Genetics-Molecular Genetics.

***Textbooks*:**
1. Campbell, Reece, Taylor, Simon, and Dickey. BIOLOGY: Concepts & Connections, Sixth Edition. 2009

***Supplemental Materials*:**

***Course Learning Outcomes*:**
By the completion of the course the student should be able to:
1. Demonstrate knowledge of Life Sciences and their vital applications in many life aspects
2. Appreciate the role of Life Sciences in solving out more global issues and man-current issues (e.g. global warming)
3. Demonstrate ability to develop general initiative and problem solving skills, which would improve his intellectual ability to choose the career that meets with his skills.
4. Apply the scientific methods for experimentation and analysis by English language, which would improve his reading, written, interpreting and presentational communication skills.

Topics to be Covered:		***No. of Weeks***
1.	Getting Acquainted with Biology	1
2.	Chemical Basic of Life	1
3.	Cells And Tissues	1
4.	Biodiversity	1
5.	Metabolism and Bioenergetics	1
2.	Nutrition	1
8.	Gas exchange (respiratory) and Circulation	1
9.	Excretion	1
10	Reproduction , Fertilization and Development	1
11	Basic Genetic Mechanisms	2

FACULTY OF ENGINEERING - DEPARTMENT OF CIVIL ENGINEERING
COURSE SYLLABUS

CE 201 Engineering Mechanics (Statics)

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Engineering Mechanics (Statics)	CE 201	هـ مد 201	3			3
Pre-requisites:	IE 200: Engineering Communication Skills, PHYS 281: Physics lab					
Course Role in Curriculum	Required or Elective:	Required				
	A pre-requisite for:	CE 202				
Catalogue Description: Vector operations. Equilibrium of a particle. Free body diagram. Moment of forces about a point and about an axis. Equivalent systems. Equilibrium of a rigid body in two and three dimensions. Trusses (method of Joints and sections). Frames and machines. Dry friction.						

Textbooks:

"Engineering Mechanics STATICS", R. C Hibbeler, 12th Edition, SI Edition, Prentice-Hall, Pearson Education, 2010

Supplemental Materials: None

Course Learning Outcomes:

By the completion of the course the student should be able to:

1. Find the resultant of a system of concurrent forces by parallelogram laws and Cartesian vector notation in 2D & 3D. (magnitude and direction)
2. Solve equations of equilibrium for a particle and for a rigid determinate structure in 2D & 3D.
3. Determine the moment of a force about a point and a line and the moment of a couple in 2D and 3D (magnitude and vector).
4. Reduce a system of forces and couples to a single force and determine its point of application.
5. Calculate the forces in truss members using method of joints and method of sections.
6. Analyze the forces acting on the members of pin-connected frames and machines.
7. Comprehend the concept of frictional forces

	Topics to be Covered:	***Duration in Weeks***
1	General Principles	1
2	Force Vectors	2
3	Equilibrium of a Particle	2
4	Force System Resultants	3
5	Equilibrium of a Rigid Body	1

6	Equilibrium in Two Dimensions	1
7	Equilibrium in Three Dimensions	1
8	Structural Analysis (trusses and frames)	3
9	Friction	1

Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	√
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (a)

Instructor or course coordinator: Dr. Mohammed Helmi Swellam
Last updated: March 2014

FACULTY OF SCIENCES - DEPARTMENT OF CHEMISTRY
COURSE SYLLABUS

CHEM 110 General Chemistry I

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
General Chemistry I	CHEM 110	110 كم	3			3
Pre-requisites:	None					
Course Role in Curriculum	*Required or Elective:*		Required			

Catalogue Description:
It provides an introduction to the general principles of chemistry for students planning a professional career in chemistry, a related science, the health professions, or engineering. By the end of this course the student will be able to understand the following: Significant figures, scientific notation and units, stoichiometry, atomic structure & periodic table, chemical bonding, gases, ionic equilibrium, basic principles of organic and basic principles of biochemistry.

***Textbooks*:**
1. Chemistry, by Chang, 9th. ed., 2007, McGraw-Hill.
2. Chemistry, by Steven S. Zumdahl, 6th ed., Houghton Mifflin, College Div.

***Supplemental Materials*:**
1. Chemistry, by Mortimer, 6th ed., Wadsworth Inc.

***Course Learning Outcomes*:**
By the completion of the course the student should be able to:
1. Understand Significant figures,
2. Understand Scientific notation and units,
3. Understand Stoichiometry,
4. Understand Atomic structure & periodic table,
5. Understand Chemical bonding,
6. Understand Gases,
7. Understand Ionic equilibrium,
8. Understand Basic principles of organic chemistry
9. Understand Basic principles of biochemistry.

***Topics to be Covered*:**
1. Significant figures,
2. Scientific notation and units,
3. Stoichiometry,
4, Atomic structure & periodic table,
5. Chemical bonding,
6. Gases,
7. Ionic equilibrium,
8. Basic principles of organic and biochemistry

FACULTY OF SCIENCES - DEPARTMENT OF CHEMISTRY
COURSE SYLLABUS

CHEM 281 General Chemistry Lab

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
General Chemistry Lab	CHEM 281	281 كم		3		1
Pre-requisites:	CHEM 110					
Course Role in Curriculum	*Required or Elective:*		Required			

Catalogue Description:
Safety rules, Chemical nomenclature, Acid radicals; Dil. HCl group Acid radicals; Conc. H_2SO_4group General group, General scheme for testing acid radicals + unknown, Basic radicals (1-6), General scheme for testing base radicals + unknown; Determination of the molecular weight of the volatile solution's vapor; Determination of percentage and number of molecules of water of crystallization; Titration using different indicators; 1- Determination of solubility product of sparingly soluble salt, 2- effect of common ion effect on the solubility

***Textbooks*:**
1. Chemical principles in the Laboratory with quantitative analysis, Slowiski. Wolsey. Masterton 6th ed., 1997 Brooks/Cole.

***Supplemental Materials*:**
1. Practical Experiments in Chemistry, Kim Gogarty, Col Harrison, Grahame Dobinson, 1st ed., Blake Education 2007.

***Course Learning Outcomes*:**
By the completion of the course the student should be able to:
1. Understand basic knowledge and principle in chemistry labs

***Topics to be Covered*:**
1. Safety rules,
2. Chemical nomenclature,
3. Acid radicals;
4, Dil. HCl group Acid radicals;
5. Conc. H_2SO_4group General group,
6. General scheme for testing acid radicals + unknown,
7. Basic radicals (1-6),
8. General scheme for testing base radicals + unknown;
   Determination of the molecular weight of the volatile solution's vapor;
9. Determination of percentage and number of molecules of water of crystallization;
10. Titration using different indicators;
11. Determination of solubility product of sparingly soluble salt,
12. Effect of common ion effect on the solubility

FACULTY OF ARTS AND HUMANITIES - DEPARTMENT OF COMMUNICATION SKILLS

COURSE SYLLABUS

COMM 101 Communication Skills

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Communication Skills	COMM 101	مهر 101	3			3
Pre-requisites:	None					
Course Role in Curriculum	*Required or Elective:*		Required Course			

Catalogue Description:
COMM 101 is structured as an introductory communication course. It is designed to expose students to the theories, skills, and strategies needed to become effective communicators in academic and professional settings. It explains the major theories of human communication and persuasion in interpersonal, small group, and public communication contexts. The course also focuses on effective communication skills and strategies for writing reports and CV's and for preparing and delivering effective presentations.

***Textbooks*:**

1. Saad B. Al-Masoodi (editor) (2006) Communication skills, Jeddah, King Abdulaziz University, Centre for Teaching & Learning Development. (In Arabic).

***Supplemental Materials*:**

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Identify and describe the basic components of the communication model, the various types of communication, and the role communication plays to satisfy needs.
2. Describe the different skills and strategies that enhance communication effectiveness
3. Explain the major concepts used to describe interpersonal and small group processes
4. Observe and utilize the recommended strategies for developing and delivering and evaluating effective public presentations.

***Topics to be Covered*:**	***Duration in Weeks***
1. Introductory Week	1
2. Introduction to human communication	1
3. Intrapersonal communication	2
4. Verbal communication	1
5. Non-verbal communication	1
6. Listening skills	2
7. Human communication for better human relationships	1
8. Communication within small groups	1
9. Public Speaking	1
10. Writing up CV's, letters & reports/ personal interview prep tips	2

FACULTY OF COMPUTING & INFORMATION TECHNOLOGY -
DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE SYLLABUS

CPIT 100 Computer Skills

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Computer Skills	CPIT 100	100 تم	1	3		3
Pre-requisites:	None					
Course Role in Curriculum	*Required or Elective:*		Required			

Catalogue Description:
This course aims to provide the students with advanced skills to operate and make use of a personal computer in different environments such as in academia, in business, and at home. The course introduces the students to the main concepts and terminologies of information technology, and equipped them with the knowledge to administer one of widely-used operating systems. The course also aims to provide the students with the practical skills to utilize an office productivity package for different purposes. The course will prepare the students to new learning methodologies, namely distance learning and e-learning. The delivery of the course contents will be based on a hands-on approach.

***Textbooks*:**
1. "Computer Skills," Prepared by Computer Skills Unit, Fourth Edition.

***Supplemental Materials*:**

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Explain all the basic concepts of information technology and its related terminologies.
2. Demonstrate advanced skills developed for the use of office productivity packages.
3. Search through the Internet effectively.
4. Fully utilize an e-mail service.
5. Demonstrate knowledge of e-learning and Distance Learning systems and how they work and their benefits

***Topics to be Covered*:**	***No. of Weeks***
1. Introduction to information Technology	1
2. Operating Systems (Microsoft Windows©)	1
3. Word Processing (Microsoft Word©)	3
4. Data Sheets (Microsoft Excel©)	2
5. Databases (Microsoft Access©)	3
2. Presentations (Microsoft Power Point©)	1
8. Internet (Microsoft IE©)	1
9. E-Mails (Microsoft Outlook©)	1
10 E-Learning and Distance Learning	1

DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING
COURSE SYLLABUS

EE 201 Structured Computer Programming

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Structured Computer Programming	EE 201	201 هـ ك	1	3	-	2
Pre-requisites:	MATH 110, CPIT 100					
Course Role in Curriculum	*Required or Elective:*	Required				
	A pre-requisite for:	EE 202, EE 332				
Catalogue Description:						
Introduction to computers. Algorithms and flowcharts. Solving engineering and mathematical problems using a mathematically-oriented programming language. Programming concepts: I/O, assignment, conditional loops, functions and subroutines. Programming selected numerical and non-numerical problems of mathematical and engineering nature.						

***Textbooks*:**

W.J. Palm III, *Introduction to MATLAB 7 for Engineers*, McGraw-Hill International Edition, 2005.

***Supplemental Materials*:**

Course slides (published at the course website: http://ece.goto-school.com/)

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

Describe the engineering problems and need for computer solutions.

Describe the structured programming and choosing MATLAB as a mathematically-oriented programming language.

Express basic operations, how to use menus, Help System, and different tools in MATLAB.

Compute simple mathematical expressions, and manage variables in Interactive mode of operation.

Create, address, edit arrays, and **perform** array and matrix operations including addition, subtraction, multiplication, division, and exponentiation.

Apply the most common mathematical functions stored in MATLAB to create and use user defined functions including storing them in a function file and plotting those using graphing functions: XY plots - subplots.

Describe the fundamentals of programming design and development, using Algorithms, and program documentations like Flowcharts and pseudo-code.

Design programs that perform decision-making procedures using Relational and Logical operators, and conditional IF statements and SWITCH structure.

Design programs that repeat calculation a specified number of times, and/or until some condition is satisfied using MATLAB loop structures.

Debug programs and use simulations in engineering applications.

Topics to be Covered:	***Duration in Weeks***
Engineering Problems and the Need for Computer Solutions	0.5
Basics of MATLAB: Menus – Toolbars – Computing with MATLAB – Script Files and the Editor/Debugger – MATLAB help System.	0.5
Arrays, Matrices and Matrix Operations.	2
User-Defined Functions.	1
Basics of Programming: Algorithms - Pseudo Code - Flow Charts – Programming Structures.	1
Program Design and Development.	1
Relational Operations and Logical Variables.	0.5
Logical Operators and Functions.	0.5
Conditional Statements: if – else – elseif – switch	2
Loops: for – while – break – continue.	2
Debugging MATLAB Programs.	1
Working with Data Files, and Graphing Functions: XY Plots – Sub-Plots	1

Student Outcomes addressed by the course: (Put a **x** sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	x
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	x

Key Student Outcomes assessed in the course: (a) and (k)

Instructor or course coordinator: Dr. Wassim ZOUCH, wzouch@kau.edu.sa
Last updated: September 2013

DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING
COURSE SYLLABUS

EE 251 Basic Electrical Engineering

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Basic Electrical Engineering	EE 251	هـ ك 251	3	2		4
Pre-requisites:	PHYS 202					
Course Role in Curriculum	*Required or Elective:*		Required			
	A pre-requisite for:					
Catalogue Description:						
Electrical engineering applications, basic concepts of electricity, electric components, elementary circuit analysis and measurements, balanced three-phase systems, ideal transformers, application-specific circuits, electrical safety, DC generators and the motors, basic operation of sensors and actuators, concept of data acquisition systems.						

Textbooks:

1. C.K. Alexander and M.N.O. Sadiku, Fundamentals of electric circuits, 4th ed, McGraw-Hill,

Supplemental Materials:

1. W. H. Hayt, Engineering Circuit Design, 8th. Ed. McGraw-Hill 2008.

Course Learning Outcomes:

By the completion of the course the student should be able to:

1. Understand fundamental electric quantities: voltage, current, electric power and energy, dependant and independent voltage and current sources.
2. Calculate the currents and voltages in resistive circuits using Ohm's law, KCL, KVL, reduction of series and parallel resistances, voltage and current divisions, nodal and mesh analysis, and superposition.
3. Apply KVL, KCL, nodal and mesh analysis to circuits containing dependent sources.
4. Apply network theorems to simplify a resistive circuit by finding the Thevenin or Norton equivalent of a two-terminal network
5. Evaluate effective or rms values of AC voltages and currents, find the phasor voltage (current) for a given sinusoidal voltage (current), and find the sinusoidal voltage (current) for given phasor voltage (current) and frequency.
6. Convert an AC steady-state circuit to a phasor circuit and analyze a phasor circuit using Ohm's law, KCL, KVL, reduction of series and parallel impedances, and voltage and current divisions.
7. Calculate AC steady-state power dissipated by the circuit elements in a circuit and express the concepts of power factor, complex power, and conservation of power.
8. Solve single and three phase circuits for the real, reactive and complex power and explain the principle of power measurement and instrumentation
9. Derive the voltage and current relationship for an ideal transformer
10. Explain the operation and construction of DC machines, and derive the emf equation.

11. Explain the Concept of rotating magnetic field, principle of operation, and constructional features of three-phase induction and synchronous machines
12. Work with a small team to carry out experiments in electric circuits and prepare reports that present lab work.

Topics to be Covered:	***Duration in Weeks:***
1. Fundamental electric quantities: voltage, current, power and energy	1
2. Resistance, capacitance and inductance, Kirchhoff's laws (KVL & KCL), Source equivalence and series and parallel equivalent resistance	1
3. Mesh current (loop) and node voltage analysis	1.5
4. Circuit theorems	1
5. Sinusoidal excitation, average and effective values	0.5
6. Steady state A.C. circuit and impedance and phasor diagrams	2
7. AC power analysis Power triangle and power factor correction	1
8. Balanced three phase circuits and power measurement	1.5
9. Introduction to electromagnetism and Ideal transformer	1.5
10. Introduction to DC machines	1
11. Introduction to three phase induction motors	1
12. Introduction to synchronous machines	1

Student Outcomes addressed by the course: (Put a "x" sign)

(a) an ability to apply knowledge of mathematics, science, and engineering	x
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	x
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d) an ability to function on multidisciplinary teams	x
(e) an ability to identify, formulate, and solve engineering problems	
(f) an understanding of professional and ethical responsibility	x
(g) an ability to communicate effectively	
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i) a recognition of the need for, and an ability to engage in life-long learning	
(j) a knowledge of contemporary issues	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (a) (b) (d) (f)
Instructor or course coordinator: Dr. Mohammed N. Ajour
Last updated: September 2013

ENGLISH LANGUAGE INSTITUTE
COURSE SYLLABUS

ELI 101 English Language I

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
English Language I	ELI 101	لغة 101		18		-
Pre-requisites:	Oxford Online Placement Test (OOPT) score corresponding to beginner proficiency level and below.					
Course Role in Curriculum	*Required or Elective:*	Required				
Catalogue Description: ELI 101 is a beginner course intended to provide students with a foundation from which they can advance from A1 Breakthrough to A2 Way stage on the Common European Framework of Reference for Languages (CEFR). It is a seven-week module course with 18 hours of instruction each week.						

***Textbooks*:**

1. *Soars, John and Liz, (2011), New Headway Plus Beginner Student's Book, Special Edition, Oxford University Press*

***Supplemental Materials*:**

1. Workbook with DVD-ROM.
2. Learning Management System (LMS) for online practice at www.headwayplusonline.com accessed with the Student's Access Code found in the back of the Student's Book.
3. Headway Plus Beginner Writing Guide for additional writing support.

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Read and understand basic expressions and short, simple texts.
2. Engage in simple oral communications in order to provide and obtain essential information, using appropriate pronunciation.
3. Write basic, simple sentences leading to a paragraph.
4. 4. Demonstrate limited control of essential grammatical structures.

Course Length and Pacing

ELI 101 consists of 18 hours of class time each week. The English Language Institute follows a modular system with two modules taught in each academic semester. Thus, the course length for ELI 101 is one module of seven calendar weeks which allows for a total of 126 hours of class time each module. The 101 Instructor's Pacing Guide is designed on a weekly basis, specifying available materials and providing instructors with a degree of flexibility, allowing ample class time for language practice, and for the incorporation of relevant supplementary materials to facilitate SLO achievement. It also emphasizes regular Learner Training as an essential component of the learning process.

ENGLISH LANGUAGE INSTITUTE
COURSE SYLLABUS

ELI 102 English Language II

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
English Language II	ELI 102	لغة 102		18		2
Pre-requisites:	Successful completion of ELI 101 or an Oxford Online Placement Test score corresponding to high beginner proficiency level					
Course Role in Curriculum	*Required or Elective:*	Required				
Catalogue Description: ELI 102 is an elementary level course aiming to build and further develop language proficiency at A2 Waystage level on the Common European Framework of Reference for Languages (CEFR), moving towards a higher level of proficiency at this stage. It is a seven-week module course with 18 hours of instruction each week.						

***Textbooks*:**

1. *Soars, John and Liz, (2011), New Headway Plus Beginner Student's Book, Special Edition, Oxford University Press*

***Supplemental Materials*:**

1. Workbook with DVD-ROM.
2. Learning Management System (LMS) for online practice at www.headwayplusonline.com accessed with the Student's Access Code found in the back of the Student's Book.
3. Headway Plus Elementary Writing Guide for additional writing support.

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Read and understand simple texts and a range of high frequency vocabulary in context.
2. Talk about aspects of personal and everyday life, using appropriate stress, intonation, and rhythm of speech, and understand simple, spoken texts on familiar topics.
3. Write simple cohesive paragraphs on familiar topics.
4. Demonstrate some control of essential grammatical structures with occasional inconsistencies.

Course Length and Pacing

ELI 102 consists of 18 hours of class time each week. The English Language Institute follows a modular system with two modules taught in each academic semester. Thus, the course length for ELI 102 is one module of seven calendar weeks which allows for a total of 126 hours of class time each module. The 102 Instructor's Pacing Guide is designed on a weekly basis, specifying available materials and providing instructors with a degree of flexibility, allowing ample class time for language practice, and for the incorporation of relevant supplementary materials to facilitate SLO achievement. It also emphasizes regular Learner Training as an essential component of the learning process.

ENGLISH LANGUAGE INSTITUTE
COURSE SYLLABUS

ELI 103 English Language III

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
English Language III	ELI 103	لغة 103		18		2
Pre-requisites:	Successful completion of ELI 102 or an Oxford Online Placement Test score corresponding to elementary proficiency level.					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: ELI 103 is a pre-intermediate level course aiming to build and further improve language proficiency at A2 Waystage level on the Common European Framework of Reference for Languages (CEFR), moving into the B1 Threshold on the CEFR. It is a seven-week module course with 18 hours of instruction each week.						

***Textbooks*:**

1. *Soars, John and Liz, (2011), New Headway Plus Beginner Student's Book, Special Edition, Oxford University Press*

***Supplemental Materials*:**

1. Workbook with DVD-ROM.
2. Learning Management System (LMS) for online practice at www.headwayplusonline.com accessed with the Student's Access Code found in the back of the Student's Book.
3. Headway Plus Pre-Intermediate Writing Guide for additional writing support

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Read and understand the main ideas of a variety of texts.
2. Participate effectively in a short conversation using appropriate and understand the main ideas in short oral communications
3. Produce a range of text types using coherent and cohesive paragraphs in an adequately developed response.
4. Demonstrate control of a range of grammatical structures with minor inconsistencies.

Course Length and Pacing

ELI 103 consists of 18 hours of class time each week. The English Language Institute follows a modular system with two modules taught in each academic semester. Thus, the course length for ELI 103 is one module of seven calendar weeks which allows for a total of 126 hours of class time each module. The 103 Instructor's Pacing Guide is designed on a weekly basis, specifying available materials and providing instructors with a degree of flexibility, allowing ample class time for language practice, and for the incorporation of relevant supplementary materials to facilitate SLO achievement. It also emphasizes regular Learner Training as an essential component of the learning process.

ENGLISH LANGUAGE INSTITUTE
COURSE SYLLABUS

ELI 104 English Language IV

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
English Language IV	ELI 104	104 لغة		18		2
Pre-requisites:	Successful completion of ELI 103 or an Oxford Online Placement Test score corresponding to pre-intermediate proficiency level.					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: ELI 104 is an intermediate level course aiming to build and further improve language proficiency at B1 Threshold level on the Common European Framework of Reference for Languages (CEFR). It is a seven-week module course with 18 hours of instruction each week.						

***Textbooks*:**

1. *Soars, John and Liz, (2011), New Headway Plus Beginner Student's Book, Special Edition, Oxford University Press*

***Supplemental Materials*:**

1. Workbook with DVD-ROM.
2. Learning Management System (LMS) for online practice at www.headwayplusonline.com accessed with the Student's Access Code found in the back of the Student's Book.
3. Headway Plus Intermediate Writing Guide for additional writing support

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Read and understand a wide variety of extended texts.
2. Listen to, understand, and participate in extended oral communications.
3. Construct a range of coherent and cohesive texts with multiple paragraphs in a fully developed response.
4. Demonstrate consistent control of a wide range of grammatical structures.

Course Length and Pacing

ELI 104 consists of 18 hours of class time each week. The English Language Institute follows a modular system with two modules taught in each academic semester. Thus, the course length for ELI 104 is one module of seven calendar weeks which allows for a total of 126 hours of class time each module. The 104 Instructor's Pacing Guide is designed on a weekly basis, specifying available materials and providing instructors with a degree of flexibility, allowing ample class time for language practice, and for the incorporation of relevant supplementary materials to facilitate SLO achievement. It also emphasizes regular Learner Training as an essential component of the learning process.

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

IE 200 Technical Communication Skills

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Technical Communication Skills	IE 200	هـ ص 200		10		2
Pre-requisites:	ELI 204					
Course Role in Curriculum *(Required/Elective):*	Required Course					

Catalogue Description:
Communication skills: art of listening, tools of in-depth reading, information gathering, analyzing, and criticizing; electronic means of communication. Writing skills: writing strategies, general versus technical writing, technical report writing. Presentation skills: use of spoken English, professional computer-based oral presentations. Project-based course work on technical communication.

***Textbooks*:**
(Author, Title, Pub., year)
TLSU Team (2012), Face to Face with Basic Research & Communication: A Process & Project-Based Course.

***Supplemental Materials*:**
1. Markel, Mike (2006), Technical Communication. (teacher reference).
2. Woolever (2002), Writing for Technical Professions. (teacher reference).
3. Svobodva et al. (2000), Writing in English: A Practical Handbook for Scientific and Technical Writer. (teacher reference).

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1. Describe the course design, rules and regulations
2. Identify elements of report writing and research components
3. Write a research proposal dealing with one contemporary issue
4. Write down a clear and concise introduction that defines the problem and forecasts the work to be carried out.
5. Communicate ideas orally while keeping the audience engaged
6. Access information from a varity of sources and critically assess their quality, validity and accuracy
7. Analyze and present data in a meaningful way
8. Interpret data
9. Use reliable and credible citations to support the credibility and authenticity of the information presented.
10. Demonstrate knowledge of terminology and research process and ability to reflect upon the learning experience
11. Demonstrate integrity, punctuality, enthusiasm and active class participation.

Topics to be Covered:		***Duration in Weeks***
1.	Orientation	1
2.	Introduction to research and report writing	1
3.	Research proposal	1
4.	Writing technical Introduction	1
5.	Oral presentation skills	1
6.	Data Collection Methods	2
7.	Data Analysis	2
8.	Discussions and Conclusions	2
9.	Referencing and citations	1
10	Reflection upon learning	1
11.	Professional behavior	1

Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	√
(g)	an ability to communicate effectively	√
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	√
(i)	a recognition of the need for, and an ability to engage in life-long learning	√
(j)	a knowledge of contemporary issues	√
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (g) (i) and (j)

Instructor or course coordinator: Dr. Mohammad Chaudry
Last updated: May 2014

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

IE 201 Introduction to Engineering Design I

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Introduction to Engineering Design I	IE 201	هـ ص 201	3	1		3
Pre-requisites:	**ELI 104**					
Course Role in Curriculum *(Required/Elective):*	Required					

Catalogue Description:
Introduction to active learning: teamwork, team dynamics, team norms and communication, conducting effective meetings and quality assessment. Problem solving procedure: problem definition, generation of solutions, selection methodology, solution implementation, assessment of implementation. Levels of learning and degrees of internalization. Ethical decision. Organization of the work and design notebook. Reverse engineering and design projects.

***Textbooks*:**
(Author, Title, Pub., year)

1. STRATEGIES FOR CREATIVE PROBLEM SOLVING, Fogler, H.S., LeBlanc, S., E.,, 2th Ed., 2007, Prentice Hall PTR ISBN 978-0130082794
2. INTRODUCTION TO ENGINEERING DESIGN, McNeill, B. W., Bellamy, L., Burrows, V. A.,2004, King Abdulaziz University Press

***Supplemental Materials*:** Course Website http://engg.kau.edu.sa/ie201

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1. Develop and exhibit the behaviors associated with taking personal responsibility for time management, classroom expectations, professional and ethical behaviors in the class, and academic integrity, etc.
2. Practice elements of active learning as well as apply active learning techniques such as Engineering Journal, Facilitator Signal, Process Check
3. Explain quality, costumer, expectations, and process as well as demonstrate the ability to meet customer expectations.
4. Develop team norms.
5. Use effective team's tools such as team agenda, minutes and team process check as well as team dynamics tools such as maintenance phase.
6. Use team discussion tools such as Boogle method, affinity process, deployment flowchart, multi-voting and prioritization techniques.
7. Explain problem solving strategies such as using heuristic, perceiving problems, potential problem, real problem, etc.
8. Explain problem definition techniques such as exploring the problem, present state/desired state, Dunker diagram, statement restatement, KT Problem Analysis and apply them on semester design project.

9. Explain idea generation techniques such as Osborn's Checklist, random stimulation, fishbone diagram as well as apply them on semester project.
10. Explain situation analysis, problem analysis, decision analysis, potential problem analysis and apply these techniques on semester design project.
11. Explain planning components such as Gantt chart, deployment chart and critical path management and apply them on semester design project.
12. Explain ethical issues, safety considerations, and environmental, social and cultural impact and evaluate them on semester design project.
13. Demonstrate the fundamentals of organizing and presenting technical work using modern engineering tools in their written and oral presentation
14. describe their chosen field of engineering as well as identify other fields of engineering
15. Explain stages of level of learning (LOL) and degree of internalization (DOL) and apply them on example
16. use organization techniques such as book keeping (Design Notebook), using checklist, etc
17. search and collect information and rearrange it for a given topic

Topics to be Covered:		***Duration in Weeks***
1.	Learning Culture	2
2.	Quality	2
3.	Teaming	2
4.	Creative Problem Solving	5
5.	Engineering The Profession and Communication	2
6.	Autonomous Learner	2

Key Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	√
(d)	an ability to function on multidisciplinary teams	√
(e)	an ability to identify, formulate, and solve engineering problems	√
(f)	an understanding of professional and ethical responsibility	√
(g)	an ability to communicate effectively	√
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	√
(i)	a recognition of the need for, and an ability to engage in life-long learning	√
(j)	a knowledge of contemporary issues	√
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (c) (f) and (k)

Instructor or course coordinator: Dr Ahmed Z. Salem (c), Mohammad Rehan Maqbool
Last updated: 02-02-2014

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

IE 202 Introduction to Engineering Design II

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Introduction to Eng. Design II	IE 202	هـ ص 202		4		2
Pre-requisites:	IE 201					
Course Role in Curriculum *(Required/Elective):*	Required Course					

Catalogue Description:
Engineering design process. Hands-on real life and team–based engineering design experience: Problem definition, Objectives & constraints, Functions & requirements, Alternative designs, Evaluation and selection, Project management, Modeling, Analysis and optimization, Prototyping, Testing, Design specs, Communicating design outcomes.

***Textbooks*:** (Author, Title, Pub., year) Clive L. Dym and Patrick Little, Engineering Design, a Project-Based Introduction, Third Edition, John Wiley and Sons, Inc., NJ, USA, 2009.

Supplemental Materials: Course Notes: First day materials, Course project, Guide to assignments

Course Learning Outcomes:

By the completion of the course the students should be able to:

1. Describe the nature of engineering design and the roadmap of the design process as a response to the conflicting interests of different stakeholders.
2. Devise an effective work plan with manageable subtasks, resources, and timelines using standard project planning techniques to ensure project completion on time and within budget.
3. Define the problem and identify design attributes, objectives, metrics, and constraints by integrating customers' needs, applicable realistic constraints and data collected from multiple credible sources of information.
4. Transform customer needs, objectives, and attributes into design requirements by identifying design functions, means of realization and performance specifications that demonstrate successful functional behavior.
5. Generate possible solutions and compare alternatives to select a baseline design based on solid evaluation criteria and feasibility analysis.
6. Integrate prior knowledge of science and mathematics with engineering principles, heuristics, modern engineering tools, and modeling techniques to analyze, estimate performance, and optimize design solutions
7. Plan and execute effective manufacturing and testing procedures to produce a proof of concept working prototype.
8. Document and communicate details of the design process and express thoughts clearly and concisely, both orally and in writing, using necessary supporting material, to achieve desired understanding and impact.

9. Achieve project objectives using independent, well organized, and regularly reported multidisciplinary team management techniques that integrate, evaluate, and improve different skills of team members.

Topics to be Covered:		***Duration in Weeks***
1.	Course Norms - Working within Multidisciplinary Teams	1
2.	Introduction - The Design Process	1
3.	Problem Definition	1
4.	Objectives & Constraints	1
5.	Functions & Requirements	1
6.	Alternative Designs	1.5
7.	Evaluation & Selection	1.5
8.	Project Management	1.5
9.	Modeling, Analysis, and Optimization	1.5
10	Prototyping	2
11.	Testing	1
12.	Design Specifications	1
13	Communication Skills	1

Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	√
(d)	an ability to function on multidisciplinary teams	√
(e)	an ability to identify, formulate, and solve engineering problems	√
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	√
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	√
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (c) and (g)

Instructor or course coordinator: Dr. Ibrahim Olwi
Last updated: May 2014

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

IE 255 Engineering Economy

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Engineering Economy	IE 255	هـ ص 255	3		2	3
Pre-requisites:	MATH 110					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: Fundamentals of engineering economy. Time value of money. Evaluation of alternatives. Replacement and retention analysis. Break even analysis. Depreciation methods. Basics of inflation.						

***Textbooks*:** (Author, Title, Pub., year) Blank, Leland T. and Tarquin, Anthony J., Basics of Engineering Economy, 1ST Ed., McGraw-Hill, 2008, ISBN 9780071287623.

***Supplemental Materials*:** Course Notes in IE255 Coordinator's web page: Course outline, Course project, Homework, Old exams and Booklets for formulas and tables.

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1. Understand the fundamentals of engineering economy and the basic principles of the time value of money.
2. Draw the cash-flow diagrams (CFD).
3. Identify and compare different interest rates i.e., simple, compound, MARR, ROR, nominal and effective.
4. Compute equivalent values for time based cash flows of varying complexities.
5. Compare economic alternatives based on equivalent present worth (PW), future worth (FW), capitalized cost (CC), payback period (PbP), annual worth (AW) values and Benefit cost ratios (B/C).
6. Compute the internal rate of return (IRR) and evaluate an economic alternative on the basis of IRR.
7. Make analytical decisions by replacement and breakeven analysis of different projects / alternatives and analysis under uncertain conditions.
8. Understand and compute effects of inflation.
9. Understand capital budgeting, cost estimation and cost allocation.
10. Understand and compute depreciations related to machines / projects using straight line (SL), Declining Balance (DB) and Double Declining Balance (DDB) method.
11. Write reports related to engineering economy by using modern engineering tools.

Topics to be Covered:		***Duration in Weeks***
1.	Foundations of Engineering Economy	2
2.	How Time and Interest Affect Money	2
3.	Nominal and Effective Interest Rate	2
4.	Present Worth Analysis	2
5.	Annual Worth Analysis	1.5
6.	ROR Analysis	0.5
7.	Benefit/Cost Analysis	0.5
8.	Breakeven and Payback Analysis	1.5
9.	Replacement Decisions	1
10.	Inflation Impacts	0.5
11.	Cost Estimation	1
12.	Depreciation	0.5

Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	√
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (e) and (k)

Instructor or course coordinator: Eng. Mohammed Abdullah Alharkan

Last updated: Jan. 2014

FACULTY OF ARTS & HUMANITIES - DEPARTMENT OF ISLAMIC STUDIES
COURSE SYLLABUS

ISLS 101 Islamic Culture (1)

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Islamic Culture (1)	ISLS 101	101 سلم	3			3
Pre-requisites:	None					
Course Role in Curriculum	*Required or Elective:*		Required			

Catalogue Description:
This course aims to familiarize students with the fundamental aspects and the basic concepts of Islamic culture. It further discusses the basic tenets of Islam as well as the issues and principles related to faith and their impact on both individuals and society. The course also looks at the position of Islamic culture versus other cultures and civilizations.

***Textbooks*:**
1. Dr. Ali O. Badahdah & Dr. Mohammad A. Ba-Jaber (2008) Islamic Culture (level 1), King Abdulaziz University, Centre for Scientific Publications. (In Arabic)

***Supplemental Materials*:**
1. Hindi Saleh & Al-Hawari Mohammad (2000): Islamic Culture, Amman, Dar Al-Fikr. (In Arabic).
2. Al-Khatib Omar (1975): Glimpses of Islamic Culture, Beirut, Dar Al-Kitab Al-Lubnani. (In Arabic)
3. Jamal A. Mohammad (1977): Lectures on Islamic Culture, Jeddah. King Abdulaziz University, Fifth Ed. (In Arabic)
4. Al-Sayyid A. Taha (1996): Islamic Culture, Amman, Dar Al-Manahij. (In Arabic)

***Course Learning Outcomes*:**
By the completion of the course the student should be able to:
1. Demonstrate understanding of the idiomatic of culture and know the conception of Islamic culture and its specification, its importance, and its relation with others cultures.
2. Demonstrate understanding of the idiomatic of Islamic faith, its specification and impact on the individual and society, and learn a group of important matter in the life.
3. Demonstrate understanding of the meaning of worship in Islam, its specifications, its provision and its motive, its aims, with understanding of wrong conception and practice in Islam.
4. Demonstrate ability to deal with others civilizations, form the basis of his own civilization distinguish, with getting a benefit from the others cultures.

5. Demonstrate ability to fulfill the practice impact of faith on himself, and in his society practical life.
6. Demonstrate ability to distinguish between the right conceptions of the basic affaire of faith, and its correct application and wrong conception and its implications
7. Demonstrate ability to achieve the aims of worship, and avoid the wrong conception.

Topics to be Covered:		***No. of Weeks***
1.	The concept & origin of Islamic culture	1
2.	The importance of Islamic culture & its relationship to other cultures	1
3.	The concept & foundations of Islamic faith	1
4.	The characteristics of Islamic faith	1
5.	The effects of faith on individuals & society	1
6.	Issues in faith: relationship between faith & Shari'a Law, freedom of belief in Islam	1
7.	Issues in faith: Major sins & faith, implementing Shari'a Law, mocking religion, loyalty and disavowal	1
8.	Issues in faith: extremism in Islam, reason & revelation	1
9.	The concept of worship	1
10.	Motives & conditions of worship	1
11.	Provisions, characteristics & purpose of worship	1
12.	Wrong concepts & practices of worship	2

FACULTY OF ARTS & HUMANITIES - DEPARTMENT OF ISLAMIC STUDIES
COURSE SYLLABUS
ISLS 201 Islamic Culture (2)

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Islamic Culture (2)	ISLS 201	201 سلم	3			3
Pre-requisites:	None					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: This course aims to: identify the Islamic legislation to the student with its general aims, and identifying with Holy Quran and its specifications, and the position of its coming, and its proof, and take the Muslims attention to its rights, and fixed the prophet Muhammad (peace be upon him)						

***Textbooks*:**
1. Dr. Faisal Bin Saeed Baalamash, Husham Bin Saeed Azhar, and DrFathiya Abdulsamad Obaid,Islamic Culture (Second Level), King Abdulaziz University, Centre for Scientific Publications. (In Arabic)

***Supplemental Materials*:**
1.

***Course Learning Outcomes*:**
By the completion of the course the student should be able to:
1. Demonstrate understanding of Islamic legislation, its aims and characteristics.
2. Demonstrate understanding of Quran, its importance, global aims and the Muslims' duties towards Quran.
3. Demonstrate understanding of Sunnah, its importance, global aims and the Muslims' duties towards Sunnah.
4. Demonstrate understanding of the roles of Ijmaa, Quias, Ijtihad, and Fatwa.

***Topics to be Covered*:**		***No. of Weeks***
1	Islamic legislation and its characteristics	2
2.	Aims of Islamic legislation (Sharia)	2
3.	Introduction to Quran Studies	3
4.	Introduction to Sunnah (words, actions and silent assertions of Prophet Muhammad PBUH)	3
5.	Consensus (Ijmaa)	1
6.	Analogical reason (Quias)	1
7.	Reasoning (Ijtihad) and learned interpretation and opinion (Fatwa)	1

FACULTY OF ARTS & HUMANITIES - DEPARTMENT OF ISLAMIC STUDIES

COURSE SYLLABUS

ISLS 301 Islamic Culture (3)

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Islamic Culture (3)	ISLS 301	301 سلم	3			3
Pre-requisites:	None					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: This course aims to: identify the Islamic systems to the students, with its general specifications and its principals and concentrate in the special way on the family system, and social system in Islam, with connect between theoretical provision and the actual practical with its all different problems and affairs, and identify the famous modern affairs, and show the ways hoe to deal with this affairs, in the Islamic form.						

***Textbooks*:**

1. Dr. Faisal Bin Saeed Ba alamashHusham Bin Saeed Azhar, and DrFathiya Abdulsamad Obaid,Islamic Culture (Third Level), King Abdulaziz University, Centre for Scientific Publications. (In Arabic)

***Supplemental Materials*:**

1.

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Demonstrate understanding of the idiomatic of culture, and know the conception of Islamic culture and its specification, its important, and its relation with others cultures.
2. Demonstrate understanding of idiomatic of Islamic faith, its specification and impact on the individual and society, and learn a group of important matter in the life.
3. Demonstrate understanding of the meaning of worship in Islam, its specifications, its provision, and its motive, its aims, with understand for wrong conception and practice in Islam.
4. Demonstrate ability to deal with others civilizations, form the basis of his/her own civilization's distinctions.

	Topics to be Covered:	***No. of Weeks***
	I$^{s'}$ section: Family system in Islam :	
1	• Concept and provision of marriage	1
2.	• Family important modern affaires	1
	2 $^{"d}$ Section :Social system in Islam	
3.	• Conception of Islamic society.	1
4.	• Specification of Islamic society and the Islamic society establishment.	1
5.	• Impact of Islamic legislation and strength the social relation: worship (collective pray, zakah ,charity and pray of two Eids,(prevent the sales of brothers on his brother sales, prevent to meet the riders , prevent form monopoly, family jursdepndance , prevent form engagement on your brother engagement,	1
6.	• Details of Some religious provision relations:	1
7.	• The important social problems: its reasons and how to solve it.	1
	3rd Section: Islamic Affairs and Modern affairs	
9.	• Dialogue between Civilization.	1
10.	• Human rights in Islam.	1
11.	• Globalization and its varied type.	1
12.	• Calling for favor and prevent form Abominable	1
13.	• Islamic attitude from the terrorism.	1

FACULTY OF ARTS & HUMANITIES - DEPARTMENT OF ISLAMIC STUDIES
COURSE SYLLABUS

ISLS 401 Islamic Culture (4)

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Islamic Culture (4)	ISLS 401	401 سلم	3			3
Pre-requisites:	ISLS 201					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: This course aims to: identify the Islamic concept of morality, And its importance in life, and to clarify the significance of ethics in the modern era, and to highlight the assets and Islamic landmarks of Sciences linguistic, psychological, social and media, and a statement contributions Muslims practical and scientific therein, including strengthens affiliation Muslim youth to his nation and his pride religion and civilization, and to clarify the jurisprudence and Islamic Studies required in the above areas.						

***Textbooks*:**

1. Islamic culture (level IV) (under preparation and authoring) with participation of the Faculty of Arts and Humanities and professors of Islamic Studies).

***Supplemental Materials*:**

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Demonstrate understanding of the meaning of the language of morality and idiomatically, and the place of morality in Islam and the contemporary ethics.
2. Demonstrate understanding of the Islamic assets of linguistic and psychological sciences, social, media, and the contributions of Muslims.
3. Demonstrate understanding of contemporary jurisprudence for technical and medical professions.
4. Demonstrate the ability to embryogenesis Islamic ethics of professions linguistic psychological, social and media.

***Topics to be Covered*:**		***No. of Weeks***
1	The concept of ethics of the profession	1
2.	Great prestige of morality in Islam	1
3.	Professional ethics in the modern era	1
4.	Models of professional ethics in the light of Quran and Sunnah	2
5.	Models applied to ethics of Islamic civilization.	2
6.	Islamic assets of linguistic and psychological sciences, social	2

media, and the contributions of Muslims.

7.	Contemporary jurisprudence of occupations associated with humanities and media.	2
8.	Ethics related professions of humanities and media.	2

FACULTY OF SCIENCES - DEPARTMENT OF MATHEMATICS
COURSE SYLLABUS

MATH 110 General Mathematics (1)

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
General mathematics (1)	MATH 110	110 ر	3			3
Pre-requisites:	None					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: This course is a first Calculus dealing mainly with differential calculus. After a discussion of few mathematical preliminaries, we introduce functions and models, limits and derivatives, differentiation rules, and finally applications of differentiation.						

***Textbooks*:**

1. J. Stewart, Calculus, Early Transcendentals, Seventh Edition. International Metric Version, 2012.

***Supplemental Materials*:**

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Handle functions occurring in calculus and in the mathematical modeling of real-world problems;
2. Grasp the central idea of limit and continuity, and its application in a variety of problems;
3. Understand the main theme of calculus and its applications involving rates of change and the approximation of functions;
4. Differentiate standard functions by applying the fundamental rules of differentiation;
5. Compute the optimal values of functions and handle the optimization problems;
6. Apply the concepts of monotonicity and concavity in sketching the plane curves;
7. Deal with indeterminate forms and L'Hôpital's rule;
8. Understand the connection between derivatives and antiderivatives.
9. Handle functions occurring in calculus and in the mathematical modeling of real-world problems;

***Topics to be Covered*:**

1. Mathematical Preliminaries
    a. Numbers, Inequalities, and Absolute Values
    b. Coordinate Geometry and Lines
    c. Graphs of Second-Degree Equations
    d. Trigonometry
2. Functions and Models
    a. Four Ways to represent a Function

b. Mathematical Models
c. New Functions from Old Functions
d. Graphing Calculators and Computers
e. Exponential Functions
f. Inverse Functions and Logarithms

3. Limits and Derivatives
    a. The Tangent and Velocity Problems
    b. The Limit of a Function
    c. Calculating Limits Using the Limit Laws
    d. Continuity
    e. Limits at Infinity; Horizontal Asymptotes
    f. Derivatives and Rates of Change
    g. The Derivative as a Function
4. Differentiation Rules
    a. Derivatives of Polynomials and Exponential Functions
    b. The Product and Quotient Rules
    c. Derivatives of Trigonometric Functions
    d. The Chain Rule
    e. Implicit Differentiation
    f. Derivatives of Logarithmic Functions
    g. Rates of Change in the Sciences
    h. Exponential Approximations and Differentials
    i. Hyperbolic Functions

5. Applications of Differentiation
    a. Maximum and Minimum Values
    b. The Mean Value Theorem
    c. How derivatives Affect the Shape of a Graph
    d. Intermediate Forms and L'Hospital Rule
    e. Summary of Curve Sketching
    f. Graphing with Calculus and Calculators
    g. Optimization Problems
    h. Antiderivatives

FACULTY OF SCIENCES - DEPARTMENT OF MATHEMATICS
COURSE SYLLABUS

MATH 202 Calculus II

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Calculus II	MATH 202	202 ر	3			3
Pre-requisites:	MATH 110					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: This course deals mainly with Integral Calculus. We cover Integrals, Applications of Integration, Techniques of Integration, and further applications of Integration to the Sciences and Engineering.						

***Textbooks*:**

1. J. Stewart, Calculus, Early Transcendentals, Seventh Edition. International Metric Version, 2012.

***Supplemental Materials*:**

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Comprehend the connection between differential and integral calculus, and use of integrals to find the area bounded by curves.
2. Calculate the volume of solids, lengths of plane curves, work done by a varying force, etc. by means a definite integral;
3. Use exponential and logarithmic functions to describe exponential growth and decay in problems of applied nature;
4. Evaluate the integrals using different techniques and integral formulae;
5. Distinguish between proper and improper integrals;
6. Perform numerical integration.

***Topics to be Covered*:**

1. Integration
    a. Sigma Notation
    b. Areas and Distances
    c. The Definite Integral
    d. The Fundamental Theorem of Calculus
    e. Indefinite Integrals and the Net Change Theorem
    f. The Substitution Rule
2. Applications of Integration
    a. Areas between Curves
    b. Volumes

c. Volumes by Cylindrical Shells
d. Work
e. Average Value of a Function

3. Techniques of Integration
   a. Integration by Parts
   b. Trigonometric Integrals
   c. Trigonometric Substitution
   d. Integration of Rational Functions by Partial Fractions
   e. Strategy for Integration
   f. Approximate Integration
   g. Improper Integrals

4 Further Applications of Integration
   a. Arc Length
   b. Area of a Surface of Revolution
   c. Applications to Physics and Engineering
   d. Applications to Economics and Biology
   e. Probability

FACULTY OF SCIENCES - DEPARTMENT OF MATHEMATICS
COURSE SYLLABUS

MATH 203 Calculus III

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Calculus III	MATH 203	203 ر	3			3
Pre-requisites:	MATH 110					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: This course deals with Calculus topics that are not treated in Math 110 and Math 202. We will study in details Parametric Equations and Polar Coordinates, Vectors and the Geometry of Space, Vector Functions, and Partial derivatives.						

***Textbooks*:**

1. J. Stewart, Calculus, Early Transcendentals, Seventh Edition. International Metric Version, 2012.

***Supplemental Materials*:**

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Know about the basics of parameterization of plane curves, polar coordinates, and conic section;
2. Use vectors in two and three dimensions to describe lines and planes in space;
3. Understand sketching of quadric surfaces;
4. Comprehend vector-valued functions and their use to describe the motion of objects through space;
5. Grasp the idea of the epsilon-delta definition of the limit, and understand the methods for proving existence and non-existence of limit of functions of two/three variables;
6. Learn the idea of partial derivative and application of the chain rule; solve optimization problems without and with constraints.

***Topics to be Covered*:**

1. Parametric Equations and Polar Coordinates
    a. Curves Defined by Parametric Equation
    b. Calculus with Parametric Curves
    c. Polar Coordinates
    d. Areas and Lengths in Polar Coordinates
    e. Conic Sections
    f. Conic Sections in Polar Coordinates
2. Vectors and the Geometry of Space
    a. Three-Dimensional Coordinate Systems

b. Vectors
c. The Dot Product
d. The Cross Product
e. Equations of Lines and Planes
f. Cylinders and Quadric Surfaces

3. Vector Functions
    a. Vector Functions and Space Curves
    b. Derivatives and Integrals of Vector Functions
    c. Arc Length and Vector Functions
    d. Motion in Space: Velocity and Acceleration
4. Partial Derivatives
    a. Functions of Several Variables
    b. Limits and Continuity
    c. Partial Derivatives
    d. Tangent Planes and Linear Approximations
    e. The Chain Rule
    f. Directional Derivatives and the Gradient Vector
    g. Maximum and Minimum Values
    h. Lagrange Multipliers

FACULTY OF SCIENCES - DEPARTMENT OF MATHEMATICS
COURSE SYLLABUS

MATH 204 Differential Equations I

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Ordinary Differential Equations I	MATH 204	204 ر	3	1		3
Pre-requisites:	MATH 202					
Course Role in Curriculum	*Required or Elective:*		Required			

Catalogue Description:
Basic concepts - First-order differential equations - Existences and Uniqueness for initial – boundary value problems - Separable variables - Homogeneous equations - Exact equations. Linear equations - Equations of Bernoulli - Ricatti. Substitutions - Picard's methods - Linear differential equations of higher-order - Homogeneous equations with constant coefficients, Method of undetermined coefficients, Method of variation of parameters. Differential equations with variable coefficients, Cauchy-Euler equations - Laplace Transform - Applications of Laplace transform to solve ordinary differential equations.

***Textbooks*:**
1. C. H. Edwards & D. E. Penney, Elementary Differential Equations with Boundary Value Problems, Sixth Edition. Pearson Prentice Hill, 2008.

***Supplemental Materials*:**

***Course Learning Outcomes*:**
By the completion of the course the student should be able to:
1. Deriving ODEs that describe various phenomena in physics, mechanics, chemistry, biology, etc.
2. Learning various methods for solving a great variety of differential equations.
3. Upgrading the skills of the student to understand more better the other branches physics, mechanics, chemistry, biology.

***Topics to be Covered*:**
1. Basic concepts:
    a. Definitions.
    b. Classifications of ODEs.
    c. Solutions types.
    d. Origin of ODEs.
2. First-order differential equations.
    a. Preliminary theory.
    b. Existences and uniqueness for initial – boundary value problems.

c. Separable variables,
d. Homogeneous equations.
e. Exact equations.
a. Linear equations.
f. Equations of Bernoulli,
g. Ricatti. Substitutions.
h. Picard's methods.

3. Linear differential equations of higher-order:
    a. Preliminary theory
    b. Existences and uniqueness for initial – boundary value problems.
    c. Basic concepts;
    a. Linear dependence and Linear independence,
    d. Superposition principle for homogeneous equations,
    e. fundamental set,
    f. Superposition principle for non-homogeneous equations,
    g. Constructing of a second solution from a known solution,
    h. Homogeneous equations with constant coefficients,
    i. Method of undetermined coefficients,
    j. Method of variation of parameters.
    k. Differential equations with variable coefficients,
    l. Cauchy-Euler equations.
4. Laplace Transform:
    a. Laplace transform,
    b. Inverse transform,
    c. Translation theorems,
    d. differentiation and Integration of the Laplace Transform,
    e. Partial Fractions,
    f. Transform of derivatives,
    g. Convolution,
    h. Transform of periodic functions,
    i. Applications of Laplace transform to solve ordinary differential equations.

FACULTY OF SCIENCES - DEPARTMENT OF MATHEMATICS
COURSE SYLLABUS

MATH 205 Series and Vector Analysis

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Series and Vector Analysis	MATH 205	205 ر	3			3
Pre-requisites:	MATH 202 and MATH 203					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: This course deals mainly with Integral Calculus. We cover Integrals, Applications of Integration, Techniques of Integration, and further applications of Integration to the Sciences and Engineering.						

***Textbooks*:**

1. J. Stewart, Calculus, Early Transcendentals, Seventh Edition. International Metric Version, 2012.

***Supplemental Materials*:**

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Grasp the concepts of infinite sequences and series, idea of convergence and divergence of the infinite series, representation of functions as power series, Taylor series, Maclaurin series and Fourier series.
2. Evaluate double and triple integrals, and learn their use to compute volume, surface area, entroids, etc., and change of variables in multiple integrals
3. Understand calculus of vector fields, line integrals and surface integrals with applications, connection between line integral, double integral, and triple integral (Green's Theorem, Stokes' Theorem, The Divergence Theorem).

***Topics to be Covered*:**

1. Infinite Sequences and Series
    a. Sequences
    b. Series
    c. The Integral Test and Estimates of Sums
    d. The Comparison Tests
    e. Alternating Series
    f. Absolute Convergence and the Ratio and Root Tests
    g. Strategy for Testing Series
    h. Power Series
    i. Representations of Functions as Power Series
    j. Taylor and Maclaurin Series

k. Applications of Taylor Polynomials

2. Multiple Integrals
    a. Double Integrals over Rectangles
    b. Iterated Integrals
    c. Double Integrals over General Regions
    d. Double Integrals in Polar Coordinates
    e. Applications of Double Integrals
    f. Triple Integrals
    g. Triple Integrals in Cylindrical Coordinates
    h. Triple Integrals in Spherical Coordinates
    i. Change of Variables in Multiple Integrals
3. Vector Calculus
    a. Vector Fields
    b. Line Integrals
    c. The Fundamental Theorem for Line Integrals
    d. Green's Theorem
    e. Curl and Divergence
    f. Parametric Surfaces and Their Areas
    g. Surface Integrals

FACULTY OF SCIENCES - DEPARTMENT OF MATHEMATICS						
COURSE SYLLABUS MATH 206: Calculus II for Engineers						
COURSE TITLE	**ENGLISH CODE/NO**	**ARABIC CODE/NO.**	**CREDITS**			
			Th.	**Pr.**	**Tr.**	**Total**
Calculus II for Engineers	Math 206		4			4
Prerequisites:	Math 110 (Calculus I)					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: This is the second course in a three-course sequence on differential and integral calculus. Topics include integrals of algebraic and transcendental functions of one variable, applications of definite integrals, techniques of integration, improper integrals, infinite series, conic sections, parametric equations, and polar coordinates. Upon completion, students should be able to use differentiation, integration, and approximation techniques to solve application problems.						

***Textbooks*:** (Author, Title, Pub., year)
Stewart, James. Calculus, 7th ed, Early Transcendentals, International Metric Version, Brooks/Cole, Cengage Learning 2012.
ISBN-13: 9780538498876 / ISBN-10: 0538498870

***Supplemental Materials*:** Course Notes: First day materials, Guide to assignments

***Course Learning Outcomes*:**

Upon completion of this course, the students should be able to:

1. Evaluate the indefinite integral of a variety of functions using a variety of integration techniques
2. Evaluate the definite integral of a variety of functions analytically and numerically
3. Evaluate improper integrals
4. Utilize the techniques of integration together with appropriate technology to solve practical engineering problems and to analyze and communicate results.
5. Convert functions among rectangular, polar, and parametric forms
6. Differentiate and integrate expressions in parametric and polar form
7. Write the equation, graph, state the properties of, and analyze parabolas, ellipses, and hyperbolas.
8. Determine whether a sequence or a series converges absolutely, converges conditionally, or diverges.
9. Identify a geometric series, a p-series, an alternating series, and determine whether or not it converges; and if it does, find or estimate its sum.
10. Identify a power series and determine its interval of convergence.
11. Determine a Taylor Polynomial, a Maclaurin Series, or a Taylor Series for selected functions.
12. Use Taylor's Theorem to place a bound on the error for selected Taylor and Maclaurin Series.

Topics to be Covered:		***Duration in weeks***
1.	Chapter 5. Integrals.	2
2.	Chapter 6. Applications of Integration.	2
3.	Chapter 7. Techniques of Integration.	3
4.	Chapter 8. Further Applications of Integration.	1
5.	Chapter 10. Parametric Equations and Polar Coordinates.	2
6.	Chapter 11. Infinite Sequences and Series.	4

Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	√
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (a)

Instructor or course coordinator:
Last updated: November 18, 2012

FACULTY OF SCIENCES - DEPARTMENT OF MATHEMATICS						
COURSE SYLLABUS MATH 207: Calculus III for Engineers						
COURSE TITLE	**ENGLISH CODE/NO**	**ARABIC CODE/NO.**	**CREDITS**			
			Th.	**Pr.**	**Tr.**	**Total**
Calculus III for Engineers	Math 207		4			4
Prerequisites:	Math 206 (Calculus II for Engineers)					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: This course covers the calculus of several variables and is the third calculus course in a three-course sequence. Topics include functions of several variables, partial derivatives, multiple integrals, solid analytical geometry, vector-valued functions, and line and surface integrals. Upon completion, students should be able to solve problems involving vectors and functions of several variables.						

***Textbooks*:** (Author, Title, Pub., year)
Stewart, James. Calculus, 7th ed, Early Transcendentals, International Metric Version, Brooks/Cole, Cengage Learning 2012.
ISBN-13: 9780538498876 / ISBN-10: 0538498870

***Supplemental Materials*:** Course Notes: First day materials, Guide to assignments

***Course Learning Outcomes*:**

Upon completion of this course, the students should be able to:

1. Convert between coordinate systems in three dimensions, and recognize and graph standard equation forms in three dimensions
2. Carry out vector operations to solve practical problems
3. Evaluate limits and study the continuity of vector-valued functions
4. Differentiate and integrate vector-valued functions
5. Solve practical problems involving vector-valued functions.
6. Evaluate the limits and study the continuity of functions of several variables
7. Compute the partial derivatives and multiple integrals of selected functions of several variables
8. Utilize the techniques of partial differentiation and multiple integration (together with appropriate technology) to solve practical problems and communicate results
9. Carry out scalar and vector operations on vector-valued functions (gradient, divergence, curl)
10. Use Green's Theorem to evaluate line integrals.
11. Evaluate selected surface integrals
12. Evaluate surface integrals using the divergence theorem and Stokes' theorem

Topics to be Covered:		***Duration in weeks***
1.	Chapter 12. Vectors and the Geometry of Space.	2
2.	Chapter 13. Vector Functions.	1.5
3.	Chapter 14. Partial Derivatives.	3.5
4.	Chapter 15. Multiple Integrals.	3.5
5.	Chapter 16. Vector Calculus.	3.5

Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	√
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (a)

Instructor or course coordinator:
Last updated: December 17, 2012

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 102 Engineering Graphics

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Engineering Graphics	MENG 102	هـ مك 102	1	5	-	3
Pre-requisites:	**None**					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: Introduction: Skills of freehand sketching. Methods of projection: orthographic, isometric. Dimensioning of views. Third view prediction. Primary and successive auxiliary views. Intersections of surfaces and bodies. Development of surfaces. Sectioning. Introduction to assembly drawings. Steel sections. Standards and conventions. Computer Aided Graphics using SOLIDWORK crafting package. Applications						

***Textbooks*:** (Author, Title, Pub., year) - Exercise sheets by course team, K.A.U, 2014

Supplemental Materials: - Online SolidWorks Tutorial 2012
- Online Tutorials on YouTube by course team, 2014

Course Learning Outcomes:

By the completion of the course the students should be able to:

1. Develop 3D solid models using modern engineering 3D software, through:
   1.1 Using sketching commands and entities relationships,
   1.2 Using Extrude and Extrude Cut Commands,
   1.3 Using Revolve and Revolve Cut Commands,
   1.4 Using 3D sketch Commands,
   1.5 Using Sweep and Sweep Cut Commands,
   1.6 Using Loft and Loft Cut Commands,
   1.7 Using Assembly Commands to assemble several parts to create 3D assembled Models.
2. Use Drawing Sheet Commands to create:
   2.1 Orthographic and auxiliary views in 2D working drawings sheets.
   2.2 Section views in 2D working drawings sheets.

3. Conclude 3D models out of 2D models.
4. Use Sheet Metal Commands needed to develop sheet metals models.

Topics to be Covered:	***Duration in Weeks***
1. Introduction, Sketching commands	1
2. Sketching, entities relationships commands	1
3. Extrude and extrude cut commands	2
4. Drawing sheet, dimensioning and sectioning commands	2
5. Concluding 3D models out of 2D drawings	3
6. Assembly commands and Toolbox	1
7. Revolve and revolve cut commands	1
8. 3D sketch and sweep commands	1
9. Loft and loft cut commands	1
10. Sheet Metal commands	1

Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	√
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	√
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (g), (i) and (k)

Instructor or course coordinator: Dr. Haitham A. Bogis
Last updated: Spring 2015

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS
MENG 130 Basic Workshop

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Basic Workshop	MENG 130	هـ مك 204	1	3	-	2
Pre-requisites:	MENG 102					
Course Role in Curriculum *(Required/Elective):*	Required Course					

Catalogue Description: Introduction to principles of production. Engineering materials, Metal forming; foundry and pattern making, forging processes, rolling, extrusion, sheet metal work, bench work and fitting. Metal machining, drilling, turning, shaping, milling, grinding, joining of materials (fastening. riveting. welding), industrial safety. Measurements, interchangeability and standards, specifications. Quality control.

***Textbooks*:** *(Author, Title, Pub., year)*	Serope Kalpakjian and Steven Schmid, *Manufacturing Engineering and Technology, 7/e*, Prentice Hall, 2014
***Supplemental Materials*:**	Instructor Handouts, 2014

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1.	Familiarize with the primary processes for extracting basic metals from their ores.
2.	Deal with the primary processes for making structural members from steel.
3.	Practice and observe the basics of casting process.
4.	Practice and observe the basics of turning process.
5.	Practice and observe the basics of drilling process.
6.	Practice and observe the basics of milling process.
7.	Practice and observe the basics of sheet-metal process.
8.	Practice and observe the basics of welding process.

***Topics to be Covered*:**		***Duration in Weeks***
1.	Engineering Materials	1
2.	Metal Forming	2
3.	Foundry	2
4.	Machining Processes	2
5.	Welding Processes	2
6.	Sheet- Metal Processes	1
7.	Measurements	2
8.	Quality Control	2

Key Student Outcomes addressed by the course: (Put a √ sign)		
(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	√
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (f)

Instructor or course coordinator: Prof. Abdulmalik Aljinaidi
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 204 Mechanical Engineering Drawings

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Mechanical Engineering Drawings	MENG 204	هـ مك 204	1	5		3
Pre-requisites:	MENG 130					
Course Role in Curriculum *(Required/Elective):*	Required Course					

Catalogue Description:
Introduction to CAD. Skills of using a drafting package (AutoCAD).Geometrical and dimensional tolerances. Applications on mechanical elements (bolted, welded and riveted joints, shafts and keys, springs, gears).Applications on assembly and working drawings (valves, presses ...etc.).

***Textbooks*:**	Lecture and Exercise notes by instructor KAU ,2014
***Supplemental Materials*:**	▪ Technical Drawing with Engineering Graphics; Giesecke et al.; 14th Edition; Pearson; 2011. ▪ Shigly's Mechanical Engineering Design; Budynas & Nisbett; 9th Edition; McGraw-Hill; 2011. ▪ Engineering Design and Graphics with SolidWorks; Bethune; Pearson; 2010. ▪ Mechanisms and Mechanical Devices Sourcebook; Sclater; 5th Edition; McGraw-Hill; 2011.

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1.	Apply the engineering standards and best practices in engineering drawing.
2.	Assign tolerances, surface finish, limits and fits for mechanical components.
3.	Identify the different elements used for making non-permanent joints.
4.	Identify the different permanent joining methods.
5.	Recognize the function, terminology, and common standards associated with the different types of mechanical elements.
6.	Use SolidWorks for making assemblies and producing professional engineering working drawings.
7.	Use the different mechanical elements' toolboxes in SolidWorks.

Topics to be Covered:		***Duration in Weeks***
1.	Introduction, Engineering working drawings basics	2
2.	Sections, Assemblies, Exploded views	1
3.	Preferred numbers, Tolerances	1
4.	Limits and fits, Surface finish	1
5.	Mechanical springs (compression, tension and torsion coil springs, leaf springs, air springs)	1
6.	Bolts, Screws, Nuts, Washers, Power screws, Rivets	1
7.	Shafts, Setscrews, Keys, Pins, Retaining rings	1
8.	Bearings (ball, roller, sliding) , Seals	1
9.	Gears (spur, helical, bevel, worm)	1
10.	Belts, Chains, Wire robes	1
11.	Sheets, Plates, Pipes, Tubes, Structural profiles	1
12.	Welding, Soldering, Brazing, Bonding	1
13.	Cams, Slots, Multi-degree-of-freedom joints, Couplings	1

Key Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	√
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (g) and (k)

Instructor or course coordinator: Dr. Ala Hijazi
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING

PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM

COURSE SYLLABUS

MENG 262 Engineering Mechanics (Dynamics)

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Engineering Mechanics (Dynamics)	MENG 262	262 هـ مك	3	1		3
Pre-requisites:	CE 201					
Course Role in Curriculum *(Required/Elective):*	Required course					

Catalogue Description:
Review of particle motion. Rotation and translation of a rigid body in the plane. General motion. Displacement, velocity, and acceleration of rigid bodies, including Coriolis motion. Motion about a fixed point. Equations of motion for a rigid body. Constrained plane motion. Work and energy. Impulse and momentum. Gyroscopic motion. Introduction to mechanical vibrations.

***Textbooks*:** *(Author, Title, Pub., year)*	Meriam J. L., Kraige, L. G., Engineering Mechanics: Dynamics, 6th Edition, 2008, John Wiley
Supplemental Materials:	1. Vector Mechanics for Engineers, Dynamics, 7th Edition, F. B. Beer, E. R. Johnston, W. L. Clausen, McGraw Hill, 2003. 2. Engineering Mechanics: Dynamics, 1st Computational Edition, R. W. Soutas-Little, D. J. Inman, CL-Engineering, 2007. 3. Engineering Mechanics: Dynamics. 12th Edition, R. C. Hibbeler, Prentice Hall, 2009. 4. Vectorial Engineering Dynamics, M. Akyurt, A. K. El-Kalay, A. R. M. Mannaa, A. M Abuelnaga, F. Abulkarim, Hafiz House Publisher & Distributor, 1992.

Course Learning Outcomes:

By the completion of the course the students should be able to:

1.	Define Newton's Laws for motion
2.	Perform kinematic analysis of particles in different coordinate systems such as Cartesian, polar and normal-tangential coordinates
3.	Perform kinetic analysis of particles through the use of Newton's Second Law.
4.	Perform kinetic analysis of particles through the use of energy concepts.
5.	Perform kinetic analysis of particles through the use of impulse-momentum principles

6.	Perform planar kinematic analysis of rigid bodies in rotation and/or translation
7.	Perform kinetic analysis of rigid bodies and mechanisms through the use of Newton's Second Law
8.	Perform kinetic analysis of rigid bodies through the use of energy concepts
9.	Perform kinetic analysis of rigid bodies through the use of impulse-momentum concepts
10.	Perform free vibration analysis of particles

Topics to be Covered:	***Duration in Weeks***
1. Newton's Laws of Motion	1
2. Kinematics of Particles	3
3. Kinetics of Particles	3
4. Plane Kinematics of Rigid Bodies	3
5. Plane Kinetics of Rigid Bodies	3
6. Free Vibration of Particles	1

Key Student Outcomes addressed by the course: (Put a √ sign)

(a) an ability to apply knowledge of mathematics, science, and engineering	√
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d) an ability to function on multidisciplinary teams	
(e) an ability to identify, formulate, and solve engineering problems	√
(f) an understanding of professional and ethical responsibility	
(g) an ability to communicate effectively	
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i) a recognition of the need for, and an ability to engage in life-long learning	
(j) a knowledge of contemporary issues	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (a) and (e)

Instructor or course coordinator: Dr. Ramzi Othman
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 270 Mechanics of Materials

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Mechanics of Materials	MENG 270		2	3		3
Pre-requisites:	CE 201					
Course Role in Curriculum *(Required/Elective):*	Required Course					

Catalogue Description: Axial stress, strain, Hook's law, deformation and transverse forces. Torsion of circular shafts. Pure bending and bending strain. Shear force and Bending moment conventions and diagrams. Beam design for pure bending. Combined stresses. Principal planes and principal stresses. Static failure theories for ductile materials. (MSST and DE). Shaft design for static loads. Thin-walled pressure vessels. Beam deflections by use of superposition. Column Design using the AISC Design Code.

Textbooks: *(Author, Title, Pub., year)*	F. Beer, E. Johnston and J. DeWolf, ***Mechanics of Materials***, McGraw-Hill, 5th Edition 2009
Supplemental Materials:	

Course Learning Outcomes:

By the completion of the course the students should be able to:

1. Find direct stress and strain for axial loads.
2. Identify yield and ultimate stress on the stress-strain curve.
3. Find direct shear stress bearing stresses
4. Calculate strain measurement
5. Find torsional shear stresses in circular shaft
6. Draw shear force and bending moment diagrams
7. Use the bending formula in the design of beams
8. Calculate principal stresses and their planes.
9. Use the theory of failures for ductile materials in the design of circular shafts.
10. Calculate beam deflections using superposition.
11. Use of the AISC Design Code in Column Design
12. Calculate stresses in thin-walled pressure vessels
13. Design and conduct an Experiment

Topics to be Covered:		***Duration in Weeks***
	1. Stress and Strain	2
	2. Torsional and Bending Stresses	3
	3. Principal Stresses	2
	4. Failure Theories and shaft design	2
	5. Thin-walled pressure vessels	2
	6. Beam Deflections	1.5
	7. Column Design	1.5

Key Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	√
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	√
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	√
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (b) (d) and (g)

Instructor or course coordinator: ABDEL SALAAM MOHAMAD
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 310 Machine Elements Design

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Machine Elements Design	MENG 310		2	3		3
Pre-requisites:	IE 202 and MENG 270					
Course Role in Curriculum *(Required/Elective):*	Required Course					

Catalogue Description: Material selection in design, Static failure theories, Fatigue failure. Design of Shafts for static and dynamic loads. Selection of Ball bearings, Lubrication and Journal Bearings. Gear geometry and forces. Use of the AGMA code in gear design. Power transmission by belts and/or chains. Power screws, Bolted Joints, Welded joints. Design of helical compression springs.

Textbooks: *(Author, Title, Pub., year)*	Shigley, Mischke, Budynas, *Mechanical Engineering Design*, McGraw Hill, 8th Ed, 2010
Supplemental Materials:	

Course Learning Outcomes:

By the completion of the course the students should be able to:

1. Select a material in the static loading of shafts.
2. Design a shaft using the DE-Goodman line.
3. Choose deep groove ball bearings to support a loaded shaft.
4. Identify the design parameters of journal bearings.
5. Calculate spur and helical gear forces.
6. Design spur and helical gears using the AGMA code.
7. Select a suitable V-belt specification for a given power transmission system.
8. Design a bolt for a tensile load.
9. Design a welded joint for tensile, torque and moment loads.
10. Design a helical compression spring.

Topics to be Covered:	***Duration in Weeks***
1. Design of Shafts	3
2. Bearings	3
3. Gears	2
4. Belts	1
5. Bolted Joints	2

	6. Welded Joints 7. Helical Compression Springs	1 2

Key Student Outcomes addressed by the course: (Put a √ sign)		
(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	√
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	√
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (c) and (j)

Instructor or course coordinator: ABDEL SALAAM MOHAMAD
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 332 Manufacturing Technology

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Manufacturing Technology	MENG 332	332 هـ مك	2	3		3
Pre-requisites:	CHE 210 and MENG 130					
Course Role in Curriculum *(Required/Elective):*	Required Course					

Catalogue Description:
Introduction, Casting processes (solidification and melting, furnaces, expendable and permanent mold casting). Bulk deformation processes (hot and cold forming processes, workability and limits of forming).Sheet metal processes (formability of sheets and sheet forming processes, processing of polymers). Metal powders and ceramics, welding processes. Heat treatment of metals, Principles of metal cutting (machining processes, types of chips, process sheet).

***Textbooks*:**	Mikell P. Groover "Fundamentals of Modern Manufacturing: Materials, Processes, and Systems", Forth Edition, John Wiley & Sons Inc. (2010).
***Supplemental Materials*:**	1. Serope Kalpakjian, "Manufacturing Engineering and Technology", Sixth Edition, Prentice Hall (2010). 2. Lecture Notes.

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1.	Describe the behavior of liquid metals and solidification of casting.
2.	Distinguish between the different casting processes, sand types and properties, and melting furnaces.
3.	Design and construct the pattern, gating system, and sand mold for sand casting components. Construct the manufacturing process sheets for casting different components.
4.	Diagnose casting defects and propose suitable finishing processes.
5.	Compare between hot and cold bulk metal forming processes
6.	Analyze sheet metal forming operations.
7.	Demonstrate the different welding processes.
8.	Evaluate the mechanical properties and defects in welded parts.
9.	Classify the different heat treatment processes.

10.	Describe the metal powders and ceramics production processes and illustrate their mechanical properties and applications.
11.	Describe the different types of polymers and polymer processing.
12.	Compare between the different machining operations, machine tools, and cutting tools.

Topics to be Covered:		***Duration in Weeks***
1.	Melting Furnaces and Solidification	1
2.	Metal casting	4
3.	Bulk and sheet metal forming operations	3
4.	Welding processes	3
5.	Heat treatment of steels	1
6.	Metal powders, ceramics, and polymer processing	1
7.	Introduction on machining operations	1

Key Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	√
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	√
(i)	a recognition of the need for, and an ability to engage in life-long learning	√
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (f) (h) and (i)

Instructor or course coordinator: Prof. Usama A. Khashaba
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS
MENG 364 Machine Dynamics

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Machine Dynamics	MENG 364	364 هـ مك	2	3		3
Pre-requisites:	MATH 205 and MENG 262					
Course Role in Curriculum *(Required/Elective):*	Required					

Catalogue Description:
Design of ordinary gear trains and analysis of epicyclic gear trains. Analytical design of disk cams. Grashof rules. Design of mechanisms in terms of transmission angle and time ratio. Kinematic and force analysis of linkages and machinery with the aid of computers. Flywheel design. Balancing.

***Textbooks*:** *(Author, Title, Pub., year)*	Robert L. Norton, Kinematics and Dynamics of Machinery, McGraw-Hill, 2009.
Supplemental Materials:	Lecture Notes.

Course Learning Outcomes:

By the completion of the course the students should be able to:

1.	Determine mobility, transmission angle and time ratio of a mechanism.
2.	Do position, velocity and acceleration analysis of mechanisms.
3.	Do static and dynamic force analysis of mechanisms.
4.	Analyze and design flywheels.
5.	Do mass balancing and field balancing.
6.	Kinematically analyze ordinary gear trains and epicyclic gear trains.
7.	Analyze and design plane disk cams.

Topics to be Covered:		***Duration in Weeks***
1.	Grashof rules, time ratios and transmission angles of linkages	2
2.	Kinematic analysis of linkages and machinery	3
3.	Force analysis of linkages and machinery	3
4.	Flywheel analysis and design	2
5.	Balancing	1
6.	Kinematic analysis of ordinary gear trains and epicyclic gear trains	2
7.	Analytical design of disk cams	1

Key Student Outcomes addressed by the course: (Put a √ sign)		
(a)	an ability to apply knowledge of mathematics, science, and engineering	√
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	√
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (a) (e) and (k)

Instructor or course coordinator: Prof. Hamza Diken
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 366 Systems Dynamics and Control

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Systems Dynamics and Control	MENG 366	هـ مك 366	2	3		3
Pre-requisites:	EE 251 and MENG 262					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: Laplace Transforms. Transfer Function. Block diagrams. State Space Equations of Control Systems. Mathematical Modeling of Dynamic Systems; Mechanical, Electrical, Electromechanical, Liquid Level, Thermal, and Pressure systems. Industrial Automatic Controllers; Basic Control Actions, Tuning Methods. Transient Response Analysis. Root Locus. Frequency Response1 (Bode Plot). Frequency Response2 (Nyquist Plot), State Space Modeling and Analysis, Controllability and Observability.						
***Textbooks*:** *(Author, Title, Pub., year)*	Katsuhiko Ogata, Modern Control Engineering, 5th Edition, 2009					
***Supplemental Materials*:**	**MATLAB Ref**.: Analysis and Design of Control Systems using MATLAB **Software: LabVIEW** and ACSYS2007 (MATLAB based application written for Automatic Control System) **Reference:** System Dynamics, William J. Palm III, McGraw-Hill, 2005. **Course Website:** http://www.asiri.net/course/meng366					

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1. Evaluate Laplace and Inverse Laplace Transformations.
2. Understand how to get the transfer function (TF) of a physical system
3. Identify specifications of a transient response of a second order system. (maximum overshoot, rise time, peak time, settling time)
4. Determine the stability of the system using Routh's stability criterion.
5. Analyze a system error related to a transient response of a control system.

6. Design a control system using basic control actions. (P., PI., PD., and PID control)
7. Design a control system using root-locus method.
8. Sketch Bode plots and use it for system identification and stability.
9. Plot Nyquist diagram to determine the stability of a closed loop system.
10. Model and analyze the control systems in state space.
11. Use LabVIEW to study a linear system.

Topics to be Covered:	***Duration in Weeks***
1. Laplace transforms	2
2. Modeling of Physical Systems	2
3. Transient Response and Routh's Stability	3
4. Basic Control Actions	1
5. Root Locus Analysis and Design	2
6. Frequency Response Analysis: Bode and Nyquist Plots	3
7. Modeling and Analysis with State Space	1

Key Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	√
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	√
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (a) and (e)
Instructor or course coordinator: Dr. Saeed Asiri
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 410 Mechanical Design

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Mechanical Design	MENG 410	410 هـ مك	2	3		3
Pre-requisites:	MENG 204, MENG 310					
Course Role in Curriculum *(Required/Elective):*	Required Course					

Catalogue Description:
Introduction. Design methodology and concepts. Team work skills. Problem solving heuristic. Comprehensive design projects (includes fixed and movable joints, shafts, sliding and rolling bearings, gears, couplings, clutches, belts, chains and ropes drives). Producing assembly and working drawings. Using of Standards and Design codes. Structure design and Cost Analysis. Using of available Computer software in drawing and design.

***Textbooks*:** *(Author, Title, Pub., year)* Shigley J.E. and Mischke C.R. "Mechanical Engineering Design", 9th Edition, McGraw-Hill, 2008

***Supplemental Materials*:** Course Notes: First day materials, Course project, Guide to assignments

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1. Choose the suitable materials with suitable dimensions for machine components.
2. Analyze components under acting loads.
3. Design a system to carry on given ideas for specific tasks.
4. Design system with definitive dimensional and arrangement.
5. Use computers and available software in drawing and design.
6. Develop teamwork skills.

Topics to be Covered:		***Duration in Weeks***
1.	Design Methodology, Synthesis, Creativity and Conceptualization.	1
2.	Shaft design based on strength and rigidity.	2
3.	Shaft mounting.	1.5
4.	Bearings Selection. (Using SKF)	1.5
5.	Design of gears. (According to AGMA)	2
6.	Belt Drive Design. (Using DIN)	1
7.	Chains and Rope Drives.	1
8.	Structure Design in Mechanical Systems.	2
9.	Electric Motors, Selection and Cost Analysis.	1
10.	Use of standards and design codes for machine elements and implemented in three major mechanical systems design projects worked by students in teams.	1

Key Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	√
(d)	an ability to function on multidisciplinary teams	√
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	√
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	√
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (c) (d) (g) (j) and (k)

Instructor or course coordinator: Prof. Nidal Abu-Hamdeh
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 412 Computer Aided Design

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Computer Aided Design	MENG 412	412 هـ مك	2	3		3
Pre-requisites:	MENG 410					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: Introduction to computer aided engineering environment. Solid modeling. Introduction to Finite Element Method. CAD packages. Static linear analysis in one, two, and three dimensions. Thermal systems analysis and design, introduction to nonlinear analysis. Optimum design. Computer applications in mechanical design.						

***Textbooks*:** (Author, Title, Pub., year) An Introduction to Finite Element Method, J. Reddy, McGraw-Hill , 2 edition, USA, 1993, ISBN:0070513554

Supplemental Materials: - Course Handouts

Course Learning Outcomes:

By the completion of the course the students should be able to:

1. Ability to setup and solve finite element models of bar structures software
2. Ability to setup and solve finite element models of beam structures
3. Ability to setup and solve finite element models of truss structures
4. Ability to use ANSYS in solving static structural problems
5. Ability to use ANSYS in performing modal analysis
6. Ability to use ANSYS to analyze structures subjected to thermal loading
7. Ability to use ANSYS to solve coupled field problems
8. Ability to use ANSYS to check column structures for linear buckling
9. Ability to use ANSYS to setup and solve plane stress and plane strain problems

Topics to be Covered:	***Duration in Weeks***
1. Finite element Analysis of bar structures	2
2. Finite element Analysis of beams	2
3. Finite element Analysis of trusses	2
4. Static structural analysis using ANSYS	2
5. Modal analysis using ANSYS	1
6. Harmonic analysis using ANSYS	1
7. Thermal analysis using ANSYS	2
8. Linear buckling analysis using ANSYS	1
9. Coupled filed analysis using ANSYS	1

Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	√
(d)	an ability to function on multidisciplinary teams	√
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	√
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	√
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (c) (d) (g) (j) and (k)

Instructor or course coordinator: Dr. Khalid Almitani
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 434 Material Removal Procedures

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Material Removal Procedures	MENG 434	434 هـ مك	2	3		3
Pre-requisites:	MENG 332					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: Fundamentals of metal cutting. Mechanics of chip formation. Cutting forces and power. Effect of temperature on cutting. Tool life. Machinability: metal removal rate, cutting tool materials and fluids. Machining processes: turning, thread cutting, boring, drilling, reaming, milling, shaping and planning, broaching, gear cutting. Abrasives, grinding wheels, grinding processes. Super finishing process: Lapping, honing, blasting and peening. Nonconventional machining. Numerical control of machine tools.						

***Textbooks*:** Mikell P. Groover "Fundamentals of Modern Manufacturing: Materials, Processes, and Systems", Forth Edition, John Wiley & Sons Inc. (2010).

Supplemental Materials:
1. Serope Kalpakjian, "Manufacturing Engineering and Technology", Sixth Edition, Prentice Hall (2010).
2. Lecture Notes.

Course Learning Outcomes:

By the completion of the course the students should be able to:

1. Distinguish between Machining and machinability
2. Analyze the mechanics of chip formation, and demonstrate the different types of chips.
3. Measure and evaluate the cutting forces and power
4. Describe the effect of temperature on cutting process and tool life.
5. Describe the different types of cutting tool materials and fluids and recognize their impact on tool life.
6. Analyze the different machining processes and machine tools: turning, thread cutting, boring, drilling, reaming, milling, shaping and planing, broaching, evaluate the machining time and metal removal rate for each process.
7. Analyze the gear cutting processes.
8. Describe and implement the grinding processes.

9. Describe the super finishing processes: Lapping and honing
10. Describe the blasting and peening processes.
11. Describe the non-conventional machining processes.
12. Explain part program, machine control unit, and processing equipment in numerical control machine tools. Distinguish between closed loop and open loop systems. Describe the coordinate system, and the different movement systems of tool or table in CNC machine tools.

Topics to be Covered:	***Duration in Weeks***
1. Theory of metal cutting	1.5
2. Cutting tools	1.5
3. Machining processes and machine tools	6
4. Gear cutting processes	0.5
5. Finishing processes	0.5
6. Nonconventional machining	2
7. Numerical control of machine tools	2

Key Student Outcomes addressed by the course: (Put a √ sign)

(a) an ability to apply knowledge of mathematics, science, and engineering	
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d) an ability to function on multidisciplinary teams	
(e) an ability to identify, formulate, and solve engineering problems	
(f) an understanding of professional and ethical responsibility	√
(g) an ability to communicate effectively	
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	√
(i) a recognition of the need for, and an ability to engage in life-long learning	√
(j) a knowledge of contemporary issues	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (f) (h) and (i)

Instructor or course coordinator: Prof. Usama A. Khashaba
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 436 Metrology and Quality Control

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Metrology and Quality Control	MENG 436	436 هـ مك	2	3		3
Pre-requisites:	MENG 332					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: Quality Standardization and standards. Accuracy and precision. Sensitivity and magnification systems. Errors, geometric tolerances. Surface texture. Interferometry and laser applications. Inspection and limit gauging. Quality control and sampling techniques, lot-acceptance, sampling plans, statistical control charts, quality assurance systems, total quality management.						

***Textbooks*:** (Author, Title, Pub., year)

1- Fundamentals of Dimensional Metrology, C. Dotson, R. Harlow, and R. Thompson, Delmar Learning, 4th ed., 2003.
2- Quality Control, D. Besterfield, Prentice-Hall Inc., 6th ed., 2001.

***Supplemental Materials*:** Lecture notes (last update September 2013)

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1. Recognize the importance, basics and types of dimensional measurements and quality Control techniques in production processes.
2. Describe fundamental methods of linear, angular and surface texture measurements and their related instrumentation.
3. Recall essential knowledge about geometric forms and their technique of dimensioning and tolerancing.
4. Evaluate production performance of manufacturing processes using control chart techniques.
5. Employ simple measuring instruments to perform common dimensional measurements.
6. Summarize and express up-to-date topics on dimensional metrology and quality control production.

Topics to be Covered:	***Duration in Weeks***
1. Introduction to Metrology	1
2. Linear Measurements	2
3. Comparators	1
4. Gauges	1
5. Angular Measurements	1
6. Geometric Dimensioning & Tolerancing	1
7. Surface Texture Measurements	2
8. Optical Measurements (Interferometry)	1
9. Introduction to Production Quality	1
10. Principles of Control Charts Technique	2
11. Control Charts for Variables	1

Student Outcomes addressed by the course: (Put a √ sign)

(a) an ability to apply knowledge of mathematics, science, and engineering	
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	√
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d) an ability to function on multidisciplinary teams	
(e) an ability to identify, formulate, and solve engineering problems	
(f) an understanding of professional and ethical responsibility	
(g) an ability to communicate effectively	
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i) a recognition of the need for, and an ability to engage in life-long learning	
(j) a knowledge of contemporary issues	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (b)

Instructor or course coordinator: Assoc. Prof. Ahmed Elkeran
Last updated: Spring 2014

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE SYLLABUS

MENG 450 Computer Aided Manufacturing

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Computer Aided Manufacturing	MENG 450	450 همك	3	2		5
Pre-requisites:	MENG 204, MENG 434					
Course Role in Curriculum *(Required/Elective):*	*Elective*					

Catalogue Description:
This course covers fundamentals of computer aided manufacturing with special emphasis on manufacturing using numerical control machining systems. Heavy emphasis will be on proper use of commercial CAM systems to generate optimized CNC tool path. Program generations will be reinforced with practical training in CNC Lab. This course is very much a course for the engineer of the future!

***Textbooks*:** (Author, Title, Pub., year) Chang, T.C., Wysk, R.A., & Wang, H.P. Computer-Aided Manufacturing, 3rd Edition, Prentice-Hall, ISBN-10: 0131429191, (2005).

***Supplemental Materials*:** Lecture notes

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1. Use CAM software to properly select part geometry, tools, tool path strategy, cutting parameters and postprocessor to generate a part program for a specific CNC machine tool.
2. Create a part program for milling (pocketing, contouring, sweeping, z-level ,…. etc) and turning operations (ID and OD turning, threading, grooving, ...etc).
3. Simulate the generated part program using simulation software and on the machine if possible .
4. Communicate CNC machine with a PC using RS232 and Ethernet.

Topics to be Covered:	***Duration in Weeks***
1. Introduction to Numerical Control Machine Tools	1
2. Numerical Control Machine Tool Elements	2
3. Machining Centers configuration	2
4. Turning Center configurations	2
5. Cutting Tools	1
6. Introduction to CNC machine tools Programming	2
7. Prismatic Machining	2

8. Multi-Axis Machining 2

Grading:

Quiz	10 %
Workshop Examination	25 %
Mid-Term Examination	25 %
Final-Term Examination	40 %

Not: 75% attendance is required. No makeup for quiz.

Key Student Outcomes assessed in the course: g, k

Instructor or course coordinator: Assoc. Prof. Ahmed ElQiran
Last updated: Nov. 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 452 Manufacturing Planning and Shop Loading

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Manufacture Planning And Shop Loading	MENG 452	452 هـ مك	2	3		3
Pre-requisites:	IE 255 and MENG 332					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: Productivity: Methods of measurement. Production methods and machine capacities. Planning of manufacturing process. Flow and handling of materials. Factory location decisions. Plant layout. Scheduling, loading and project planning. Group technology. Cost estimation. Forecasting and pre-planning for production. Computer-aided process planning. Computer-integrated manufacturing systems.						

***Textbooks*:**
(Author, Title, Pub., year)

3- Mikell P. Groover, 2008, "Automation, Production Systems, and Computer-Integrated Manufacturing", 3rd ed., Pearson/Prentice Hall, ISBN: 0-13-239321-2.
4- Nanua Singh, "Systems Approach to Computer-Integrated Design and Manufacturing", John Wiley&Sons, ISBN: 0-471-58517-3, July 1995.

***Supplemental Materials*:** Lecture notes (last update September 2013)

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

7. Identify classical and state-of-the-art production systems
8. Classify basic types of automation.
9. Define automation migration strategy.
10. Analyze automated materials handling systems and manufacturing support systems
11. Identify automated storage/retrieval systems
12. Define group technology and cellular manufacturing
13. Recognize parts classification and coding
14. Develop the Opitz form code for different parts

15. Explain basic concepts related to flexible manufacturing systems
16. Describe the two basic approaches in computer-aided process planning
17. Describe production planning and production control
18. Define just-in-time and lean production systems.

Topics to be Covered:	***Duration in Weeks***
12. Fundamentals of manufacturing and Automation	2
13. Material Handling	1
14. Storage Systems	1
15. Group Technology and Cellular Manufacturing	2
16. Flexible Manufacturing Systems	2
17. Process Planning and concurrent Engineering	2
18. Production Planning	2
19. Just-In-Time and Lean Production	2

Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (k)

Instructor or course coordinator: Dr. Saad Aldousari
Last updated: Spring 2014

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE SYLLABUS

MENG 454 Welding Technology

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Welding Technology	MENG 454	454 همك	3	2		5
Pre-requisites:	MENG 332					
Course Role in Curriculum *(Required/Elective):*	*Elective*					

Catalogue Description:
Fusion welding. Weld ability. Selection of welding electrodes. Hot cracking. Cold cracking. Welding metallurgy, heat affected zone. Welding of heat-treatable alloys. Welding of dissimilar alloys. Destructive and nondestructive testing of welds. Weld thermal cycles and residual stresses. Welding in manufacturing: pressure vessels, boilers and ship building industries; welding in automotive maintenance. Welding codes

***Textbooks*:** (Author, Title, Pub., year)
5- Modern Welding Technology, 10th edition, Andrew D. Althouse, Goodheart Willcox Publishing Co., 2004

Supplemental Materials: Lecture notes

Course Learning Objectives:
By the completion of the course the students should be able to:

1- Discuss shop safety and safe procedures used in welding.
2- Recognize and understand use of welding symbols;
3- Set up and operate welding equipment.
4- Select correct welding method
5- Select correct welding parameters
6- Inspect and evaluate welding

Topics to be Covered:	***Duration in Weeks***
1. Fundamentals of Welding	1
2. Safety and Health of Welders	1
3. Arc Welding With a Nonconsumable Electrode	1
4. Arc Welding with a Consumable Electrode	1
5. Gas Welding, Brazing,	1
6. Gas Welding, Soldering	1
7. Gas Solid-State Welding	1
8. Resistance Welding	1
9. Electron Beam and Laser Beam Welding	1
10. Power Sources for Arc Welding	1
11. Electrodes and Filler Materials	1

12. Quality Control and Evaluation of Welds	1
13. Repair of Welding	1
14. Welding Specifications	1

Grading:

Quiz	10 %
Workshop Examination	25 %
Mid-Term Examination	25 %
Final-Term Examination	40 %

Not: 75% attendance is required. No makeup for quiz.

Key Student Outcomes assessed in the course: k

Instructor or course coordinator: Assoc. Prof. Ahmed ElQiran
Last updated: Nov. 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS
MENG 470 Mechanical Vibrations

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Mechanical Vibrations	MENG 470	هـ مك 470	2	3		3
Pre-requisites:	MATH 204 and MENG 364					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: Free and damped vibration of single degree of freedom systems. Viscous damping. Forced vibration. Resonance. Harmonic excitation. Rotating unbalance. Base motion. Vibration isolation. Fourier analysis. Vibration measuring. General excitation. Step and impulse response. Two degree of freedom systems. Frequencies and mode shapes. Modal analysis. Undamped vibration absorber. Multi degree of freedom systems. Introduction to Continuous systems, Applications with computer programs.						

***Textbooks*:** Course notes and slides
(Author, Title, Pub., year)
***Supplemental Materials*:**

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1. Ability to model linear and nonlinear mechanical systems as combinations of springs, masses and dampers
2. Ability to determine and define the degrees of freedom of a given mechanical system
3. Ability to extract the equations of motion of a given mechanical system
4. Ability to analyze and interpret the response of mechanical systems to various types of excitations
5. Ability to analyze and interpret the response of mechanical systems to different cases of damping
6. Ability to predict qualitatively the response of systems based on the spectral content of the excitation
7. Ability to minimize the effects of transient and harmonic excitations on systems and their support structures
8. The ability to decouple equations of motion

9. The understanding of the significance of vibration control in various applications

Topics to be Covered:	***Duration in Weeks***
1. Fundamentals of Vibration	1
2. Degrees of Freedom (Generalized Coordinates)	1
3. Lagrange's Equations	2
4. Free Vibration of Single Degree of Freedom Systems	2
5. Harmonic Excitation of Single Degree of Freedom Systems	2
6. Base Excitation of Single Degree of Freedom Systems	1
7. Free Vibration of Multi-Degree of Freedom Systems	2
8. Forced Vibration of Multi-Degree of Freedom Systems	2
9. Vibration Control	1

Student Outcomes addressed by the course: (Put a √ sign)

(a) an ability to apply knowledge of mathematics, science, and engineering	√
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d) an ability to function on multidisciplinary teams	
(e) an ability to identify, formulate, and solve engineering problems	√
(f) an understanding of professional and ethical responsibility	
(g) an ability to communicate effectively	
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i) a recognition of the need for, and an ability to engage in life-long learning	
(j) a knowledge of contemporary issues	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (a) (e)

Instructor or course coordinator: Dr. Redwan Alqasemi
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 472 Fault Diagnosis of Mechanical Systems

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Fault Diagnosis of Mechanical Systems	MENG 472	هـ مك 472	2	2		2
Pre-requisites:	MENG 470					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: Review of vibration: Free vibration, Harmonically excited vibration, Fourier analysis. Vibration measuring techniques and instruments: Transducers, FFT analyzer, Sampling and aliasing. Introduction, Basics of Mechanical Vibrations, Fourier Series, Vibration Measuring Instruments, Condition Monitoring, Techniques of Fault Diagnosis, Maintenance Categories, Maintenance Management, Equipment Overview, Machinery Fault Diagnosis using Vibration Analysis: Imbalance, Misalignment, Bearings, Gears, Fans, Belts, Looseness.							

***Textbooks*:** Lecture Notes from Course Website
(Author, Title, Pub., year)

***Supplemental Materials*:**

1. Practical Machinery Vibration Analysis and Predictive Maintenance, Scheffer and Gridhar
2. Machinery Vibration: Measurement and Analysis, Victor Wowk, McGraw-Hill, Inc., 1991.
3. Machinery Vibration: Balancing, Victor Wowk, McGraw-Hill, Inc., 1995.
4. Mechanical Vibrations, Singiresu S. Rao, 3rd Edition, 1995, Addison-Wesley Publishing Company.

Course Website: http://www.asiri.net/course/meng472

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

1. Analyze the free and hormonally excited vibratory systems.
2. Use Fast Fourier Transform (FFT) to study the system performance with periodic excitation.
3. Classify transducers for vibration measurement.
4. Identify problems of vibration measurements and analysis: FFT analyzer, filtering, sampling, aliasing, averaging, windowing.
5. Distinguish between the four maintenance categories.

6. Identify the causes of machine problems using vibration analysis like: imbalance, misalignment, bearings, gears, fans, resonance, looseness, etc.
7. Function in a team.
8. Communicate effectively.
9. search and collect necessary information from different resources

Topics to be Covered:	***Duration in Weeks***
1. Introduction	1
2. Free and Forced Vibration	1
3. Fourier Series	1
4. Vibration Measuring Instruments	1
5. Conditioning Monitoring	1
6. Techniques of Fault Diagnosis	1
7. Equipment Overview	1
8. Machinery Fault Diagnosis using Vibration Analysis	7

Key Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	√
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (d) and (k)

Instructor or course coordinator: Dr. Saeed Asiri
Last updated: Spring 2014

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE SYLLABUS

MENG 482 Mechatronics

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Mechatronics	MENG 482	482 همك	3	2		5
Pre-requisites:	MENG 366					
Course Role in Curriculum *(Required/Elective):*	*Elective*					

Catalogue Description:
Introduction, modeling and simulations: simulation and block diagrams. Ana1ogies. Electrical and mechanical systems. Electro-mechanical coupling. Fluid systems. Sensors and transducers. Actuating devices. DC, stepper and servomotors. Fluid power actuation. Piezo electric actuators. Hardware components. Number systems. Binary logic systems and control. Real time interfacing. Data acquisition and control systems. The I/O process.

***Textbooks*:** (Author, Title, Pub., year) Robert H. Bishop. "Mechatronic Systems, Sensors, and Actuators Fundamentals and Modeling", CRC PRESS 2008.

***Supplemental Materials*:** Lecture notes

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:

5. Identify the principles of operation of mechanical sensors (position, velocity, acceleration, angular motion, pressure, force, and strain).
6. Identify the principles of operation of magnetic sensors (Hall effect, Reed switch, Magnetostrictive)
7. Identify the principles of operation of temperature sensors (thermocouple, thermistor, RTD, pyrometers)
8. Identify the principles of operation of different types of actuators (electric, pneumatic, and hydraulic)
9. Program of Pic Microcontroller using proton basic software
10. Simulate Pic Microcontroller using Protus software.

Topics to be Covered:	***Duration in Weeks***
20. Introduction to Mechatronics	1
21. Sensors Introduction	1
22. Mechanical Sensors	5
23. Magnetic Sensors	1

24. Actuators	2
25. Pic Microcontroller	1
26. Microcontroller Programing	3

Grading:

Quiz	10 %
Lab. Examination	10 %
Mid-Term Examination	25 %
Project	15 %
Final-Term Examination	40 %

Not: 75% attendance is required. No makeup for quiz.

Key Student Outcomes assessed in the course: k

Instructor or course coordinator: Assoc. Prof. Ahmed ElQiran
Last updated: Nov. 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
PRODUCTION AND MECHANICAL SYSTEMS DESIGN PROGRAM
COURSE SYLLABUS

MENG 499 Senior Project

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Senior Project	MENG 499	هـ مك 499	2	4		4
Pre-requisites:	MENG 410 and MENG 434					
Course Role in Curriculum *(Required/Elective):*	Required Course					

Catalogue Description:
This course includes lectures and projects. Lectures are on Research Methodology, Problem solving heuristic, Project Management, Technical writing and presentation skills, Teamwork skills and Engineering software tutorials. Senior-Level and/or Design Project. Thesis and oral examination are required.

***Textbooks*:**
(Author, Title, Pub., year)

1. Zaval, L. and Wagner, T. "Project Manager Street Smarts", Wiley Publishing, Inc., 2009.
2. Engineering Standards Handbooks
3. Software manuals.

Supplemental Materials: Course Notes: First day materials, Project Requirements, Project Management, Ethics of a Muslim Engineer

Course Learning Outcomes:

By the completion of the course the students should be able to:

1. Analyze a project statement, brief, or proposal to identify the real problem and the most relevant needs and realistic constraints.
2. Identify potential customers, their needs, and their operational constraints.
3. Collect and review related data such as technical information, regulations, standards, and operational experiences from credible literature resources.
4. Integrate previous knowledge from mathematics, basic sciences, engineering fundamentals and discipline related courses to address the problem.
5. Discuss all applicable realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
6. Define design objectives, design constraints, measures of design viability, and the evaluation criteria of the final project, and reformulate the problem based on collected data.
7. Generate possible solutions; compare alternatives, and select one alternative based on evaluation criteria and feasibility analysis.
8. Plan an effective design strategy and a project work plan, using standard project planning techniques, to ensure project completion on time and within budget.
9. Implement a planned design strategy for an Experimental Design Project, if applicable.
10. Implement a planned design strategy for a Product-Based Design Project, if applicable

11 Communicate design details and express thoughts clearly and concisely, both orally and in writing, using necessary supporting material, to achieve desired understanding and impact.
12 Use the tools and techniques of project management.

Project: Students are expected to work in teams under the supervision of a faculty member and an advisor from industry, if possible, to complete the project. The progress work of the project is discussed and evaluated weekly during the semester. A written thesis is submitted at the end of the second semester and a final oral examination is held.

Topics to be Covered:		***Duration in Weeks***
1.	Design Methodology, Synthesis, Creativity and Conceptualization	1
2.	Project Management Techniques	2
3.	Problem Solving Heuristics	1
4.	Team Work Skills	2
5.	Communication Skills; Written, graphical and Oral	2
6.	Use of standards and design codes	2
7.	Ethics of a Muslim Engineer	2
8.	Laws of Land related to Engineers	2

Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	√
(d)	an ability to function on multidisciplinary teams	√
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	√
(g)	an ability to communicate effectively	√
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	√
(i)	a recognition of the need for, and an ability to engage in life-long learning	√
(j)	a knowledge of contemporary issues	√
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (c) (d) (f) (g) (h) (i) (j) and (k)

Instructor or course coordinator: Dr. Haitham A. Bogis
Last updated: Spring 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
THERMAL ENGINEERING AND DESALINATION TECHNOLOGY PROGRAM
COURSE SYLLABUS

MEP 261 THERMODYNAMICS I

COURSE TITLE	ENGLISH CODE /NO	ARABIC CODE/NO.	UNITS			
			Th.	Pr.	Tr.	CU
Thermodynamics I	**MEP 261**	**هـ مق 261**	**3**	**1**	**-**	**3**
Pre-requisites		MATH 202, PHYS 281				
Course Role in Curriculum		**Required or Elective:**	Required			
		A pre-requisite for:	MEP 360, MEP 361, MEP 365			
Concepts and definitions. Properties of pure substances. Different forms of energy. Concepts of Heat and work. First law of thermodynamics. Applications of first law on closed system and control volume. Second law of thermodynamics. Entropy. Isentropic efficiency. Some ideal power and refrigeration cycles (including Rankine Cycle, vapor compression cycle, Otto cycle, Diesel cycle, Brayton cycle).						

Faculties and departments requiring this course (if any): MENG; EE; NE

***Textbook*:**

Authors: Sonntag, Borgnakke and Van Wylen
Title: Fundamentals of Thermodynamics
Publisher: John Wiley & Sons **Edition:** 7th Ed. **Place:** NY
Year: 2009 **ISBN:** 9780470171578

Reference: Thermodynamics: An Engineering Approach by Cengel, Y. A., and Boles, M. A.

***Course Leaning Outcomes By completion of the course, the students should be able to*:**

CLO_1 Explain basic thermodynamic concepts.
CLO_2 Find the thermodynamic properties of various pure substances.
CLO_3 Compute the work done on or by a system.
CLO_4 Apply the first law of thermodynamics to closed systems.
CLO_5 Apply the first law of thermodynamics to common thermodynamic devices undergoing a steady state flow process.

CLO_6 Compare between operations of reversible and irreversible cycles.
CLO_7 Apply the second law of thermodynamics to a closed system.
CLO_8 Apply the second law of thermodynamics on common thermodynamic devices undergoing a steady state flow process.
CLO_9 Analyze basic ideal thermodynamic cycles with phase change systems.
CLO_10 Analyze basic ideal thermodynamic cycles operating with ideal gaseous working fluids.
CLO_11 Conduct and analyze basic thermodynamics experiments.

Topics Covered During the Course [CLO] [STUDENT OUTCOME]:

T1: Introduction, Control Volumes and Units [1][a, e]
T2: Pure Substance Behavior [2][a, e]
T3: Energy Transfers [3][a, e]
T4: Energy Equation for a Control Mass [4][a, e]
T5: Energy Equation for a Control Volume [5][a, e]
T6: The Classical Second Law of Thermodynamics [6] [a, e, h]
T7: Entropy for a Control Mass [7] [a, e, h]
T8: Entropy Equation for a Control Volume [8] [a, e, h]
T9: Power and Refrigeration Systems-with Phase Change [9] [a, e, h]
T10: Power and Refrigeration Systems-Gaseous Working Fluids [10] [a, e, h]
T11: Conducting Basic Thermodynamics Experiments [11][b, g, i]

Course Schedule:

- Lecture: 3 sessions 50 min each (or) 2 sessions 80 min each
- Lab: one session 110 min each

Course Contribution to professional Component:

- Engineering science: 100%
- Engineering design: 0%

Course Relationship to Student Outcomes:

MEP 261 (Thermodynamics I)											
Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Highest Attainable Level of Learning*	X	X			**K (F)**		**K (F)**	**K (F)**	**X**		

K: Key outcome, F: Formative assessment, S: Summative assessment, X: Related outcome but not assessed.

Course Coordinator:

Dr. Abdullatif Gari, 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
THERMAL ENGINEERING AND DESALINATION TECHNOLOGY PROGRAM
COURSE SYLLABUS

MEP 290 FLUID MECHANICS

COURSE TITLE	ENGLISH CODE /NO	ARABIC CODE/NO.	UNITS			
			Th.	Pr.	Tr.	CU
Fluid Mechanics	**MEP 290**	**هـ مق 290**	**3**	**1**	**-**	**3**
Pre-requisites		MATH 202, PHYS 281				
Course Role in Curriculum		**Required or Elective:**	Required			
		A pre-requisite for:	MEP 360, MEP 361, MEP 365			

Concepts and definitions. Fluid statics. Forces on submerged surfaces and bodies. Non-viscous flow. Conservation of mass, momentum and energy. Bernoulli's equation. Dimensional analysis. The PI-Theorem. Similarity. Viscous flow, pipe flow, losses in conduit flow (Laminar and turbulent flow). Flow over submerged bodies.

Faculties and departments requiring this course (if any): MENG; CE

Textbooks

Authors: Frank M. White
Name: Fluid Mechanics
Publisher: McGraw-Hill
Edition: Intl Ed.**Place:** NY **Year:** 2011
ISBN: 978-007-131121-2
Other Required Materials: Lab manuals are purchased at College Copy Shop

Reference: Fundamentals of Fluid Mechanics by B.R. Munson, D.F. Young and T. H. Okiishi

Course Leaning Outcomes By completion of the course, the students should be able to:

CLO_1 Identify the basic properties of fluids and the various types of fluid flow configurations encountered in practice.
CLO_2 Compute the forces due to viscosity and surface tension.

CLO_3 Compute the capillary rise and excess pressure in droplets and bubbles due surface tension.
CLO_4 Determine the variation of pressure with elevation.
CLO_5 Calculate the hydrostatic forces exerted by a fluid at rest on submerged surfaces.
CLO_6 Obtain the stream function for a velocity and acceleration fields, and plot them.
CLO_7 Apply the mass and energy conservation equations for flow system.
CLO_8 Apply the momentum equation for flow system.
CLO_9 Use dimensional analysis to obtain relation among variables and to use them in modeling of fluid systems.
CLO_10 Calculate the major and minor losses associated with pipe flow system and determine power requirements.
CLO_11 Calculate the drag force on immersed bodies.
CLO_12 Perform experiments in fluid mechanics.

Topics Covered During the Course [CLO] [STUDENT OUTCOME]:

T1: Introduction [1, 2, 3][a, e]
T2: Pressure Distribution in a Fluid [4, 5][a, e]
T3: Integral Relations for a Control Volume [6, 7][e, j]
T4: Dimensional Analysis and Similarity [8][a, e]
T5: Viscous Flow in Ducts [6][e]
T6: Flow Past Immersed Bodies [10] [a, e, j]
T7: Lab [11] [b, g]

Course Schedule:

- Lecture: 3 sessions 50 min each (or) 2 sessions 80 min each
- Laboratory and Tutorial: one session 110 min each

Course Contribution to professional Component:

- Engineering science: 100%
- Engineering design: 0%

Course Relationship to Student Outcomes:

MEP 290 (Fluid Mechanics)											
Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Highest Attainable Level of Learning*	**K (F)**	**K (F)**			X		X			X	

K: Key outcome, F: Formative assessment, S: Summative assessment, X: Related outcome but not assessed.

Course Coordinator:

Prof. Abdulhaiy Radhwan, 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
THERMAL ENGINEERING AND DESALINATION TECHNOLOGY PROGRAM
COURSE SYLLABUS

MEP 360 HEAT TRANSFER

COURSE TITLE	ENGLISH CODE /NO	ARABIC CODE/NO.	UNITS			
			Th.	Pr.	Tr.	CU
Heat Transfer	**MEP 360**	**360 هـ مق**	**3**	**1**	**-**	**3**
Pre-requisites		MEP 261, MEP 290, IE 202				
Course Role in Curriculum		**Required or Elective:**	Required			
		A pre-requisite for:	MEP 451, MEP 460, MEP 473, MEP 474, MEP 481, MEP 482, MEP 499			

Principles of heat transfer. Steady state and transient conduction in different co-ordinates. Extended surfaces. Convective heat transfer. Analysis and empirical relations for forced and natural convection. Radiation heat transfer. Radiation exchange between black and gray surfaces. Heat transfer applications (heat exchangers). Numerical methods in heat transfer with computer applications.

Faculties and departments requiring this course (if any): MENG

Textbook:

Authors: Incropera/DeWitt/Bergmann/Lavine
Title : Principles of heat and mass transfer
Publisher: John Wiley & Sons **Edition:** 7th Ed. **Place:** NY
Year: 2013
ISBN: 9780470646151
Other Required Materials: Lab manuals are purchased at College Copy Shop

Reference: Heat and Mass Transfer: A practical Approach by Y. A. Cengel

Course Leaning Outcomes By completion of the course, the students should be able to:

CLO_1 Recall definitions, mechanisms and basic equations of the different heat transfer modes besides the energy balance equation.
CLO_2 Recall the steady-state 1-D heat diffusion equation and its boundary conditions for conduction problems.
CLO_3 Solve steady-state 1-D basic heat conduction problems (plane walls, cylinders, spheres, composite walls, conduction with internal heat generation and extended surfaces).

CLO_4 Apply finite-difference and energy balance methods besides boundary conditions to solve 2-D steady-state basic heat conduction problems.
CLO_5 Solve unsteady basic heat conduction problems with lumped capacitance method.
CLO_6 Describe velocity and thermal boundary layers.
CLO_7 Solve basic heat transfer problems of forced convection over flat plates, circular and non-circular cylinders, spheres and over bank of tubes.
CLO_8 Solve basic heat transfer problems of forced convection inside ducts.
CLO_9 Solve basic heat transfer problems of free convection over vertical plates, inclined plates, horizontal plates, vertical cylinders, horizontal cylinders and spheres.
CLO_10 Define thermal radiation, emission, irradiation, radiosity, emissivity, transmissivity, absorptivity, reflectivity, black, opaque, diffuse and gray bodies.
CLO_11 Solve basic radiation heat transfer problems between black, diffuse and gray surfaces in an enclosure including view factor.
CLO_12 Conduct, design and analyze experiments.

Topics Covered During the Course [CLO] [STUDENT OUTCOME]:

T1: Introduction [1][e]
T2: Introduction to Conduction [2][e]
T3: One-dimensional,, Steady-state Conduction [3][a, e, k]
T4: Two-dimensional,, Steady-state Conduction [4][a, e, k]
T5: Transient Conduction [5][a, e, k]
T6: Introduction to Convection [6][a, e]
T7: External Flow [7][a, e]
T8: Internal Flow [8][e]
T9: Free Convection[9][a, e]
T10: Radiation: Processes and Properties [10][a, e]
T11: Radiation Exchange between Surfaces [11][a, e]
T12: Heat transfer Laboratory [12][b, g]

Course Schedule:

- Lecture: 3 sessions 50 min each (or) 2 sessions 80 min each
- Laboratory and Tutorial: one session 110 min each

Course Contribution to professional Component:

- Engineering science: 100%
- Engineering design: 0%

Course Relationship to Student Outcomes:

MEP 360 (Heat Transfer)

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Highest Attainable Level of Learning*	X	**K (F)**			**K (F)**		**K (F)**				X

K: Key outcome, F: Formative assessment, S: Summative assessment, X: Related outcome but not assessed.

Course Coordinator:

Dr. Elsayed A. Shabana, 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
THERMAL ENGINEERING AND DESALINATION TECHNOLOGY PROGRAM
COURSE SYLLABUS

MEP 361 THERMODYNAMICS II

COURSE TITLE	ENGLISH CODE /NO	ARABIC CODE/NO.	UNITS			
			Th.	Pr.	Tr.	CU
Thermodynamics II	**MEP 361**	**361 هـ مق**	**3**	**1**	**-**	**3**
Pre-requisites		MEP 261, MEP 290				
Course Role in Curriculum		**Required or Elective:**	Required			
		A pre-requisite for:	MEP 370, MEP 451, MEP 460, MEP 473, MEP 481, MEP 482, MEP 499			

Irreversibility and availability. Thermodynamic relations. Mixtures and solutions. Chemical reactions and combustion. Phase and chemical equilibrium. Thermodynamics of compressible flow.

Faculties and departments requiring this course (if any): MENG

Textbook:

Authors: Cengel, Y. A., and Boles, M. A.,
Title: Thermodynamics: An Engineering Approach
Publisher: McGraw-Hill **Edition:** 7th Ed. **Place:** NY
Year: 2011 **ISBN:** 9780071311113

Reference: Fundamentals of Thermodynamics by Sonntag, Borgnakke and Van Wylen

Course Leaning Outcomes By completion of the course, the students should be able to:

CLO_1 Apply exergy concept in the analysis of closed systems and control volumes.
CLO_2 Evaluate changes in enthalpy, internal energy and entropy of real gases using generalized charts.
CLO_3 Apply Dalton's law, Amagat's law and Kay's rule for determining mixture properties for ideal and real gas mixtures.
CLO_4 Design air conditioning systems using psychrometric chart, and mass and energy balance relations.
CLO_5 Analyze reacting systems using thermodynamics laws.
CLO_6 Compute the chemical equilibrium constant based on Gibb's function.

CLO_7 Analyze isentropic flow through converging and converging-diverging nozzles.

Topics Covered During the Course [CLO] [STUDENT OUTCOME]:

T1: Exergy: A Measure of Work Potential [1][e, i]
T2: Thermodynamic Property Relations [2][a, e]
T3: Gas Mixtures [3][a, e]
T4: Gas Vapor Mixtures and Air Conditioning [4][c, i]
T5: Chemical Reactions [5][a, i, k]
T6: Chemical and Phase Equilibrium [6][a, e]
T7: Compressible Flow [7][a, e, i]

Course Schedule:

- Lecture: 3 sessions 50 min each (or) 2 sessions 80 min each
- Lab/Tutorial : one session 110 min each

Course Contribution to professional Component:

- Engineering science: 90%
- Engineering design: 10%

Course Relationship to Student Outcomes:

MEP 361 (Thermodynamics II)											
Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Highest Attainable Level of Learning*	**K (F)**		X		**K (F)**				**K (F)**		X

K: Key outcome, F: Formative assessment, S: Summative assessment, X: Related outcome but not assessed.

Course Coordinator:

Dr. Nazrulislam Abdulhafiz, 2014

FACULTY OF ENGINEERING - DEPARTMENT OF MECHANICAL ENGINEERING
THERMAL ENGINEERING AND DESALINATION TECHNOLOGY PROGRAM
COURSE SYLLABUS

MEP 451 REFRIGERATION & AIR CONDITIONING

COURSE TITLE	ENGLISH CODE /NO	ARABIC CODE/NO.	UNITS			
			Th.	Pr.	Tr.	CU
Refrigeration & Air Conditioning	**MEP 451**	**451 هـ مق**	**3**	**1**	**-**	**3**
Pre-requisites		MEP 360, MEP 361				
Course Role in Curriculum		**Required or Elective:**	Required			
		A pre-requisite for:	None			
Review of basic thermodynamics, vapor compression cycles, multi-stage and cascade vapor compression refrigeration. Refrigerants and their characteristics. Basic vapor compression equipment. Introduction to absorption refrigeration. Psychrometry and psychrometric processes. Human comfort. Heat gain-through walls and fenestrations. Cooling load calculations. Calculations using software packages.						

Faculties and departments requiring this course (if any): MENG

Text Book:

Authors: Mcquiston, Parker and Spitler
Title: Heating Ventilating and Air conditioning
Publisher: John Wiley & Sons **Edition:**6th Ed. **Place:** NY
Year: 2005 **ISBN:** 0-471-47015-5
Other Required Materials: Lab handouts are purchased from College Copy center

Reference: ***HVAC- Heating Ventilating and Air Conditioning by S. D. Swenson***

Course Leaning Outcomes: By completion of the course, the students should be able to:

CLO_1 Solve ideal, actual VC cycle on property diagrams.
CLO_2 Solve simple single stage H2O-LiBr absorption refrigeration cycle.
CLO_3 Determine the AC system properties on psychrometric chart.
CLO_4 Analyze the factors affecting thermal comfort in the AC zones.
CLO_5 Calculate the solar angles, and the solar radiation intensity on a surface.
CLO_6 Calculate the heat transmitted due to external loads for a building.
CLO_7 Calculate the cooling loads for a selected building in Jeddah, KSA.

CLO_8 Design the basic dimensions for an air distribution system.
CLO_9 Using software packages in a thermal design project
CLO_10 Perform (conduct, analyze and report) laboratory experiments on vapor compression cycle and A/C systems

Topics Covered During the Course [CLO] [STUDENT OUTCOME]:

T1: Vapor Compression Cycle [1][a, c, e]
T2: Refrigerants, Refrigeration Equipment [2][a, c, e]
T3: Absorption Refrigeration [3][k]
T4: Moist air and Conditioning Processes [4][a, c, e]
T5: Thermal Comfort and Health [5][a, c, e]
T6:Thermal Comfort and Indoor Air Quality [6][a, c, e]
T7: Air Conditioning Systems [7][a, c, e]
T8: Solar Radiation [8][a, c, e]
T9: Cooling Load [9][k]
T10: Fan and Duct Design [10][b]

Course Schedule:

- Lecture: 3 sessions 50 min each (or) 2 sessions 80 min each
- Lab: one session 110 min each

Course Contribution to professional Component*:*

- Engineering Science: 67 %
- Engineering Design: 33 %

Course Relationship to Student Outcomes:

MEP 451 (Air Conditioning)											
Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Highest Attainable Level of Learning*	X	X	**K (F)**		X						**K (S)**

K: Key outcome, F: Formative assessment, S: Summative assessment, X: Related outcome but not assessed.

Course Coordinator:

Prof. Yacine Khetib, 2014

FACULTY OF SCIENCES - DEPARTMENT OF PHYSICS
COURSE SYLLABUS

PHYS 110 General Physics (1)

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
General Physics (1)	PHYS 110	فيز 110	3			3
Pre-requisites:	None					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: Physical quantities and dimensional analysis, vectors, motion in one dimension, motion in a plane, Newton's laws, friction, work and energy, impulse, momentum, collisions, and rotational motion.						

***Textbooks*:**

1. C. H. Edwards & D. E. Penney, Elementary Differential Equations with Boundary Value Problems, Sixth Edition. Pearson Prentice Hill, 2008.

***Supplemental Materials*:**

1. Physics for scientist and engineers with modern physics by Serway (2005), Saunders College Publisher.
2. University Physics by Sears, Zemansky, and Young (2007).
3. Physics by Halliday, Resnick & Krane (2008) John Wiley & Sons.

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Understand the fundamental concepts of mechanics.

***Topics to be Covered*:**

1. Physical quantities and dimensional analysis,
2. Vectors,
3. Motion in one dimension,
4. Motion in a plane,
5. Newton's laws,
6. Friction,
7. Work and energy,
8. Impulse,
9. Momentum,
10. Collisions,
11. Rotational motion.

FACULTY OF SCIENCES - DEPARTMENT OF PHYSICS
COURSE SYLLABUS

PHYS 202 General Physics II

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
General Physics II	PHYS 202	فيز 202	3	2		4
Pre-requisites:	MATH 110 and PHYS 110					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: Charge and electric force, electric field, Gauss' law, electric potential, capacitance, current and resistance, DC circuits, magnetic force, magnetic field, induction and inductance, magnetism of matter and Maxwell's equations.						

***Textbooks*:**

1. Halliday, Resnick & Walker, Fundamental of Physics, John Wiley & Sons, 2008.

***Supplemental Materials*:**

1. Physics for scientist and engineers with modern physics by Serway (2005), Saunders College Publisher.
2. University Physics by Sears, Zemansky, and Young (2007).
3. Physics by Halliday, Resnick & Krane (2008) John Wiley & Sons.

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Understand more concepts of physics by studying electricity and magnetism

***Topics to be Covered*:**

1. Charge and electric force
2. Electric field,
3. Gauss' law,
4. Electric potential,
5. Capacitance,
6. Current and resistance,
7. DC circuits,
8. Magnetic force,
9. Magnetic field,
10. Induction and inductance,
11. Magnetism of matter and Maxwell's equations.

FACULTY OF SCIENCES - DEPARTMENT OF PHYSICS
COURSE SYLLABUS

PHYS 281 Physics Lab

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Physics Lab	PHYS 281	فيز 281		2		1
Pre-requisites:	MATH 110 and PHYS 110					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: Safety & regulations- friction- free fall- force table- Newton‘s law- projectile motion- air track- rotational motion- simple pendulum- hook’s law						

***Textbooks*:**

1. Halliday, Resnick & Walker, Fundamental of Physics, John Wiley & Sons, 2008.

***Supplemental Materials*:**

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Carry out experiments in Mechanics

***Topics to be Covered*:**

1. Safety & regulations-
2. friction
3. free fall
4, force table
5. Newton‘s law
6. projectile motion
7. air track
8. rotational motion
9. simple pendulum
10. hook’s law

FACULTY OF SCIENCES - DEPARTMENT OF STATISTICS
COURSE SYLLABUS

STAT 110 General Statistics (1)

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
General Statistics (1)	STAT 110	110 ص	3			3
Pre-requisites:	None					
Course Role in Curriculum	*Required or Elective:*		Required			
Catalogue Description: This course is designed to teach students how to use a broad base of statistical methods and concepts to organize, analyze, and interpret hypotheses developed in various applications. This course consists of three main parts: (1) Data analysis and description, (2) Probability and random variables, and (3) Inferential statistics. Main goal for this class is to familiarize students with the various techniques of statistical analyses that are utilized in different disciplines. Emphasis will be on the basic concepts and their meaning, as well as their applications and interpretation						

***Textbooks*:**

1. Elementary Statistics a Step by Step Approach, 7th Edition by Allan Bluman, McGraw/Hill, 2006..

***Supplemental Materials*:**

1. Larson & Farber, "Elementary Statistics: Picturing the World", 3rd Edition (2006)

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1. Demonstrate an understanding of statistics.
2. Learn some commonly used statistical techniques.
3. Apply these techniques in describing and analyzing data.
4. Use statistics to solve different kind of problems.
5. Recognize sound/good statistical studies.
6. Gain an appreciation for analytical skills.

***Topics to be Covered*:**

1. Collecting data, graphical presentation and tabulation.
2. Measures of central tendency: Mean, Median and Mode.
3. Measures of dispersion: range, and standard deviation.
4, Relative Dispersion and Skewness.
5. Elementary probability: random experiment, sample space, event, and computation of probability. Rules of addition and multiplication, conditional probability and independence.
6. Random variables, probability distributions, variance and expected value - Some probability distributions (Binomial, Poisson, and Normal).

7. Sampling and sampling distribution: Sampling distribution of Sample Mean (in case of large samples), central limit theorem and sampling distribution of proportion.
8. Estimation of population mean and proportion.
   Tests of statistical hypotheses: testing of mean, differences between two means, proportion, differences between two proportions in large samples.
9. Simple linear regression and Correlation: Pearson's correlation coefficient and Spearman's rank correlation coefficient.
10. Collecting data, graphical presentation and tabulation.