THERMAL ENGINEERING AND DESALINATION TECHNOLOGY DEPARTMENT

COURSE SYLLABI

DEPARTMENT OF THERMAL ENGINEERING AND DESALINATION TECHNOLOGY

COURSE SYLLABUS									MEP261_01_Fall_2007		Page - 1
Code:	MEP261	**Name:**	Thermodynamic I						**Type:**	Required	
Number of Credit:		4	**Section:**	01	**Semester:**	Fall	**Year:**	2007	**Number of students:**		23
Course Catalog Description	Concepts and definitions. Properties of pure substances. First law of thermodynamics. Specific heats and enthalpy. Application to first law on closed system and control volume. Second law of Thermodynamics. Entropy. Principle of increase of entropy and definition of isentropic efficiency. Some power and refrigeration cycles including Rankine and vapor compression cycles.										
Prerequisite:	Math. 102E General Mathematics II, Phys. 101E Physics I										
Textbook:	**Authors:**	Sonntag, Borgnakke and Van Wylen			**Name:**	Fundamentals of Thermodynamics					
	Publisher:	John Wiley & Sons	**Edition:**	6th Ed.	**Place:**	NY	**Year:**	2003	**ISBN:**	0471428833	
Other Required Materials:	Lab manuals are purchased at College Copy Shop										

Course Topics [Supported CLO's][Supported PO's]

T1:Introduction, concepts and Definitions[1, 2][a]	
T2:Properties of a pure substance[3, 4, 5][a]	
T3:Work and heat[6, 7, 8][a, e, n]	
T4:First law of Thermodynamics[9, 10, 11, 12][a, e, n]	
T5:First law of Thermodynamics for a control volume[13, 14][a, e, n]	
T6:The second law of thermodynamics[15, 16, 17, 18][a, e, j, n]	
T7:Entropy[19, 20, 21, 22][a, e]	
T8:Second law analysis for a control volume[23, 24][a, e]	
T9:Power and refrigeration cycle[25][a, e]	
T10:Thermodynamic laboratory[26][b, g]	

Supp.Program Outcomes (Ave.Rel:Repitition): a(3.0:25), b(3.0:1), e(3.0:10), g(3.0:1), j(1.0:2), n(1.0:6)

Performance Target for Course Learning Objectives Assessment:				Contribution of course:					Class/Laboratory Schedule:		Lecture:	Lab:
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:		3	1
At least score:		No. of students, %:		Engineering Sciences:	100	%	4.0	hrs.	Duration of each session, min.:		50	120
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	0	%	0.0	hrs.	**Instructor name:**	Dr. Abdul Rahim A. Khaled		

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**03/02/2008**

COURSE SYLLABUS (Course Learning Objectives)		**MEP261_01_Fall_2007**	**Page - 2**
CLO_1	Students will be able to define a thermodynamic system, closed and open systems, state, equilibrium, process, cycle and system properties.		
CLO_2	Students will be able to define intensive/extensive properties and explain the Zeroth law of thermodynamics.		
CLO_3	Students will be able to define the pure substance, different phases (compressed liquid, saturated liquid phase, saturated liquid-vapor mixture and super heated vapor).		
CLO_4	Students will be able to determine the properties of a pure substance using thermodynamic tables		
CLO_5	Students will able to define the ideal gas and state the ideal gas relation.		
CLO_6	Students will be able to define the work as a system property.		
CLO_7	Students will be able to calculate the system work for a closed system undergoing different quasi-equilibrium processes.		
CLO_8	Student will be able to define the heat as a system property.		
CLO_9	Students will be able to explain the first law of thermodynamics.		
CLO_10	Students will be able to define the internal energy and enthalpy for a system.		
CLO_11	Students will be able to define the specific heat at constant pressure and specific heat at constant volume.		
CLO_12	Students will be able to apply the first law of thermodynamics on closed systems.		
CLO_13	Students will be able to apply the first law of thermodynamics on a control volume where a steady state flow process is performed.		
CLO_14	Students will be able to define various control volumes: e.g. turbine, compressor, heat exchanger, throttle valves, nozzles, diffusers and mixing chambers.		
CLO_15	Students will be able to define thermal reservoirs, heat engines, refrigerators and the heat pumps.		
CLO_16	Students will be able to explain the statements of the second law: Kelvin-Planck statement and Clausius statement.		
CLO_17	Students will be able to define thermal efficiency, coefficient of performance, reversible processes and irreversible processes.		
CLO_18	Students will be able to define the Carnot cycle.		
CLO_19	Students will be able to define the entropy as a system property.		
CLO_20	Students will be able to find the entropy change of a pure substance, a solid, a liquid and an ideal gas.		
CLO_21	Student will be able to define the isentropic process undergoing a given process.		
CLO_22	Students will be to define the entropy generation and apply the second law of thermodynamics for closed systems.		
CLO_23	Students will be able to apply the second law of thermodynamics for control volumes undergoing steady state flow processes.		
CLO_24	Students will be able to define the isentropic efficiency of turbines and compressors.		
CLO_25	Students will be able to identify and analyze some ideal cycles: e.g. Rankine's cycle, Otto's cycle, Diesel's cycle and the Brayton's cycle, Ideal vapor compression cycles.		
CLO_26	Students will be able to conduct and analyze experiments.		

COURSE SYLLABUS										**MEP290_05_Fall_2007**	**Page - 1**
Code:	MEP290	**Name:**	Fluid Mechanics							**Type:**	Required
Number of Credit:	4	**Section:**	05	**Semester:**		Fall	**Year:**	2007		**Number of students:**	18
Course Catalog Description	Concepts and definitions. Fluid statics. Forces on submerged surfaces and bodies. Non–viscous flow, Conservation of mass, momentum and energy equations. Bernoulli's equation. Dimensional analysis, the Pi–theorem, and similarity. Pipe flow, Losses in conduit flow. Laminar and turbulent flow										
Prerequisite:	Math. 102E General Mathematics II, Phys. 101E Physics I										
Textbook:	**Authors:**	By: Yunus A. Cengel and John M. Cimbala		**Name:**	Fluid Mechanics, Fundamentals and Applications						
	Publisher:	McGraw-Hill	**Edition:**	Intl Ed.	**Place:**	NY	**Year:**	2006	**ISBN:**	0071115668	
Other Required Materials:	Lab manuals are purchased at College Copy Shop										

Course Topics [Supported CLO's][Supported PO's]	
T1:Introduction and Basic Concepts[CLO_1, CLO_2][a, b, g, k]	
T2:Properties of Fluids[CLO_3 , CLO_4][a, b, g, k, l]	
T3:Pressure and Fluid Statics[CLO_5 , CLO_6, CLO_7][a, b, e, g, l]	
T4:Fluid Kiematics[CLO_8][a, e]	
T5:Mass, bernoulli, and Energy Equations[CLO_9 , CLO_10, CLO_11, CLO_12][a, b, e, g]	
T6:Momentum Analysis of Flow Systems[CLO_13][a, b, e, g]	
T7:Dimensional Analysis and Modeling[CLO_14, CLO_15][a, e, k]	
T8:Flow in Pipes[CLO_16][a, b, e, g, k]	

Supp.Program Outcomes (Ave.Rel:Repitition): a(3.0:16), b(3.0:6), e(3.0:10), g(1.8:6), k(3.0:4), l(3.0:2)

Performance Target for Course Learning Objectives Assessment:				**Contribution of course:**					**Class/Laboratory Schedule:**		**Lecture:**	**Lab:**
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:		2	1
At least score:		No. of students, %:		Engineering Sciences:	100	%	4.0	hrs.	Duration of each session, min.:		75	120
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	0	%	0.0	hrs.	**Instructor name:**	Dr. Abdullatif Gari		

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**03/02/2008**

COURSE SYLLABUS (Course Learning Objectives)		**MEP290_05_Fall_2007**	**Page - 2**
CLO_1	Identify the basic properties of fluids and the various types of fluid flow configurations encountered in practice.		
CLO_2	Recognize the importance and application of dimensions, units and dimensional homogeneity in engineering calculations.		
CLO_3	Compute the viscous forces in various engineering applications as fluids deform due to the no-slip condition.		
CLO_4	Discuss the various effects of surface tension, e.g. pressure difference and capillary rise.		
CLO_5	Determine the variation of pressure in a fluid at rest.		
CLO_6	Calculate the forces exerted by a fluid at rest on plane or curved submerged surfaces.		
CLO_7	Compute the effect of buoyancy on submerged bodies.		
CLO_8	Identify the various types of flow and plot the velocity and acceleration vectors.		
CLO_9	Apply the mass conservation equation in a flow system.		
CLO_10	Utilize the Bernoulli equation to solve fluid flow problems and recognize its limitation.		
CLO_11	Utilize the energy equation to determine turbine power output and pumping power requirements.		
CLO_12	Incorporate the energy conversion efficiencies in the energy equation.		
CLO_13	Determine the various kinds of forces and moments acting on a fluid flow field.		
CLO_14	Apply the method of repeating variables to identify non–dimensional parameters.		
CLO_15	Understand the concept of dynamic similarity and how to apply it to experimental modeling.		
CLO_16	Calculate the major and minor losses associated with pipe flow system and determine the pumping power requirements.		

COURSE SYLLABUS								MEP360_02_Fall_2007		Page - 1
Code:	MEP360	**Name:**	Heat Transfer					**Type:**	Required	
Number of Credit:		4	**Section:**	02	**Semester:**	Fall	**Year:**	2007	**Number of students:**	20
Course Catalog Description	General Conduction equations, composite walls and cylinders. Heat generation. Heat transfer from extended surfaces. Transient and two-dimensional analysis. Convection heat transfer, forced external and internal convection heat transfer. Natural convection. Radiation heat transfer, emission and heat exchange between surfaces. Black and gray bodies. View factors and enclosures									
Prerequisite:	MEP 261 Thermodynamics I, MEP 290 Fluid Mechanics									

Textbook:								
Authors:	Incropera/DeWitt/Bergmann/Lavine			**Name:**	Fundamentals of heat and mass transfer			
Publisher:	John Wiley & Sons	**Edition:**	6th Ed.	**Place:**	NY	**Year:**	2006	**ISBN:** 0

Other Required Materials:	Lab manuals are purchased at College Copy Shop

Course Topics [Supported CLO's][Supported PO's]	
T1:Introduction[1, 2][a, e]	
T2:Introduction to conduction[3, 4][a, e, m]	
T3:Steady 1-D conduction[5, 6][a, e, m, n]	
T4:Two-D computational conduction analysis[7][a, e, m]	
T5:Transient conduction heat transfer analysis[8, 9][a, e]	
T6:Introduction to convection heat transfer[10, 11][a]	
T7:Forced convection heat transfer analysis for external flows[12][a, e]	
T8:Forced convection heat transfer analysis for internal flows[13][a, e]	
T9:Natural convection[14, 15][a, e]	
T10:Thermal radiation[16, 17][a, e]	
T11:Radiation exchange between surfaces[18][a, e]	

Supp.Program Outcomes (Ave.Rel:Repitition):	a(3.0:18), b(2.0:1), e(2.9:14), g(2.0:1), m(2.0:4), n(2.0:2)

Performance Target for Course Learning Objectives Assessment:				**Contribution of course:**					**Class/Laboratory Schedule:**		**Lecture:**	**Lab:**
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:		2	1
At least score:		No. of students, %:		Engineering Sciences:	100	%	4.0	hrs.	Duration of each session, min.:		80	120
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	0	%	0.0	hrs.	**Instructor name:**	Dr. Abdullah Turki		

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**03/02/2008**

COURSE SYLLABUS (Course Learning Objectives)		**MEP360_02_Fall_2007**	**Page - 2**
CLO_1	students will be able to identify the different modes of heat transfer mechanisms.		
CLO_2	students will be able to recall the energy balance equation.		
CLO_3	Students will be able to define heat conduction..		
CLO_4	Students will be able to describe the heat diffusion equation for conduction problems and list its boundary conditions.		
CLO_5	Students will be able to derive heat diffusion equation for steady 1-D conduction.		
CLO_6	Students will be able to solve steady 1-D basic heat conduction problems (plane walls, cylinders, spheres, composite walls, conduction with internal heat generation and extended surfaces).		
CLO_7	Students will be able to apply finite difference methods to solve steady state 2-D heat basic conduction problems.		
CLO_8	Students will be able to define lumped systems and solve unsteady basic heat conduction problems using lumped analysis.		
CLO_9	Students will be able to solve unsteady 1-D basic heat conduction problems (plane walls, cylinders, spheres).		
CLO_10	Students will be able to define heat convection.		
CLO_11	Student will be able to describe velocity and thermal boundary layers.		
CLO_12	Students will be able to solve basic heat transfer problems involving forced convection over flat plates, circular cylinders, non-circular cylinders, spheres and over bank of tubes		
CLO_13	Students will be able to solve basic heat transfer problems involving forced convection inside circular and non-circular ducts.		
CLO_14	Students will be able to define natural convection.		
CLO_15	Students will be able to solve basic heat transfer problems involving natural convection over vertical plates, inclined plates, horizontal plates, vertical cylinders, horizontal cylinders and spheres.		
CLO_16	Students will be able to define thermal radiation, irradiation, radiosity, spectral and total hemispherical emmisivity, transmissivity, absorptivity, and reflectivity.		
CLO_17	Students will be able to define the black body and the gray body.		
CLO_18	Students will be able to calculate basic radiation heat transfer problems between gray surfaces.		
CLO_19	Students will be able to conduct and analyze experiments in heat transfer domain.		

COURSE SYLLABUS	**MEP361_01_Fall_2007**	**Page - 1**

Code:	MEP361	**Name:**	Thermodynamics II	**Type:**	Required
Number of Credit:	4	**Section:**	01	**Semester:**	Fall
Year:	2007	**Number of students:**	20		

Course Catalog Description	Irreversibility and availability(exergy), Thermodynamic relations, Mixtures and solutions, Chemical reactions and combustion, Phase and chemical equilibrium, Thermodynamics of high- speed gas flows
Prerequisite:	MEP 261 : Thermodynamics- I (4 :3,1); MEP 290 : Fluid Mechanics (4 :,3,1)

Textbook:								
Authors:	Cengel, Y. A., and Boles, M. A.,	**Name:**	Thermodynamics: An Engineering Approach					
Publisher:	McGraw-Hill	**Edition:**	6th Ed.	**Place:**	NY	**Year:**	2002	**ISBN:** 0071121773

Other Required Materials:	0

Course Topics [Supported CLO's][Supported PO's]

T1:Exergy[1][e]	
T2:Property relations[2][a, e, g]	
T3:Mixtures[3][c]	
T4:A/C Processes[4][c, g, k]	
T5:Chemical reactions and equilibrium[5][c, f, g, k]	
T6:High velocity gas flow[6][a, k]	

Supp.Program Outcomes (Ave.Rel:Repitition):	a(3.0:2), c(2.7:3), e(2.5:2), f(2.0:1), g(2.0:3), k(1.7:3)

Performance Target for Course Learning Objectives Assessment:				**Contribution of course:**				
				Math & Basic Sciences:	0	%	0.0	hrs.
At least score:		No. of students, %:		Engineering Sciences:	67	%	2.7	hrs.
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	33	%	1.3	hrs.

Class/Laboratory Schedule:	**Lecture:**	**Lab:**
Number of Sessions per week:	3	1
Duration of each session, min.:	50	120
Instructor name:	Dr. Samir Elsayed Aly	

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**05/02/2008**

COURSE SYLLABUS (Course Learning Objectives)		**MEP361_01_Fall_2007**	**Page - 2**
CLO_1	Student can apply such concept in the analysis of thermodynamic systems		
CLO_2	Student can identify, choose, and apply the proper property relation that works within the available data for the given process.		
CLO_3	Student can describe, identify the phase, determine the properties and apply thermodynamic laws to multi- components systems.		
CLO_4	Student can apply the conservation laws for various air-conditioning processes		
CLO_5	Student can apply thermodynamic laws on systems where various fuel aspects of fuel combustion processes are encountered.		
CLO_6	Student can define and describe the basic features for the compressible flow and can determine the expected property variations associated with high speed flows		

COURSE SYLLABUS					MEP365_01_Fall_2007	Page - 1
Code: MEP365	**Name:** Thermal Engineering Measurements				**Type:**	Required
Number of Credit: 3	**Section:** 01	**Semester:** Fall	**Year:** 2007		**Number of students:**	12

Course Catalog Description	Introductions on the use of computers on the Lab., Error analysis, Temperatur measurement, Pressure measurement, Flow measurement (Mass flow rate, velocity, flow visualization), Torque, Speed, Power Measuremen
Prerequisite:	MEP 261 Thermodynamics I, MEP 290 Fluid Mechanics

Textbook:	**Authors:**	1. R. S. Figliola and D. E. Beasley		**Name:**	Theory and Design of Measurements Systems			
	Publisher:	John Wiley & Sons	**Edition:** 4th Ed.	**Place:**	NY	**Year:** 2006	**ISBN:**	978-0-471-44593-7

Other Required Materials:	Lab manuals are purchased at College Copy center

Course Topics [Supported CLO's][Supported PO's]

T1:Basic systems of Measurements systems and sensors	
T2:Probability & statistics[CLO_2][a, b, c, n, o]	
T3:Error, uncertainty analysis and presentation of	
T4:Temperature measurements[CLO_5 , CLO_6][a, b, e, k, o]	
T5:Technical report writing[CLO_13][a, b, c, e, k, o]	
T6:Pressure measurements[CLO_7 , CLO_8][a, b, c, e, k, o]	
T7:Flow measurements[CLO_9 , CLO_10][a, b, e, i, k, o]	
T8:Force, Torque, Speed, & Power Measurements[CLO_11][a, e, k, o]	
T9:Introduction to Data Acquisition Systems[CLO_12][a, i, k]	

Supp.Program Outcomes (Ave.Rel:Repitition): a(2.1:12), b(1.8:5), c(1.5:4), e(2.1:10), f(1.0:1), h(1.0:1), i(1.7:3), k(1.8:8), n(2.0:1), o(1.6:10)

Performance Target for Course Learning Objectives Assessment:				**Contribution of course:**					**Class/Laboratory Schedule:**	**Lecture:**	**Lab:**
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:	3	1
At least score:		No. of students, %:		Engineering Sciences:	67	%	2.0	hrs.	Duration of each session, min.:	50	120
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	33	%	1.0	hrs.	**Instructor name:**	Prof. Omar Al-Rabghi	

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**17/03/2008**

COURSE SYLLABUS (Course Learning Objectives)		**MEP365_01_Fall_2007**	**Page - 2**
CLO_1	explain general measurement system, calibration and standards		
CLO_2	apply statistical analysis, regression analysis and data reduction techniques on a given data set		
CLO_3	apply uncertainty analysis on a measurement system		
CLO_4	calculate the uncertainty due to error propagation		
CLO_5	Describe temperature measurements techniques as well as to explain their physical principals		
CLO_6	Conduct calibration experiments of thermocouple, RTD and thermistor, as well as to analyze and interpret data,		
CLO_7	Describe pressure measurements techniques as well as to explain their physical principals		
CLO_8	Conduct experiment related with pressure measurement,		
CLO_9	Describe flow measurements techniques as well as to explain their physical principals.		
CLO_10	Conduct an experiment related with calibration of flow measuring devices		
CLO_11	Describe force, torque and power measurements techniques as well as to explain their physical principals		
CLO_12	Describe data acquisition system (both plug-in and stand alone types), Hand out + lab. visit		
CLO_13	Apply technical report writing skills when preparing lab reports		

<table>
<tr><th colspan="3">COURSE SYLLABUS</th><th>MEP370_01_Fall_2007</th><th>Page - 1</th></tr>
<tr><td>Code: MEP370</td><td colspan="2">Name: Internal Combustion Engines</td><td colspan="2">Type: Required</td></tr>
<tr><td>Number of Credit: 4</td><td>Section: 01</td><td>Semester: Fall   Year: 2007</td><td>Number of students:</td><td>24</td></tr>
<tr><td>Course Catalog Description</td><td colspan="4">Spark ignition and compression ignition engine types, design and operating parameters; thermo chemistry of fuel-air mixture and thermodynamic models of working fluids and engine cycles. Gas exchange processes and volumetric efficiency. Carburetors and electronic fuel injection. Performance parameters. Combustion chamber design and octane number. Diesel fuel injection, supercharging of 4-stroke and 2-stroke S.I. and C.I. engines.</td></tr>
<tr><td>Prerequisite:</td><td colspan="4">Math. 102E General Mathematics II, Phys. 101E Physics I</td></tr>
<tr><td rowspan="2">Textbook:</td><td colspan="2">Authors: J. B. Heywood</td><td colspan="2">Name: Fundamentals of Internal Combustion Engines</td></tr>
<tr><td>Publisher: McGraw-Hill</td><td>Edition: Intl. Ed.</td><td>Place: NY   Year: 1988</td><td>ISBN: 0071115668</td></tr>
<tr><td>Other Required Materials:</td><td colspan="4">Lab manuals are purchased at College Copy Shop</td></tr>
<tr><th colspan="5">Course Topics [Supported CLO's][Supported PO's]</th></tr>
<tr><td colspan="3">T1: Introduction, Engine Types and their Operation [1, 2][a, e, k]</td><td colspan="2"></td></tr>
<tr><td colspan="3">T2:Engine Design and Operating Parameters[3, 4, 5][a, b, e, l]</td><td colspan="2"></td></tr>
<tr><td colspan="3">T3:Thermo-chemistry of Fuel-Air Mixture[6, 7][a, l, m]</td><td colspan="2"></td></tr>
<tr><td colspan="3">T4:Properties of Working Fluids[8][a, b, e]</td><td colspan="2"></td></tr>
<tr><td colspan="3">T5:Ideal Models of Engine Cycles[9, 10, 11, 12][a, b, e]</td><td colspan="2"></td></tr>
<tr><td colspan="3">T6:Gas Exchange process[13, 14, 15, 16][a, c, e, k]</td><td colspan="2"></td></tr>
<tr><td colspan="3">T7:SI Engine Fuel Metering & Manifold Phenomena[17][a, c, k]</td><td colspan="2"></td></tr>
<tr><td colspan="3">T8:Engine Operating Characteristics[18, 19, 20, 21, 22, 23, 24, 25][a, b, c, d, e, k]</td><td colspan="2"></td></tr>
<tr><td colspan="3"></td><td colspan="2"></td></tr>
<tr><td colspan="3"></td><td colspan="2"></td></tr>
<tr><td colspan="3"></td><td colspan="2"></td></tr>
<tr><td colspan="2">Supp.Program Outcomes (Ave.Rel:Repitition):</td><td colspan="3">a(1.8:25), b(2.0:5), c(1.0:5), d(2.0:2), e(1.7:9), k(1.8:5), l(2.0:3), m(1.0:1)</td></tr>
</table>

<table>
<tr><th colspan="4" rowspan="2">Performance Target for Course Learning Objectives Assessment:</th><th colspan="5">Contribution of course:</th><th colspan="2">Class/Laboratory Schedule:</th><th>Lecture:</th><th>Lab:</th></tr>
<tr><td>Math & Basic Sciences:</td><td>0</td><td>%</td><td>0.0</td><td>hrs.</td><td colspan="2">Number of Sessions per week:</td><td>3</td><td>1</td></tr>
<tr><td colspan="2">At least score:</td><td colspan="2">No. of students, %:</td><td>Engineering Sciences:</td><td>67</td><td>%</td><td>2.7</td><td>hrs.</td><td colspan="2">Duration of each session, min.:</td><td>50</td><td>120</td></tr>
<tr><td>Direct, %</td><td>InDirect(1-5)</td><td>Direct</td><td>InDirect</td><td>Engineering Design:</td><td>33</td><td>%</td><td>1.3</td><td>hrs.</td><td>Instructor name:</td><td colspan="3">Dr. Nazrul Islam Abdulhafiz</td></tr>
</table>

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**06/02/2008**

COURSE SYLLABUS (Course Learning Objectives)		**MEP370_01_Fall_2007**	**Page - 2**
CLO_1	ability to classify power machines by their basic operational principles and general design features		
CLO_2	ability to recognize and define basic elements and subsystems of an IC Engine with their functions		
CLO_3	ability to recognize and define operational modes of a piston-piston rod-crank mechanism, some related parameters such as compression ratio, some volumes, TC, BC etc. and carry out basic mathematical analysis.		
CLO_4	ability to know the meaning and significance of some parameters which are very important in determining performance of an engine		
CLO_5	ability to calculate power and efficiencies of an engine with different input values available and to see the effect of these parameters and also some minor design considerations on engine performance.		
CLO_6	able to carry out some elementary analysis on combustion chemistry and associated effect on engine performance through the combustion efficiency		
CLO_7	able to recognize fuel types and distinguish their typical effects on engine performance		
CLO_8	able to know about different models of thermodynamic properties and also be able to read these properties from thermodynamic charts for unburned and burned gas.		
CLO_9	able to calculate performance of ideal thermodynamic cycles and compare them		
CLO_10	able to realize the importance of cycle approximations as engineering approaches, assumptions included and their effect on the performance calculation		
CLO_11	able to realize elements of an actual cycle and difference between it and ideal and approximated cycles.		
CLO_12	able to recognize and define important points of a real cycle process and also to get some knowledge about how a good engine performance is achieved by design and adjustment		
CLO_13	able to describe effect of atmospheric and operational conditions and design properties on volumetric efficiency of a 4-stroke engine and on scavenging parameters of a 2-stroke engine		
CLO_14	able to analyze and compare effect of varying conditions on engine performance via volumetric efficiency.		
CLO_15	able to recognize and distinguish between supercharging systems and their performance, and effect of supercharging on engine performance.		
CLO_16	able to carry out elementary calculations on turbochargers and contribution of them on engine performance.		
CLO_17	able to know about SI engine mixture requirements, compare and distinguish between the different fuel metering systems and their effect on engine performance and also some exposure of fuel-injection systems.		
CLO_18	able to demonstrate engine characteristics (torque, power and sfc) against speed and make general comments about them		
CLO_19	able to describe the most important combustion concepts and problems in concern with SI engines and CI engines.		
CLO_20	able to analyze effect of combustion chamber design features and other engine parameters on the SI engine performance and detonation and also on the CI engine performance and diesel knock.		
CLO_21	able to define two-stroke engine design features and their differences from four-stroke ones.		
CLO_22	able to carry out two-stroke engine performance calculations.		
CLO_23	able to recognize main and supplementary elements of SI and CI engines and define operational principles.		
CLO_24	able to analyze energy distribution in an internal combustion engine		

CLO_25	able to test an engine under laboratory conditions, collect data in a suitable way, calculate engine characteristics and determine the energy distribution.

COURSE SYLLABUS									MEP390_01_Fall_2007		Page - 1
Code:	MEP390	**Name:**	Summer Training						**Type:**	Required	
Number of Credit:		2	**Section:**	01	**Semester:**	Fall	**Year:**	2007	**Number of students:**		24
Course Catalog Description	Training in the industry under the supervision of a staff member. Students have to submit a report about their acheivements during the training in addition to any other requirements as assigned by the department.										
Prerequisite:	Completion of 120 credit hours of course work										
Textbook:	**Authors:**	0			**Name:**	0					
	Publisher:	0	**Edition:**	0	**Place:**	0	**Year:**	0	**ISBN:**	0	
Other Required Materials:	None										

Course Topics [Supported CLO's][Supported PO's]

T1:To enhance the student’s engineering skills experience and provide exposure to real life engineering professional practices before graduation[1, 2, 3, 4, 5, 6, 7][f, h, j, o]

T2:Application of communication skills[8, 9][g]

Supp.Program Outcomes (Ave.Rel:Repitition): f(2.3:3), g(3.0:2), h(3.0:2), j(3.0:1), o(2.0:1)

Performance Target for Course Learning Objectives Assessment:				Contribution of course:					Class/Laboratory Schedule:		Lecture:	Lab:
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:		5	0
At least score:		No. of students, %:		Engineering Sciences:	100	%	2.0	hrs.	Duration of each session, min.:		480	0
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	0	%	0.0	hrs.	**Instructor name:**	Dr. Mansoor Siddique		

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**18/02/2008**

COURSE SYLLABUS (Course Learning Objectives)		**MEP390_01_Fall_2007**	**Page - 2**
CLO_1	Students will be abe to identify corporate organizational and administrative structure		
CLO_2	Students will be able to recognize the value of work, time, and teamwork		
CLO_3	Students will be able to describe professional attitudes and practices		
CLO_4	Students will be able to relate the impact of engineering solutions on society		
CLO_5	Students will able to discuss contemporary issues		
CLO_6	Students will be able to discuss the interrelation between theories studied and real engineering examples		
CLO_7	Students will be able to describe professional experiences of working both in the thermal and mechanical systems areas		
CLO_8	Student will be able to apply technical report writing skills		
CLO_9	Students will be able to apply oral and visual presentations skills		

COURSE SYLLABUS								MEP451_01_Fall_2007	Page - 1
Code:	MEP451	**Name:**	Refrigeration & Air Conditioing I					**Type:**	Required
Number of Credit:	3	**Section:**	01	**Semester:**	Fall	**Year:**	2007	**Number of students:**	16
Course Catalog Description	Review of basic thermodynamics, vapor compression cycles, multistage and cascade vapor compression refrigeration. Refrigerants and their charachterstics. Basic vapor compression equipment. Introduction to								
Prerequisite:	MEP 261 Thermodynamics I, MEP 360 Heat transfer								
Textbook:	**Authors:**	Mcquiston, Parker and Spitler		**Name:**	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								

Course Topics [Supported CLO's][Supported PO's]

T1:Review of English and SI units.[1][a, o]	
T2:Review of basic vapor compression refrigeration	
T3:Air conditioning systems (All air, All water	
T4:Psychrometery and psychrometric processes. Give	
T5:Solar angles and Solar heat gain[6, 7][a, e, o]	
T6:Thermal Comfort and Indoor Air Quality (IAQ)[8, 9][f, h, o]	
T7:Cooling Load Calculations[10, 11][c, i, k, o]	
T8:Refrigerants[12][g, j, o]	
T9:Deviation from ideal vapor compression cycle	
T10:Vapor compression refrigeration equipment	
T11:Absorption refrigeration cycle[17][o]	

Supp.Program Outcomes (Ave.Rel:Repitition): a(2.0:4), b(2.3:4), c(2.0:4), e(2.6:8), f(1.0:2), g(1.8:5), h(1.0:2), i(1.3:3), j(2.0:1), k(2.0:5), o(1.9:18)

Performance Target for Course Learning Objectives Assessment:				Contribution of course:					Class/Laboratory Schedule:	Lecture:	Lab:
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:	3	1
At least score:		No. of students, %:		Engineering Sciences:	67	%	2.0	hrs.	Duration of each session, min.:	50	120
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	33	%	1.0	hrs.	**Instructor name:**	Prof. Omar Al-Rabghi	

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**20/02/2008**

COURSE SYLLABUS (Course Learning Objectives)		**MEP451_01_Fall_2007**	**Page - 2**
CLO_1	Be able to convert from SI system of units to English units and vise versa for parameters related to refrigeration & air conditioning		
CLO_2	Be able to solve and analyze basic vapor compression refrigeration cycle.		
CLO_3	Draw the basic refrigeration cycle on T-s & P-h diagrams		
CLO_4	Define, distinguish and sketch different Air Conditioning (AC) systems		
CLO_5	Be able to use psychrometric chart, analyze simple Air conditioning processes and basic AC cycles		
CLO_6	Be able to define solar angles, and be able to estimate incident solar radiation intensity on a surface.		
CLO_7	Be able to calculate heat gain due to sunlit and shaded windows		
CLO_8	Be able to list factors affecting thermal comfort in air conditioning zones.		
CLO_9	Be able to use ASHRAE comfort chart, be able to calculate the required outdoor (fresh) quantity for an application		
CLO_10	Be able to calculate cooling load due to external loads for a building using the RTS method.		
CLO_11	Be able to calculate cooling load due to internal loads for a building using the RTS method		
CLO_12	Identify types of refrigerants, their numbering system and safety groups.		
CLO_13	Analyze non-ideal vapor compression refrigeration cycles, and draw them on T-s and P-h diagrams		
CLO_14	Identify different multi-stage arrangements and be able to compute the coefficient of performance for each. In addition to been able to draw T-s and P-h diagrams for such systems.		
CLO_15	Ability to solve refrigeration cycle problems using computer program such as EES (Engineering Equation Solver)		
CLO_16	List different types of compressors, condensers, control valves and evaporators.		
	Identify and solve simple single stage H2O- absorption refrigeration cycle		

COURSE SYLLABUS	MEP460_01_Fall_2007	Page - 1

Code:	MEP460	**Name:**	Applied Heat Transfer					**Type:**	Required	
Number of Credit:		3	**Section:**	01	**Semester:**	Fall	**Year:**	2007	**Number of students:**	16

Course Catalog Description	Heat exchanger classifications, Heat transmission and fluid flow. Thermal analysis of heat exchangers. Gas to gas heat exchangers. Gas to liquid heat exchangers. Liquid to liquid heat exchangers. Boiling and condensation heat transfer. Condensers and cooling towers.Applications of heat exchangers.
Prerequisite:	MEP 360

Textbook:	**Authors:**	Incropera F. P. and Dewitt D. P.		**Name:**	Fundamentals of Heat and Mass Transfer			
	Publisher:	John Wiley & Sons	**Edition:** 5th Ed.	**Place:**	NY	**Year:** 2002	**ISBN:**	978-0-471-45728-2

Other Required Materials:	2. Analysis and Design of Energy Systems, Hodge B. K. and Taylor R. P., 3rd edition, Prentice Hall 1999 3. Heat Exchangers Selection, Rating and Thermal Design, Kakac S. and Liu H., 2nd edition, CRC Press 2002 4. Handouts from references and Lab manuals are purchased at College Copy Shop .

Course Topics [Supported CLO's][Supported PO's]

T1:Review of engineering thermodynamics, heat transfer and fluid mechanics principles.[CLO_1][a, e]

T2:Classification of different types of heat exchangers[CLO_2][a, c]

T3:The LMTD and effectiveness e-NTU method for heat exchanger sizing and analysis (Type-I & Type II problems).[CLO_3 , CLO_4][a, c, e]

T4:The thermal sizing & rating of shell and tube (STHX) heat exchangers.[CLO_5 , CLO_6][a, c, e]

T5:The thermal rating of simple cross flow heat exchangers (CFHX).[CLO_7][a, e]

T6:The thermal rating of compact heat exchangers, for both gas-liquid and gas-gas service.[CLO_8][a, e]

T7:Boiling and condensation heat transfer[CLO_9 , CLO_10][a, c, e]

T8:Developing Communication skills[CLO_11][g]

T9:Heat transfer experiments[CLO_12][a, b]

Supp.Program Outcomes (Ave.Rel:Repitition): a(3.0:11), b(2.0:1), c(2.8:5), e(2.9:9), g(3.0:1)

Performance Target for Course Learning Objectives Assessment:				**Contribution of course:**					**Class/Laboratory Schedule:**	**Lecture:**	**Lab:**
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:	2	1
At least score:		No. of students, %:		Engineering Sciences:	50	%	1.5	hrs.	Duration of each session, min.:	80	80
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	50	%	1.5	hrs.	**Instructor name:**	Dr. Mansoor Siddique	

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**18/02/2008**

COURSE SYLLABUS (Course Learning Objectives)		**MEP460_01_Fall_2007**	**Page - 2**
CLO_1	Students will be able to conduct energy balances & choose the appropriate Nu # and f factor correlations.		
CLO_2	Students will be able to discribe common heat exchanger types, their applications and TEMA classifications		
CLO_3	Students will be able to calculate the overall heat transfer coefficient for plain, finned and fouled surfaces.		
CLO_4	Students will be able to apply the LMTD and e-NTU methods for sizing & rating of different types of heat exchangers.		
CLO_5	Students will be able to size and rate double pipe heat exchangers		
CLO_6	Students will be able to apply Kern's Method for sizing shell and tube heat exchangers.		
CLO_7	Students will be able to rate simple CFHX.		
CLO_8	Students will be able to rate compact heat exchangers.		
CLO_9	Students will be able to describe the physical mechanism of different boiling and condensation modes and working of cooling towers		
CLO_10	Students will be able to choose & apply the appropriate (pool or flow & critical heat flux) boiling & condensation heat transfer correlations.		
CLO_11	Students will be able to apply communication skills		
CLO_12	Students will be able to conduct and analyse heat transfer experiments		

COURSE SYLLABUS										**MEP473_01_Spring_2007**	**Page - 1**
Code:	MEP473	**Name:**	POWER PLANTS							**Type:**	Required
Number of Credit:	3	**Section:**	01	**Semester:**	Spring	**Year:**	2007			**Number of students:**	29
Course Catalog Description	Energy demand and power generation systems. Steam and gas power cycles. Fuels and combustion. Basic and auxiliary systems of a steam p.p. Steam generator analysis. Steam turbines and their controls. Diesel engine and gas turbine power plants. Overall plant performance. Economics of power plants.										
Prerequisite:	MEP 360, MEP 361										
Textbook:	**Authors:**	P.,K.,Nag		**Name:**	Power Plant Engineering						
	Publisher:	McGraw Hill	**Edition:**	0	**Place:**	0	**Year:**	1998	**ISBN:**	978-0074632918	
Other Required Materials:	0										

Course Topics [Supported CLO's][Supported PO's]

T1:Energy generation methods and the global energy situation [1][a, d, e, f, h, j, n]	T13:Direct contact and surface cond. Cooling towers[13][a, d, e, l]
T2:Forecasting, Load and load duration curves[2, 3, 4][a, e, h, k]	T14:Describe and explain the different plant systems [14, 15][a, c, d, e, i, l]
T3:Power plant economics[4, 5, 6][a, c, e, k]	T15:Incorporate and abbreviate the interrelation between different systems and plant performance. Pollution issues[15][a, c, d, e, i, l]
T4:Mass and energy balance of steam power plants[4, 5][a, c, e, k]	
T5:analysis of steam cycle components and the integrated cycle[5][a, c]	
T6:Fuels, combustion calculations, specific fuel consumption [6, 7][a]	
T7:Combustion calculations[7][a]	
T8:Parametric effect of fuels on plant performance[7, 8][a, l]	
T9:Steam generators, Types, components[9][a, c]	
T10:Water tube boiler components [10][a, c, d, e, l, m]	
T11:Steam flow through nozzles[11][c, d]	

Supp.Program Outcomes (Ave.Rel:Repitition): a(3.0:13), c(2.3:6), d(2.9:7), e(2.8:8), f(3.0:1), h(2.7:3), i(3.0:1), j(3.0:1), k(2.0:2), l(3.0:6), m(2.0:1), n(2.0:1)

Performance Target for Course Learning Objectives Assessment:				**Contribution of course:**					**Class/Laboratory Schedule:**		**Lecture:**	**Lab:**
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:		3	1
At least score:		No. of students, %:		Engineering Sciences:	60	%	1.8	hrs.	Duration of each session, min.:		50	80
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	40	%	1.2	hrs.	**Instructor name:**	Dr. Galal Zaki		

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**18/02/2007**

COURSE SYLLABUS (Course Learning Objectives)		**MEP473_01_Spring_2007**	**Page - 2**
CLO_1	Provide the students with understanding to appraise the different energy generation methods and the global energy situation (consumption, availability and contemporary issues)		
CLO_2	Ability to apply forecating and interprete the load curves variations and power network.		
CLO_3	Appreciate energy economic calculations.		
CLO_4	apply the basic thermodynamics and fluid flow principles to perform		
CLO_5	analysis of steam power components and the integrated cycle.		
CLO_6	Distinguish between types of fuels,		
CLO_7	Perform combustion calculations for boiler furnaces		
CLO_8	Explain the parametric effect on plant performance.		
CLO_9	Identify the different types of steam generators and the function of the components.		
CLO_10	Design, water tube boiler components (furnace, water walls, S/H, A/H and economizer) Use of software is allowed, Power point presentation is required		
CLO_11	Compare the performance of different turbine stages.		
CLO_12	Design calculations of a single stage (if time allows)		
CLO_13	Describe the purpose, construction and operation of different condensers and cooling towers. Solve Thermal calculations		
CLO_14	Describe and explain the different plant systems (air, exhaust, fuel, starting,		
CLO_15	Incorporate and interpret the interrelation between different systems and plant performance. Pollution issues		

COURSE SYLLABUS								MEP474_01_Spring_2007	Page - 1
Code:	MEP474	**Name:**	Turbo-machinery ang Gas Turbines					**Type:**	Required
Number of Credit:	3	**Section:**	01	**Semester:**	Spring	**Year:**	2007	**Number of students:**	16
Course Catalog Description	Fluid mechanics and energy transfer in turbo machines. Centrifugal and axial compressors. Centrifugal and axial flow turbines. Applications including industrial gas turbine engines and aircraft engines.								
Prerequisite:	MEP 360 Heat Transfer , MEP 361: Thermodynamics II								

Textbook:									
Authors:	Saravanamuttoo, G. Rogers, H. Cohen		**Name:**	Gas Turbine Theory					
Publisher:	Prentice Hall	**Edition:**	5th	**Place:**	0	**Year:**	2001	**ISBN:**	978-0130158475
Other Required Materials:	0								

Course Topics [Supported CLO's][Supported PO's]

T1:INTRODUCTION[1, 2][a, e, f, h, j]	
T2:SHAFT POWER CYCLES[3, 4, 5, 6][a, c, d, e, f, g, h]	
T3:Gas Turbine for Air Craft Propulsion[7, 8, 9][a, c, d, e, f, g]	
T4:Centrifugal Compressors[10, 11][a, c, d, e, f, g, o]	
T5:Axial Flow compressor[12, 13][a, c, d, e, f, g, o]	
T6:Combustion System[14, 15][a, c, e, h, j, l]	
T7:AXIAL FLOW TURBINES[16, 17][a, c, d, e, f, g, o]	

Supp.Program Outcomes (Ave.Rel:Repitition): a(2.4:14), c(3.0:11), d(3.0:6), e(3.0:16), f(2.8:6), g(3.0:6), h(2.0:3), j(2.0:2), l(2.0:1), o(3.0:3)

Performance Target for Course Learning Objectives Assessment:				**Contribution of course:**					**Class/Laboratory Schedule:**		**Lecture:**	**Lab:**
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:		3	1
At least score:		No. of students, %:		Engineering Sciences:	87	%	2.6	hrs.	Duration of each session, min.:		50	80
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	13	%	0.4	hrs.	**Instructor name:**	Dr. Majed AlHazmy		

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**18/02/2007**

COURSE SYLLABUS (Course Learning Objectives)		**MEP474_01_Spring_2007**	**Page - 2**
CLO_1	Recognize the different gas turbine arrangements, their advantages and disadvantages and different applications application.		
CLO_2	Realizing the relation between gas turbine design, application and environment.		
CLO_3	Applying the basic thermodynamic and heat transfer principles in performance calculation of industrial gas turbines.		
CLO_4	Recognizing the differences of a real cycle (from the theoretical ones)		
CLO_5	Carry out performance calculations of real GT systems		
CLO_6	Examine the effect of various design parameters on the GT performance (pressure ratio, temperature ratio, pressure drop, polytropic efficiency ..etc).		
CLO_7	Recognize the differences between A/C engines and Power GT (components and operation conditions)		
CLO_8	Identifying different A/C engine configurations		
CLO_9	Carry performance calculations of different A/C engines configuration.		
CLO_10	Identify the characteristics the centrifugal compressors and their applications.		
CLO_11	Carry out full Design and performance calculations of centrifugal compressors.		
CLO_12	Identify the characteristics the axial flow compressors and their applications.		
CLO_13	Carry out full Design and performance calculations of axial flow compressors.		
CLO_14	Identify different types of combustion systems and their method of operation		
CLO_15	Explain the different types of fuel and their environmental impact		
CLO_16	Identify the characteristics the radial flow and axial flow turbines and their applications.		
CLO_17	Carry out full Design and performance calculations of axial flow turbines		

COURSE SYLLABUS								MEP481_01_Fall_2007		Page - 1
Code:	MEP481	**Name:**	Thermal Desalination Processes					**Type:**	Compulsary	
Number of Credit:		3	**Section:**	01	**Semester:**	Fall	**Year:**	2007	**Number of students:**	31

Course Catalog Description	Phase Rule and Equilibria, Thermodynamics and Colligative Properties, Scales and Chemical Treatment, Multi-Effect Desalination Systems, Multi Stage Flash Desalination Systems, Mechanical and Thermo-Vapor Compression Systems, Dual Purpose Plants.
Prerequisite:	MEP 360 Heat Transfer, MEP 361 Thermodynamics II,

Textbook:	**Authors:**	M.A. Darwish, A. El-Sayed, M. El-Sayed, S.E. Aly		**Name:**	Engineering Systems for Desalination				
	Publisher:	King AbduAlaziz Univ.	**Edition:** 1st Ed.	**Place:**	Jeddah	**Year:**	1995	**ISBN:**	000000
Other Required Materials:	Handout materials and Lecture notes								

Course Topics [Supported CLO's][Supported PO's]
T1:Introduction to Desalination - Water needs and resources, Desalination in KSA and the Gulf states[1][a, l]
T2:Chemical Thermodynamics and Colligative Properties of Saltwater Solutions, Scale Deposition and Prevention.[2, 3][a, l]
T3:Theory and Analyses of Single and Multiple Effects Submerged tube, Distillation (MED) Systems.[4][a, e, o]
T4:Theory and Analyses of Multiple Effect Vertical tube falling film evaporators Systems.[5][a, e, o]
T5:Theory and Analyses of single effect Vapor Compression Distillation (VCD) Systems.[6][a, e, o]
T6:Theory and Analyses of multieffects Vapor Compression Distillation (VCD) Systems.[6][a, e, o]
T7:Theory and Analyses of Single and Multi Stage once through Flash Distillation (MSF) systems[7][a, e, o]
T8:Theory and Analyses of Multi Stage recirculation Flash Distillation (MSF) systems[8][a, e, o]
T9:Dual Purpose Plant, thermal and economic analysis.[9, 10][a, e, o]
T10:Other related topics and desalination systems[11, 12, 13][d, f, g, i, j]

Supp.Program Outcomes (Ave.Rel:Repitition):	a(3.0:10), d(3.0:3), e(3.0:7), f(3.0:3), g(3.0:1), i(2.0:2), j(3.0:2), l(2.0:3), o(2.0:7)

Performance Target for Course Learning Objectives Assessment:				**Contribution of course:**					**Class/Laboratory Schedule:**		**Lecture:**	**Lab:**
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:		3	1
At least score:		No. of students, %:		Engineering Sciences:	67	%	2.0	hrs.	Duration of each session, min.:		50	120
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	33	%	1.0	hrs.	**Instructor name:**	Dr. Mohammad H. Albeirutty		

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**04/05/2008**

COURSE SYLLABUS (Course Learning Objectives)		**MEP481_01_Fall_2007**	**Page - 2**
CLO_1	Students will be able to distinguish between sea, brackish and tap water and recognize the need for water in KSA and the GCC states		
CLO_2	Students will be able to recognize Colligative Properties of Saltwater Solutions such as boiling point elevation, freezing point depression, and vapor pressure		
CLO_3	Students will be able to realize the importance of pretreatment and post-treatment processes in Desalination.		
CLO_4	Students will be able to analyze single and multi-effects submerged tube evaporators' desalination processes.		
CLO_5	Students will be able to analyze multi-effects falling film evaporators desalination processes.		
CLO_6	Students will be able to analyze single and multi-effects vapor compression distillation processes VCD.		
CLO_7	Students will be able to analyze single and multi-stage once-through desalination processes.		
CLO_8	Students will be able to analyze recirculated flash desalination processes, MSF.		
CLO_9	Students will be able to understand the economic advantages of building Dual Purpose Plants DPP.		
CLO_10	Students will be able to analyze DPP processes		
CLO_11	Student will be able to work in teams effectively		
CLO_12	Students will be able to conduct a scientific search on the internet on different related subjects not included in above topic		
CLO_13	Students will be able to write a formal report and present it orally in class and answer questions		

COURSE SYLLABUS									**MEP499_01_Fall_2007**	**Page - 1**
Code:	MEP499	**Name:**	Senior Project					**Type:**	Required	
Number of Credit:	4	**Section:**	01	**Semester:**	Fall	**Year:**	2007	**Number of students:**		13
Course Catalog Description	Selection of topic; literature review; project design planning arranging for data collection and experimental work, Interim report. Experimental work and data collection or field study (if any), data processing. Analysis and results. Preparation of the first draft of final report. Presentation of the project, Final report.									
Prerequisite:	Students must complete total of 120 credit hours courses.									
Textbook:	**Authors:**	Karagozoglu, Bahaddin		**Name:**	Guidelines For Writing XE499 Senior Project Reports					
	Publisher:	College Copyshop	**Edition:**	1st	**Place:**	0	**Year:**	2003	**ISBN:**	0
Other Required Materials:	A. Strategies for Creative Problem Solving by H. Scott Fogler and Steven E. LeBlanc,Prentice Hall,Inc. 1995									

Course Topics [Supported CLO's][Supported PO's]	
T1:Basis of thermodynamics and electro chemistry[1][a, e, l]	
T2:ED[2, 5, 7, 8, 9, 10, 11, 12][a, c, d, e, h, i, j, o]	
T3:RO[3, 4, 5, 6, 8, 9, 10, 11, 12][a, b, c, d, e, g, h, i, j, l, m, o]	
T4:Auxiliary systems of RO plants[9, 11][a, c, e, h, j, o]	

Supp.Program Outcomes (Ave.Rel:Repitition):	a(1.3:6), b(1.0:1), c(2.0:3), d(2.0:2), e(1.4:5), g(1.0:1), h(2.0:3), i(2.0:2), j(2.0:2), l(2.0:2), m(3.0:1), o(1.7:3)

Performance Target for Course Learning Objectives Assessment:				**Contribution of course:**					**Class/Laboratory Schedule:**		**Class:**	**Lab:**
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:		3	1
At least score:		No. of students, %:		Engineering Sciences:	0	%	0.0	hrs.	Duration of each session, min.:		50	110
Direct, %	InDirect(1-5)	Direct	InDirect	Engineering Design:	100	%	4.0	hrs.	**Instructor name:**	Dr. Nedim Turkmen		

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**	**14/06/2008**

COURSE SYLLABUS (Course Learning Objectives)		**MEP499_01_Fall_2007**	**Page - 2**
CLO_1	Ability to apply basis of thermodynamics and electrochemistry		
CLO_2	Ability to define membrane: Type, structure, prperties, charcterization, techniques of the preperation		
CLO_3	Ability to understand how membrane is prepared, how performance can be improved: type of material (AC, DAC, TAC), composition (polymer, solvent, additive organic) and applied treatment		
CLO_4	abilty to apply modelling approach of concentarion polarization: Film theory model, conservation equalton (mass and momentum.		
CLO_5	Abilty to ensure updating technology: Development of new generation of membrane (minerals, organics, hybrid material) and mebrane process (EO, MD, SLM)		
CLO_6	Abilty to define the RO desalination system and design RO unit based on operation parameters.		
CLO_7	Abilty to describe ED desalination processes and design ED unit based on operating parameters		
CLO_8	Abilty to select ED or RO module based on their performances and design		
CLO_9	Abilty to apply requirement pretreatment to RO and ED vs. feed water quality		
CLO_10	Capabilty to determine the field of each memebrane process: RO, UF, MF, NF, ED, MD…….		
CLO_11	Aptitude to apply energy balance in RO and ED		
CLO_12	Abilty to understand analogy between mass and heat transfer		

COURSE SYLLABUS								**MEP499_01_Fall_2007**	**Page - 1**
Code:	MEP499	**Name:**	Senior Project				**Type:**	Required	
Number of Credit:	4	**Section:**	01	**Semester:**	Fall	**Year:**	2007	**Number of students:**	13
Course Catalog Description	Selection of topic; literature review; project design planning arranging for data collection and experimental work, Interim report. Experimental work and data collection or field study (if any), data processing. Analysis and results. Preparation of the first draft of final report. Presentation of the project, Final report.								
Prerequisite:	Students must complete total of 120 credit hours courses.								
0	**Authors:**	Karagozoglu, Bahaddin		**Name:**	Guidelines For Writing XE499 Senior Project Reports				
	Publisher:	College Copyshop	**Edition:** 1st	**Place:**	0	**Year:**	2003	**ISBN:**	0
Other Required Materials:	A. Strategies for Creative Problem Solving by H. Scott Fogler and Steven E. LeBlanc,Prentice Hall,Inc. 1995								

Course Topics [Supported CLO's][Supported PO's]	
T1:Problem Definition[1, 2, 3, 4][a, c, e, i, j, l, m, n, o]	
T2:Idea Generation[5, 6, 7][c, e, j, o]	
T3:Deciding Course of Action[8][c, o]	
T4:Implementation[9, 10][a, b, c, e, f, h, i, j, k, o]	
T5:Evaluation[9, 10, 11, 12][a, b, c, d, e, f, g, h, i, j, k, o]	

Supp.Program Outcomes (Ave.Rel:Repitition): a(3.0:3), b(3.0:1), c(3.0:9), d(3.0:1), e(3.0:4), f(3.0:1), g(3.0:1), h(3.0:2), i(3.0:2), j(3.0:4), k(3.0:2), l(3.0:1), m(3.0:1), n(3.0:1), o(3.0:8)

Performance Target for Course Learning Objectives Assessment:				**Contribution of course:**					**Class/Laboratory Schedule:**	**Class:**	**Lab:**
				Math & Basic Sciences:	0	%	0.0	hrs.	Number of Sessions per week:	3	1
At least score:		No. of students, %:		Engineering Sciences:	0	%	0.0	hrs.	Duration of each session, min.:	50	110
Direct, %	0	Direct	InDirect	Engineering Design:	100	%	4.0	hrs.	**Instructor name:**	Dr. Nedim Turkmen	

60	3	100	100	General Education:	0	%	0.0	hrs.	**Date of preparation:**		**14/06/2008**
COURSE SYLLABUS (Course Learning Objectives)										**MEP499_01_Fall_2007**	**Page - 2**

CLO_1	Analyze a project statement, brief, or proposal to identify the real problem and the most relevant needs and operational constraints
CLO_2	Identify potential costumers, their needs, and their operational constraints
CLO_3	Collect and review related data such as technical information, regulations, standards, and operational experiences from credible literature resources
CLO_4	Integrate previous knowledge from mathematics, basic sciences, engineering fundamentals and discipline related courses to address the problem
CLO_5	Discuss all applicable realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
CLO_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
CLO_7	Generate possible solutions; compare alternatives, and select one alternative based on evaluation criteria and feasibility analysis
CLO_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
CLO_9	Implement a planned design strategy for an Experimental Design Project, if applicable
CLO_10	Implement a planned design strategy for a Product-Based Design Project, if applicable
CLO_11	Demonstrate ability to achieve project objectives while acting as an effective member of a multidisciplinary team
CLO_12	Communicate design details and express thoughts clearly and concisely, both orally and in writing, using necessary supporting material, to achieve desired understanding and impact