INDUSTRIAL ENGINEERING PROGRAM

COURSE SYLLABI

Core Courses

IE 201 Introduction to Engineering Design I (3: 3, 1)

Core Course

2008 Course (Catalog) Description:

Introduction to active learning: team work, 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.

Prerequisites:	ELC 101, ELC 102.
Text Book:	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

Class Schedule: *Concept:* Three 1 hour 50 minute sessions every two week
Laboratory: Three 1 hour 50 minute sessions every two week (alternating with Concept)

Course Objectives:

At the end of the course the students will be able to:

CLO_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
CLO_2:	practice elements of active learning as well as apply active learning techniques such as Engineering Journal, Facilitator Signal, Process Check,
CLO_3:	explain quality, costumer, expectations, and process as well as demonstrate the ability to meet customer expectations.
CLO_4:	develop team norms,
CLO_5:	use effective teams tools such as team agenda, minutes and team process check as well as team dynamics tools such as maintenance phase.
CLO_6:	use team discussion tools such as Boogle method, affinity process, deployment flowchart, multi-voting and prioritization techniques.
CLO_7:	explain problem solving strategies such as using heuristic, perceiving problems, potential problem, real problem, etc.
CLO_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.
CLO_9:	explain idea generation techniques such as Osborn's Checklist, random stimulation, fishbone diagram as well as apply them on semester project.
CLO_10:	explain situation analysis, problem analysis, decision analysis, potential problem analysis and apply these techniques on semester design project.
CLO_11:	explain planning components such as Gantt chart, deployment chart and critical path management and apply them on semester design project.
CLO_12:	explain ethical issues, safety considerations, and environmental, social and cultural impact and evaluate them on semester design project.
CLO_13:	Demonstrate the fundamentals of organizing and presenting technical work using modern engineering tools in their written and oral presentation.
CLO_14:	describe their chosen field of engineering as well as identify other fields of engineering.
CLO_15:	Explain stages of level of learning (LOL) and degree of internalization (DOL) and apply them on example.
CLO_16:	use organization techniques such as book keeping (Design Notebook), using checklist, etc.
CLO_17:	search and collect information and rearrange it for a given topic,

Topics Covered during the class:

• Learning Culture	(2 weeks)
• Quality	(2 weeks)
• Teaming	(2 week)
• Creative Problem Solving	(5 weeks)
• Engineering The Profession and Communication	(2 weeks)
• Autonomous Learner	(2 weeks)

Assessment Methods:
LG, C1-2, Q1-10, L1-6, L3a-e, In-Class *(For calculation of final grade. See the Course File)*
(LG)Lapse Grade, (Q)Quiz, (C) Concept Assignment, (L) Lab Assignment, (In-Class) Class activity evaluation

Laboratory: Student practices in the class on given projects.

Contribution of course to Meeting the ABET professional Component :

- ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science : 1 credit for 35%
Engineering Design : 2 credit for 65 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1						3			1				
2				1			1		3				
3			2										
4				2									
5				3			2						
6				3			2						
7					1								
8					2								
9					2								
10					2								
11					2								
12						2		3					
13							3		2		3		
14							1						
15									3				
16							2		2				
17							2		2				
Course contribution			*2*	*3*	*2*	*2*	*3*		*3*		*3*		

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared By: Nedim Turkmen Date: September 01, 2007

IE 202: Introduction to Engineering Design II (2: 2, 2)

Core Course

2008 Course (Catalog) Description:

Engineering design process. Computer modeling and heuristics for solving problems, in teams, in the areas of comparison of strategies, trade-offs, decision making, stochastic processes, optimization and expert systems. Interpretation of results. Preparation of professional technical reports of engineering work and multimedia presentation.

Prerequisite:	IE - 201
Textbook: (and/or other required materials)	How To Model It, Problem Solving for the Computer Age Anthony M. Starfield, Karl A. Smith, and Andrew L. Bleloch McGraw Hill © 1994 Class notes and handouts material by the instructor (downloadable from the course web site http://engg.kau.edu.sa/ie202
References:	

Course Learning Objectives

I. Apply Engineering Design Process:

1. ***Identify*** the most relevant needs (objectives) from an open ended problem.
2. ***Discover*** a solution strategy using a suitable heuristic.
3. ***Breakdown*** an open ended problem into its main elements (variables, constraints, parameters, etc.)
4. ***Develop*** alternative models by using basic mathematical, scientific and engineering knowledge.
5. ***Choose*** the best model, from those developed, using specified criteria.
6. ***Solve*** the model by a suitable computer software/tool and with an appropriate level of details.
7. ***Test*** the model and ***analyze*** the results to determine if they are sufficient.
8. ***Evaluate*** the solution and ***argue*** suitable improvements and changes.

II. Demonstrate Teamwork and Project Management:

9. ***Demonstrate*** work harmoniously and effectively in a team to solve open ended problems.
10. ***Demonstrate*** effective communication, ***resolve*** team conflicts, ***apply*** social team norms, ***prepare*** team rules, organize and delegate work as needed, and manage available resources.
11. ***Demonstrate*** time management for team meetings and to ensure that all tasks are completed and submitted on time.

III. Display Communication Skills:

12. ***Write*** high quality design reports and ***prepare*** professionally the required graphs and tables.
13. ***Plan***, ***prepare*** and ***deliver*** clear and correct oral presentations using professional visual aids.

IV. Develop Life Long Learning Attributes:

14. ***Collect*** information of a new content by asking key questions and by using a variety of sources such as internet, textbooks, etc.
15. ***Evaluate*** personal performance and progress as well as that of teammates using specific criteria.

Class/Lab Schedule:	The class meets twice a week, 110 minutes per class. The class is equipped with a complete multimedia and PC for each student to facilitate active cooperative learning.

Topics Covered During Class:

1.	Awareness of the first day materials	1	Week
2.	Developing a mathematical model by spreadsheet	1	Week
3.	Introduction to models (chapter 1)	1.5	Week
4.	Real world versus model world (chapter 2)	1.5	Week
5.	Lumping and Calibration (chapter 4)	1.5	Week
6.	Introduction to Stochastic models (chapter 5)	1.5	Week
7.	Decisions and Expert systems(chapter 10)	1.5	Week
8.	Course Project	2.5	Week
9.	Communication Skills (course celebration)	1	Week

Contribution of Course to Meeting the ABET professional Component:

ABET category content as estimated by faculty member who prepared this course description.

Engineering Science:	0.5 Credit or 25%
Engineering Design:	1.5 Credits or 75%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Learning Objectives	Program Outcomes												
	3a	3b	3c	3d	3e	3f	3g	3h	3i	3j	3k	3l	3m
			3	2	2		3		3		2		
1					1								
2					2								
3					2								
4			3										
5			3										
6											2		
7			2										
8			3										
9							3						
10				2									
11				2									
12							3				3		
13							3						
14									3				
15									3				

L : Skill Levels 1 or 2 in Bloom's Taxonomy **(Knowledge or Comprehension)**
M : Skill Levels 3 or 4 in Bloom's Taxonomy **(Application or Analysis)**
H : Skill Levels 5 or 6 in Bloom's Taxonomy **(Synthesis or Evaluation)**

Prepared by Prof. Mostafa Hamed **Last updated:** 01 February 2008

IE 255 Engineering Economy (3: 3, 1)

Core Course

2008 Course (Catalog) Description:

Fundamentals of engineering economy. Time value of money. Evaluation of alternatives. Replacement and retention analysis. Break even analysis. Depreciation methods. Basics of inflation.

Prerequisites: IE 201, Math 203, ELC 102

Text Book: ENGINEERING ECONOMY Leland Blank, P.E., and Anthony Tarquin, P.E., 6th Ed., 2005, McGraw-Hill ISBN 0-07-111558-7

References: Contemporary Engineering Economics, 4/E Chan S. Park, 2007, Prentice Hall, ISBN 0-13-187628-7

Principles Of Engineering Economic Analysis, 4/e, John A. White, Kenneth F. Case, David B. Pratt, and Marvin H. Agee, John Willey and sons 1998, ISBN 0-47-111027-2

Class Schedule: The class meets three times in a week. Two times are for regular sessions of 1 hour 20 minutes of lecture times and 2 hours of tutorial time.

Course Objectives:

At the end of the course the students will 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.
8. Understand and compute depreciations related to machines / projects using straight line (SL), Sum of Year Digits (SYD), Declining Balance (DB) and Double Declining Balance (DDB) method.
9. Understand and compute effects of inflation.
10. Write reports related to engineering economy by using modern engineering tools.

Topics Covered during the class:

• Foundation of Engineering Economy: Interest (simple & compound), cash flows, MARR, rate of return (ROR) & CFD	(2 weeks) (9 hours)
• Factors: How time and interest affect money, combining Factors: Single payment, Uniform Series, Arithmetic & Geometric Gradient, shifting of series, determination of unknown i & n, Interpolation	(3 weeks) (13.3 hours)
• Nominal And effective Interest Rates: Nominal and effective interest and equivalence relations involving Payment period and Compounding period	(1 week) (4.5 hours)
• Tools for the evaluation of alternatives: PW, FW, AW, CC, PbP, ROR, B/C Analysis	(4 weeks) (18 hours)
• Making Decisions on real world. Replacement study & its applications, Break Even Analysis	(2 weeks) (9 hours)
• Depreciation Methods: SL, SYD, DB, DDB	(2 weeks) (9hours)
• Effects of Inflation, Evaluation of alternatives adjusted for inflation	(1 week) (4.5 hours)

Assessment Methods:

HA	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	OE	AT
5	5	15	20	15	30		10					

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (AT) Attendance

Laboratory: Not applicable

Contribution of course to Meeting the ABET professional Component :

- ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science : 1.5 credit for 50%
Human and social science : 1.5 credit for 50 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	3				3								
2					3								
3	3				3								
4	3				3								
5	3				3								
6	3				3								
7	3				3								
8	3				3								
9	3				3								
10											2		
Course contribution	3*				3						2		

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared By: Mohammad Rehan Maqbool Date: February 13, 2008

IE 256: Engineering Management (2:3,0):

Core Course

2008 Course (Catalog) Description:

The role of engineers in management of engineering organizations, technical control and/or supervision of these organizations including aspects related to planning, forecasting, Decision Making, Motivation, Project Management, and Planning Production Activities.

Prerequisites:	ENG 101; ENG 102; IE 201; IE 202
Text Book :	Managing Engineering and Technology, 4th Edition Daniel L.Babcock and Lucy C.Morse Publisher: Prentice Hall 2007 ISBN 0-13-205026-9
Reference Books:	Class notes and handouts material by the instructor.

Class Schedule:

This is a common course. The class meets 3 times a week for some sections each taking 50 minutes, or 2 times a week each taking 80 minutes.

Course Objectives:

At the end of the course the students will be able to:

1. An ability to apply knowledge of math, science and engineering in engineering management
2. An ability to work efficiently in Teams
3. An ability of using Managerial Skills in Engineering
4. An ability of Learning to Learn (long life learning)
5. An ability to communicate effectively in written/oral communication skills
6. An ability to use the techniques, skills, and modern engineering tools necessary for engineering management practices
7. An ability to use soft skills

Topics Covered during the class:

1.	Introduction to Engineering & Management – ch1	(1 week)
2.	Historical Development of Engineering Management – ch2	(1 week)
3.	Function of Management - handout	(1 week)
4.	Planning & Forecasting – ch3	(2 weeks)
5.	Organization – ch5	(2 weeks)
6.	Decision Making – ch4	(2 weeks)
7.	Motivation – ch7	(1 week)
8.	Project Management – ch14	(2 weeks)
9.	Planning Production Activities – ch11	(2 weeks)

Assessment Methods:

AT	QZ1	M	QZ2	ME	QZ3	FE	TP/HA
5	5	10	5	25	5	35	10

(AT) Attendance, (QZ1) Quiz number 1, (M) Major, (QZ2) Quiz number 2, (ME) Midterm Exam, (QZ3) Quiz number 3, (FE) Final Exam, (TP) Term Project/ Homework Assignment,

Contribution of Course to Meeting the ABET professional Component:

ABET category content as estimated by faculty member who prepared this course description.

Math and Basic Science:	20 %
Engineering Science:	20 %
Engineering Design:	20 %

Human and Social Science: 40 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes as of ABET EC 2000 Criteria												
	a	b	c	d	e	f	g	h	i	j	K	L	m
1	3												
2											1		
3	3				2								
4											2		
5											3		
6	3										2		
7											3		
Course Contribution	3				2						3		

(* Level of Relevance shows the contribution of the course objectives towards achieving a specific program outcome. Numerical values of 1, 2, and 3 indicate High, Medium, and Low Relevance respectively.

Prepared By: Dr Muhammad Ehsan Ulhaque Date: February 13, 2008

IE 311 Operations Research - I (3:3,1)

Core Course

2008 Course (Catalog) Description:

Introduction to Operations Research. Formulation of linear programming problems. Graphical solution. The Simplex algorithm. Duality and sensitivity analysis. Transportation and assignment problems. Integer and Goal programming.

Prerequisite:	Math 241
Text Book:	Introduction to Operations Research, Hillier and Lieberman (7th edition) McGraw Hill, Singapore, 2001, ISBN 0-07-232169-5
References:	Operations Research: An Introduction, Hamdy A. Taha (7th edition) Pearson Education, Singapore, 2002, ISBN 81-7808-757-X

Class Schedule:

The class meets three times a week. Sunday and Tuesday, for lectures from 9:30 am to 10:50 am, and on Tuesday for tutorial, from 2:30 to 4:30 pm.

Course Objectives:

At the end of the course the students will be able to:

1. Understand the integrated nature of the discipline.
2. Understand the basic principles of linear programming.
3. Comprehend the concepts of Simplex algorithm.
4. Analyze the concept of duality and post optimality analysis.
5. Learn the Assignment model used for solving a linear program.
6. Learn the Transportation problem for solving a linear program.
7. Identify, formulate, and solve basic engineering and managerial problems.

Topics Covered during the class:

- Introduction to Operations Research.
- Introduction to Linear Programming.
- The Simplex Method.
- Sensitivity Analysis.
- Duality.
- Transportation, Assignment, and Transshipment Problems.
- Network Models.
- Examples on Integer Programming.

Assessment Methods:

HA	QZ	T1	ME	T2	GP	CP	FE
5	10	20		20	10		35

(HA)Homework Assignment (QZ)Quiz, (T1) Test1, (ME) Midterm Exam, (T2) Test2, (GP) Group Project, (CP) Class Participation, (FE) Final Exam

Computer Usage: OR Software: Decision Sciences for Windows

Laboratory: Not applicable

Contribution of course to Meeting the ABET professional Component :

- ABET category contents as estimated by faculty member who prepared this course description.

Engineering Design : 1.5 credit or 50%
Engineering Science : 1.5 credit or 50%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	3				2				2	3			
2	3	2			3				2		3		
3	3	2	1		3			2	2		3		
4	3	3	1		3				2		3	3	
5	3				3				2		3		
6	3				3				2		3		
7	3				3				2		3		
Course contribution	3	2	1		3			2	2	3	3	3	

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared By: Dr Ahmed Al-Moreb Date: February, 2008

IE 321 Fundamentals of Computer Systems (4:3,2)

Core Course

2008 Course (Catalog) Description:

Fundamentals of computer: hardware, software and computer systems concepts. Introduction to operating systems and data processing. Overview of programming languages. Internet and computer security. Introduction to software packages for Industrial Engineering applications.

Prerequisite: EE-202 Computer Programming II

Text Book: Peter Norton, Introduction to Computers (Sixth Edition), Mc Graw Hill, ISBN: 978-0-07-297890-2.

Reference: Introduction to Information Systems: Supporting and Transforming Business, 1st Edition

Class Schedule: The class meets four times a week. Three times as regular sessions of 50 minutes each on Saturday, Monday, and Wednesday from 10:00 AM to 10:50 PM and a tutorial class for 90 minutes on Wednesday from 2:30 PM to 4:00 PM.

Course Objectives:

At the end of the course the students will be able to:

1. Recognize the role information technology in today's life
2. Identify and define the functions of computers
3. Learn how to communicate in the information age
4. Understand the significance of the Internet
5. Identify the usage of different software & packages
6. Function in multi-disciplinary teams
7. Communicate effectively in oral and written presentation

Topics Covered during the class:

Text Book Chapter	No of Weeks
Chapter-1: Introducing Computer Systems	1.0
Chapter-2: Presenting the Internet	1.0
Chapter-3: Interacting with Your Computer	1.0
Chapter-4: Seeing, Hearing, and Printing Data	1.0
Chapter-5: Processing Data	1.0
Chapter-6: Storing Data	1.0
Chapter-7: Using Operating Systems	1.0
Chapter-8: Working with Application Software	1.0
Chapter 9: Networks	1.0
Chapter-10: Working in the Online World	1.0
Chapter-11: Data Base Management	1.0
Chapter 12: Development of Information Systems	1.0
Chapter 13: Software Programming and Development	1.0
Chapter 14: Protecting Your Privacy, Your Computer and Your Data	1.0

Assessment Methods:

M1	M2	M3	M4	M5	M6	TP	AP
10	10	10	10	10	10	30	10

(M1) Major Exam 1, (M2) Major Exam 2, (M3) Major Exam 3, (M4) Major Exam 4, (M5) Major Exam 5, (TP) Term Project, (AP) Attendance & Participation.

Contribution of course to Meeting the ABET professional Component:

- ABET category contents as estimated by faculty member who prepared this course description.

Math and Basic Science	:	25%
Engineering Science	:	25%
Engineering Design	:	25%
Human and Social Science	:	25%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1								3			2	3	
2	3		3		2				3				
3							3						2
4		2		3	3			3	3	3			
5	2		3								3		
6			3			3			2				3
7							3						
Course contribution	2		3	3	2	3	2	3	2	2	2	3	3

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared By: Dr. Wajdi A Wazzan Date: May 1, 2008

IE 322 Computer Applications in Industrial Engineering I (4:3,2)

Core Course

2008 Course (Catalog) Description:

Basics of computer programming languages. Object oriented programming concepts. Development of application and appropriate algorithms for solving Industrial Engineering problems

Prerequisites: IE 321: IE 331:

Text Book: Simply C# Dietel, Dietel, Hoey, Yaeger , 2004, Prentice Hall, ISBN 0-13-142641-9

References: C# Primer Plus, 4/E Klaus Michelsen, 2002 Sams Publisher , ISBN 0-672-32152-1

Class Schedule:

The class meets three times in a week. Two times for regular sessions of 1 hour 20 minutes of lecture time and 2 hours of tutorial time.

Course Objectives:

At the end of the course the students will be able to:

1. Explain the fundamentals of C# language
2. Understand the Visual IDE of C#
3. Understand and define the real world problem
4. Develop a problem solving process for the problem.
5. Translate a written problem statement into a mathematical model
6. Develop flow chart for the process.
7. Develop / select appropriate algorithm for solving the model.
8. Convert mathematical model into C# codes.
9. Solve fundamental engineering problems using C#.
10. Develop and design a software prototype for the envisaged solutions
11. Understand the importance of lifelong learning.
12. Access information from various online resources

Topics Covered during the class:

1.	Introduction to C#, Visual IDE, its structure and compilation	4.5 hours
2.	Understanding errors ,debugging and exception handling	4.5 hours
3.	Defining real world problems	1.5 hours
4.	Computer memory concepts & data types and matrices.	4.5 hours
5.	Flow charting	3.0 hours
6.	Control structure & Decision making with C#	4.5 hours
7.	Lifelong learning concept.	1.5 hours
8.	Methods and classes in C#	4.5 hours
9.	File handling	3.0 hours
10.	Arithmetic, logical operators & algorithms.	6.0 hours
11.	Visual IDE and prototype designing	6.0 hours
12.	Menus and graphics	4.5 hours

Assessment Methods:

HA	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	SP	AT
5	10	10	15	10	30		10					5

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (SP) Student Portfolio, (AT) Attendance

Laboratory: Computer laboratory is extensively used

Contribution of course to Meeting the ABET professional Component :

- ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science	:	1 credit for 25%
Engineering Design	:	2 credit for 50%
Human and social science	:	1 credit for 25%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1											2		
2											2		
3					3								
4					3								
5	3				3								
6					3								
7					3								
8					3								
9					3								
10					3								
11									2				
12									2				
Course contribution	3				3				2		2		

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared By: Dr Manzoor H. Sheikh Date: February 13, 2008

IE 323: Computer Applications in Industrial Engineering (4:3,2)

Core Course

2008 Course (Catalog) Description:

Introduction to computer applications, databases and relational database management systems. Design and development of databases. Management of database users and security. Introduction to front-end and its connectivity with the database

Prerequisite(s):	IE 322 Computer Application In Industrial Engineering I
Text Book:	Oracle 9i development by example By Dan Hotka, Que publishers © 2002 ISBN 0-7897-2671-8
Reference:	Oracle 8: Introduction to Oracle PL/SQL, Student Guide production 1.1 Volume 1.2, Oracle Education Press Developer 2000: Forms I, Student Guide, Oracle Education Press

Class Schedule

The class meets three times in a week. Two times are for regular sessions of 1 hour 20 minutes of lecture times and 2 hours of tutorial time.

Course Objectives:

At the end of the course the students will be able to:

1. understand the concepts of Database and software applications in industrial engineering.
2. Understand concepts of ORDBMS.
3. understand and work in client / server Environment.
4. understand the basic principles of Object oriented Technology.
5. Design databases using RDBMS Tools
6. develop Databases and computer programs for the solution of engineering Problems.
7. develop and design reports and forms using GUI tools.
8. To research identify and understand a working knowledge of variety of different latest programming techniques, software's and their applications.
9. To research, write and present technical report using modern engineering tools.

Topics Covered during the class

• Introduction to Excel 2000	(1 class)
• Solving Statistical Problems Using Excel	(2 classes + 1 lab)
• Creating Graphs in Excel 2000	(1 class)
• Introduction to SQL / PLSQL	(1 class + 1 lab)
• DDL Commands	(2 classes + 1 lab)
• DML Commands	(2 classes + 1 lab)
• Function Of SQL Plus	(2 classes + 1 lab)
• Select Statement with all options	(1 class)
• Creating, Dropping and Altering Tables	(1 class + 1 lab)
• Introduction to developer 2000 version (2.1) Form designer 5.0	(1 class)
• Creating Simple forms	(2 classes + 1 lab)
• Form Properties	(1 class)
• Canvas and Canvas Properties	(2 classes + 1 lab)
• Introduction to Report designer 3.0	(1 class + 1 lab)
• Creating Simple Reports	(2 classes + 1 lab)

Computer Usage : Oracle pi, developer 2000 version 6i

Excel 2000 is used in this course.

Laboratory : Software Demonstration
Problem Solving Session in Computer Laboratory.
Term Projects

Assessment Methods:

HA	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	OE	AT
10	10	10	10	10	35		10					5

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (AT) Attendance

Contribution of course to Meeting the ABET professional Component
ABET category content as estimated by faculty member who prepared this course description.

Engineering Science: 1 Credit or 25%
Engineering Design: 2 Credits or 50%
Human and Social Science: 1 Credit or 25%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1			3		3				3		2		
2			3		3						2		
3			3		3						2		
4			3		3								
5			3		3				2		3		
6			3		3				2		3		
7			3		3				3				
8					3				3		3		
Course contribution			3		3				3		3		

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 1, 2 & 3 indicate High, Medium and Low relevance respectively.)*

Prepared By Dr. Waqar Ahmad Date: 01 February, 2008

IE 331 Probability and Engineering Statistics (3: 3, 1)

Core Course

2008 Course (Catalog) Description:

Descriptive statistics with graphical summaries. Basic concepts of probability and its engineering applications. Commonly used distributions for discrete and continuous random variables. Confidence intervals. Hypothesis testing. Correlation and simple linear regression.

Pre-requisite: Math203.

Text Book: STATISTICS FOR ENGINEERS AND SCIENTISTS William Navidi, 2nd Ed., 2008, McGraw-Hill Higher Education, ISBN: 978-0-07-110222-3.

References:

1) Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye; Probability And Statistics For Engineers And Scientists 7th Ed., 2002, Prentice Hall Inc, ISBN: 0-13-098469-8
2) Roxy Peck, Chris Olsen, Lay L. Devore; Introduction to Statistics and data Analysis, Duxbury Press, 2 ed., 2004, ISBN: 0534467105
3) William W. Hines, Douglas C. Montgomery, David M. Golsman, Connie M. Borror; Probability and Statistics in Engineering, John Wiley & Sons, Inc., 2003.

Class Schedule:

This is usually multi-section classes and therefore different sections will have different schedules. Each section will meet either three times a week (1 hour duration) or two times a week (1 hour 20 minutes duration) and 2 hours of tutorial time.

Course Objectives:

At the end of the course the students will be able to:

1. Calculate the most important descriptive statistics.
2. Apply fundamental theories of probability.
3. Identify and calculate the statistics of discrete and random variables.
4. Apply some discrete and continuous probability distributions to real life problems.
5. Express statistical results graphically.
6. Perform confidence intervals calculations.
7. Perform statistical hypothesis tests.
8. Perform simple linear regression and correlation.
9. Use some statistical packages, and apply it to real world problems.
10. Interpret the obtained statistical results.

Topics covered during the class:

1: Sampling and Descriptive Statistics
- Summary Statistics (2 weeks)
- Graphical Summaries

2: Probability
- Basic probability theories.
- Conditional Probability and Independence (4 weeks)
- Random Variables

3: Commonly Used Distributions
- The Binomial Distribution
- The Poisson Distribution
- The Exponential Distribution (4 week)
- The Normal Distribution
- The Central Limit Theorem
- The Student's t Distribution

4: Confidence Intervals (2 weeks)
5: Hypothesis Testing (1 weeks)
6: Correlation and Simple Linear Regression (2 weeks)

Computer Usage: Excel, and Minitab.

Course Assessment Methods:

HA	QZ	AT	ASS	M1	M2	FE
5	5	5	5	20	20	40

(HA)Homework, (QZ)Quiz, (AT) Attendance, (ASS) Assignment, (M1) Major 1, (M2) major 2, (FE) Final Exam.

Contribution of course to Meeting the ABET professional Component:
ABET category contents as estimated by faculty member who prepared this course description.

Math and Basic Science	2 credit for 65%
Engineering Science	1 credit for 35%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	3	1			3								
2	3												
3	1	1											
4	3	1			3								
5		1			2						1		
6	2	1			1								
7	2	1			1								
8	3	1			2								
9					2						1		
10	2	1			2								
Course contribution	3	1			3						1		

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared By: Prof. Dr. Saied Ali Hassan Date: March 01, 2008

IE 332 Engineering Statistics Credit (3: 3, 2)

Core Course

2008 Course (Catalog) Description:

Basic notions of statistics applicable to engineering problems. Moment generating functions. Random samples and sampling distributions. Parameter estimation. Hypothesis testing. Nonparametric tests. Simple and multiple regression.

Prerequisites: IE 331: Probability and Engineering Statistics.

Text Book:

1. Probability and Statistics in Engineering, Fourth Edition, William W. Hines, Douglas C. Montgomery, David M. Goldsman & Connie M. Borror, John Wiley and Sons, (2003), ISBN: 0-471-24087-7
2. Statistics for Engineers and Scientists, William Navidi, Mc Graw-Hill, (2006), ISBN: 0-13-098469-8
3. Probability & Statistics for Engineers and Scientists, Seventh edition, Walpole, Myers, Myers & Ye, Prentice Hall, (2002), ISBN: 0-13-098469-8

Reference:

1. Jiju Antony, Design of Experiments for Engineers and Scientists, Butterworth-Heinemann, (2003), ISBN – 0-7506-4709-4
2. Hayter, A.J., 1996. *Probability and Statistics For Engineers and Scientists*. PWS Publishing Company, New York, NY, ISBN 053495610-6.
3. Class notes and handouts by the instructor.

Class Schedule:

The class meets four times a week. Three times as regular sessions of 1 hour each on Saturday, Monday and Wednesday from 9 AM to 10 AM and a tutorial class for 1.5 hours on Monday from 1:00 PM to 2:30 PM.

Course Objectives:

At the end of the course the students will be able to:

1. Understand the importance of statistics
2. Identify and define statistical problems related to Industrial Engineering.
3. Demonstrate the ability to set up the procedure for appropriate solutions.
4. Comprehend professional skills and ethics in professional life.
5. Adopt analytical approach to problems faced by individuals or society.
6. Interpret the results and communicate effectively.

Topics Covered during the class:	No. of Weeks
• Joint Probability Distributions	1.5
• Functions of Random Variables	2.0
• Some Important Continuous Distributions	0.5
• Random Samples and Sampling Distributions	1.0
• Parameter estimation	2.5
• Tests of Hypotheses	3.0
• Simple linear regression and Correlation	2.0
• Multiple Regression	0.5
• Nonparametric Statistics	1.0

Assessment Methods:

HA	TH	M1	M2	M3	FE	OP	TP	IV	LRI	LRT	OE	AT
5	10	15	15	15	35							5

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (M2) Major 2, (M3) Major 3, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (AT) Attendance, (TH) Take Home Exam

Laboratory: Not applicable

Contribution of course to Meeting the ABET professional Component:

- ABET category contents as estimated by faculty member who prepared this course description.

Math and Basic Science	:	25%
Engineering Science	:	25%
Engineering Design	:	25%
Human and Social Science	:	25%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	3				3				3		2		
2	1				3						3		
3	2				3						2		
4					3	2			1				
5	2				3						3		
6	2				1		2		1		2		
Course contribution	3				3	2	2		3		3		

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared By: Dr. M. Shafi Ullah Date: February 03, 2008

IE 341: Work Study (4 :3, 1)

Core Course

2008 Course (Catalog) Description:

Introduction to Work Study (WS). Productivity and WS. WS approaches. Basic procedure of method study involving job selection, recording facts, critical examination etc. String diagram, Multiple activity chart, Travel chart. Principles of motion economy. Two-handed chart. Fundamental hand motions. Micro-motion and Memo-motion studies. Cyclegraph and Chrono-cyclegraph. Work Measurement (WM). Work sampling. Time study. Computerized WM. PMTS: MTM, Work factor and Standard data. Wage payment and incentive plans.

Prerequisite:	IE 331: Probability and Engineering Statistics
Text Book:	Kanawati, G, (Ed), 1992, Introduction to Work Study, 4th Revised edition, International Labor Office:Geneva. (ISBN 92-2-107108-1).
Reference Books:	1. Lawrence, SA, 2000, Work measurement and Methods Improvement, John Wiley & Sons, (ISBN 0-471-37089-4). 2. Barnes, RM, Motion and Time Study: Design & Measurement of Work, John Wiley & Sons Inc: New York. 3. Mundel, ME, 1989, Motion and Time Study: Principles and Practice, New Jersey: Prentice Hall. 4. Niebel, BW, 1972, Motion and Time Study, Illinois: Richard Irwin. 5. Class notes/handouts materials provided by the instructor. Web-page for the Course: Group name: works8 ; Group home page: http:// groups.yahoo.com/group/works8; Group email: works8@ yahoogroups. com

Class Schedule:

The classes are held thrice per week for lectures (Saturdays, Mondays & Wednesdays 0900-0950 Hours) and once in a week for laboratory (Mondays: 1430-1630 Hours).

Course Learning Objectives:

At the end of the course the students will be able to:

1. Explain the basic concepts of 'work study' (WS) : method study and work measurement. (Scope of WS; 'Productivity' meaning & 'Basic Procedure')
2. Explain/use the tools and techniques of 'method study' (Charts/diagrams, micro-motion studies & Principles of Motion economy)
3. Explain/use the tools and techniques of 'work measurement' (WM). (Basic concept of WM and various Techniques of WM)
4. Design, perform and analyze the studies/experiments related to WS (e. g. Process analysis, operation analysis, time study, Pre-determined motion time system (PMTS), Standard data and work sampling with statistical analysis).
5. Work in a team and communicate effectively in performing the assigned works (Home works/Term Project)

Topics Covered during the class (number of lectures):

[A] Introduction to Work Study: Definition and scope of Work Study (2);
Productivity and Work Study (2); Work Study, the Approach: Value of the Work Study, Techniques, Basic Procedure (3). [B] Method Study: Method study and Job Selection (2); Recording Facts (3); Critical Examination (2); String Diagram (1); Multiple Activity Chart (1); Travel Chart (1) Principles of Motion Economy (2); the Two Handed Chart; Operation Analysis and Fundamental Hand Motions (1); Micro-motion and Memo-motion analysis (1); Cyclegraph and Chrono-cyclegraph (1); Evaluation, Definition, Installation and Maintenance of the new method (2). [C] Work Measurement: The Definition, Purpose, Use and Techniques (2); Work Sampling (3); Time Study

:Equipment, Forms, Job-selection, Timing, Steps, Sample size (3), Rating (2),Basic time, Selected time, Allowances, Standard Time, Computer-Aided Time study(CAT)(2); PTS: Wok Factor (2), MTM(2); Standard Data(2); Case Studies pertaining to Human Factors, Wage Payment/Incentive Plans(2).

Assessment Methods:

HA	QZ	M1	ME	M2	FE	TP & OP	CPF	LRI/LRT	OE	AT
5	5	10	20	10	25	10	5	10	-	-

[HA: Homework Assignment, QZ: Quiz, M1: Major-1, ME: Midterm Exam, M2: Major-2, FE: Final Exam, OP: Oral presentation, TP: Term Project, IV : Report of industrial visits, LRI: Individual Laboratory reports, LRT: Team Laboratory Reports, OE: Oral Examination, AT: Attendance]

Laboratory Work: Topics Covered During Laboratory are as follows:
Outline Process Chart; Flow Process Chart; From-To or Cross-chart for Layout Simplification; Multiple Activity Chart; Flow Diagram and String Diagram; Operation Chart (Left-Right Hand Chart); Therbligs' application; Work sampling; Time Study;
Learning Curve.

Contribution of course to meeting the ABET professional component:
ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science	:	1 Credit or 25%
Engineering Design	:	2 Credit or 50%
Human and social science	:	1 Credit or 25%

This course is designed to introduce Work Study tools and techniques, and their applications by way of using the systematic approach to the work simplification for the development of the engineered work performance standards, while addressing health and safety aspects of the human work.

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Learning Objectives(CLO)	Program Outcomes [ABET EC 2000 criteria]												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	1												
2	2				2								
3	2	2	2		2								
4	3	2	2		3		2					2	
5	3	3	3		3		2			2		2	
Course contribution	3	3	2		3		2			2		2	

Cell entries represent "Level of Relevance" signifying the contribution of the course objectives towards achieving a specific program outcome. [Numerals 3, 2 & 1, as per Bloom's Taxonomy, indicate High (Synthesis/Evaluation), Medium (Application/Analysis) and Low (Knowledge/ Comprehension) level of skill respectively.]

Prepared By: Prof Sayed Aliul Hasan Rizvi Date: **February 16, 2008**

IE 342: Human Factors Engineering (4 :3, 1)

Core Course

2008 Course (Catalog) Description:

Introduction to human factors engineering. Muscular work. Nervous control. Work efficiency. Body size and anthropometrics. Work station design. Heavy work. Handling loads. Man-machine systems. Mental activity. Fatigue. Stress and boredom. Vision and lighting. Noise and vibration.

Prerequisite:	IE 341: Work Study
Text Book:	Kroemer, KHE & Grandjean, E. Fitting the Task to the Human: A Text Book of Occupational Ergonomics, Fifth Edition, Taylor & Francis Publishers, London, 1997..
Reference Books:	1. Tayyari, F & Smith, J, 1997, Occupational Ergonomics, Principles & Applications, Chapman & Hall: London. [SITE: www.thomson.com] 2. Bridger, R S, 1995, Introduction to Ergonomics, New York: Mc Graw Hill 3. Class notes/handouts materials provided by the instructor. 4. Web-page for the Course: Group name: zahid_jmi; Group home page: http://groups.yahoo.com/group/zahid_jmi;Group email: zahid_jmi@yahoogroups.com

Class Schedule:

The classes are held three times in a week for lectures (Saturdays, Mondays & Wednesdays: 1000-1050 Hours) and once in a week for laboratory (Wednesdays: 1430-1630 Hours).

Course Objectives:

At the end of the course the students will be able to:

1. Explain the Basic Concepts of human factors engineering.
2. Identify, formulate, and solve human factors problems and implement them.
3. Explain basic principles and impact of environmental factors such as illumination, noise, and vibration.
4. Develop verbal and written communication skills through written reports and presentations.
5. Explain and use ergonomic tools/ techniques to conduct experimental and analytical studies.
6. Work in a Team and communicate effectively.

Topics Covered during the class (number of lectures):

Introduction to human factors engineering (4); Muscular Work: physiological principles, Static effort (4); Nervous Control of Movements (4); Work Efficiency (4); Body size and Anthropometrics (4); Workstation Design: Working height, Neck & head, Room to Grasp, sitting at work, Computer work station and Design of the keyboard (6); Heavy Work: Physiological principles, Energy consumption, Upper limits, Energy efficiency, Heart rate as a measure of workload; Work and Heat, Case histories (6).Handling loads: Back troubles, ID Pressure, Biomechanical models of Lower Back, IO Pressure, Subjective judgment (4); Human-machine Systems: Introduction, Displays, Controls, C/D relationship (6);Mental Activity: Elements of Brain work, Uptake of information, Memory, Sustained alertness (vigilance) (2); Fatigue: Muscular, General, Fatigue in industry and Measurement of Fatigue (4); Introduction to Occupational Stress (2), Boredom (2), Vision & Lighting (2), and Noise and Vibration(2).

Assessment Methods:

HA	QZ	M1	ME	M2	FE	TP & OP	LRI / LRT	CP
10	5	10	15	10	25	10	10	5

[HA : Homework Assignment, QZ : Quiz, M1: Major-1, ME: Midterm Exam, M2 : Major-2, FE: Final Exam, OP : Oral presentation, TP : Term Project, IV : Report of industrial visits, LRI : Individual Laboratory reports, LRT : Team Laboratory Reports, OE : Oral Examination, AT: Attendance]

Laboratory Work: Topics Covered During Laboratory are as follows:

Anthropometric measurements, Application of Anthropometric data in Workstation Design, Vision testing, Strength Measurements, Audiometry, Reaction Time, Physical work capacity through Heart rate and Oxygen Consumption, & Manual material Handling.

Contribution of course to meeting the ABET professional component:

ABET category contents as estimated by faculty member who prepared this course description.

Math and Basic Science	:	0 Credits or 0%
Engineering Science	:	1 Credit or 25%
Engineering Design	:	2 Credit or 50%
Human and social science	:	1 Credit or 25 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes [ABET EC 2000 criteria]												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	1				2								
2	1	2	3		2								
3	1	2	2		2								
4	1	3	3				3			2			
5	2	3	3		2		3						
6	1	3	2				3			2			
Course contribution	**2**	**3**	**3**	**-**	**2**	**-**	**3**	**-**	**-**	**2**	**-**	**-**	**-**

Cell entries represent " Level Of Relevance" signifying the contribution of the course objectives towards achieving a specific program outcome. [Numerals 3, 2 & 1 indicate High, Medium and Low level of relevance respectively.)

Prepared By: Dr. Zahid Akhtar Khan Date: February 16, 2008

IE 351: Industrial Management (3:3, 1)

Core Course

2008 Course (Catalog) Description:

Introduction to industrial management. Economic concepts in industry. Organizational structure and design. Human resource management. Motivating the work force. Managing information technology. Financial management. Engineers in marketing and services. Job analysis, job description, and job specification. Preparation of business plan.

Prerequisites:	IE 256: Engineering Management
Textbook:	Excellence in Business, Edition 3rd, Bovee. Thill. Mescon ISBN: 0-13-187047-5, Prentice Hall
References:	Business A Changing World, 5/e: Ferrel Hirt Ferrel Publisher McGraw-Hill 2006: ISBN 0-07-111581-1 Contemporary Business 2006: Louis E Boone, David L Kurtz Thomson South-Western: ISBN 0-324-33587-7 Class notes and handouts material by the instructor is available on website at http://elearning.alhaque.com . The site requires registration by the students.

Class Schedule: This is a Departmental Core Course. The class meets 3 times a week for lectures, and tutorial. The lecture is of 80 minutes, and the tutorial is for 110 minutes.

Course Objectives:

As a consequent of the classroom experience, the students will be able to:

1. Identify and define the functions of management, authority relationship, and ethical responsibilities of business
2. Compare and contrast the prevalent economic systems
3. Explain the organization structure and design, methods of departmentalization commonly used
4. Discuss the significance of Human Resource Management
5. Compare and contrast the different Motivational approaches available to the managers
6. Identify and discuss the information technology tools required for managers
7. Understand and discuss the importance of Financial Management
8. Identify, define, compare and contrast customer driven marketing Strategies
9. Analyze and design Job description and specifications
10. Function in multi-disciplinary teams
11. Communicate effectively in oral and written presentation
12. Understanding the importance of Business Plan

Topics Covered during the class:

- Fundamentals of Business & Economics (8 Hours)
- Forms of Business Ownership (4 Hours)
- Information Technology & E-Commerce (8 Hours)
- The Functions of Management (4 Hours)
- Entrepreneurs and Small Business (4 Hours)
- Organization & Team Work (4 Hours)
- Employees Motivation, Workforce Trends & Labor Relations (4 Hours)
- Managing Human Resource (4 Hours)
- The Art & Science of Marketing (4 Hours)
- Financial Management (4 Hours)

Assessment Methods:

HA	QZ	M1	ME	M2	FE	GP	TP	IV	LRI	LRT	CP	CE
10	12		18		30	5	15				5	5

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (FE) Final Exam, (GP) Group Portfolio, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (CP) Class Participation, (CE) Class Exercises

Topics Covered During Laboratory:

Computer Usage Microsoft: Word, Excel, PowerPoint, Internet Explorer, Windows XP

Contribution of Course to Meeting the ABET professional Component

ABET category content as estimated by faculty member who prepared this course description.

Math and Basic Science:	25 %
Engineering Science:	25 %
Engineering Design:	-
Human and Social Science:	50 %

Course relationship matrix to ABET EC 2000 Program outcome

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1				2	2	2	2			2			
2					2		2						
3				3			2						
4				2	2		2			2			
5				2		2	2			3			
6				3	3	2	2			3			
7					2		2						
8					2		2			3			
9				2			2			2			
10				3	3	2	3						
11				3			3						
12				3	3		3						
Course contribution	-	-	-	3	3	2	3	-	-	3	-	-	-

(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively).

Prepared By: Dr Muhammad E Ulhaque Date: Feb 15, 2008

IE 352: Systems Analysis and Design

Core Course

2008 Course (Catalog) Description:

System definition, characteristics and concepts. Systems development projects: identification, selection, initiation, planning and managing. System analysis: determining and structuring requirements. System design: overview, forms and reports, interfaces and dialogues, and finalizing design specifications. Designing distributed and internet systems. System implementation and maintenance

Prerequisites:	IE 321
Text Book:	Modern Systems Analysis and Design (4th Edition) - 2005 Jeffrey A. Hoffer , Joey F. George and Joseph S. Valacich, Prentice Hall (ISBN 0-13-127391-4)
References:	1. Systems Analysis and Design (4th Edition) Kendal and Kendal Prentice Hall (ISBN 0-13-954934-X) 2. Internet and World Wide Web: How to Program (Third Edition) -2004 Deitel, Deitel and Goldberg Prentice Hall (ISBN 0-13-124682-8)

Class Schedule:

The class meets three times in a week. Two times are for regular sessions of 1 hour 20 minutes of lecture times and 2 hours of tutorial time.

Course Objectives:

The overall course objectives are

1. to develop and enhance students' understanding of the concepts of systems, systems thinking, systems analysis and design as well as other related concepts and terminology
2. to develop the analytical and design abilities of the students throughout the system development life cycle with a variety of methodologies, techniques and tools and how to apply them in improving/developing systems in organizational contexts
3. to develop awareness and understanding of the latest modern technological developments and trends specifically the widespread development and use of internet-based systems and mobile devices and also their impact on work in system analysis & design
4. to provide learning opportunities for students to know and have hands-on experience in using software for web design , project management and charting as well as CASE tools
5. to develop the students' abilities to communicate in various media and participate effectively in team work.

Topics Covered during the class:

1. The Systems Development Environment
2. Systems Concepts and Succeeding as a Systems Analyst
3. Sources of Software
4. Managing the Systems Project
5. Identifying and Selecting Systems Development Projects
6. Initiating and Planning Systems Development Projects
7. Determining System Requirements
8. Structuring System Requirements : Process Modeling
9. Structuring System Requirements : Logic Modeling
10. Structuring System Requirements: Conceptual Data Modeling
11. Design Overview
12. Designing Forms and Reports
13. Finalizing Design Specifications
14. Designing Distributed and Internet Systems
15. System Implementation & Maintenance (If Time permits)
16. Object-Oriented Analysis and Design (Optional)

Assessment Methods:

HA	QZ1	QZ2	M1	M2	FE	OP	TP	IV	LRI	LRT	OE	AT
8	5	5	20	20	30	3	4					5

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (AT) Attendance

Laboratory: Not applicable

Contribution of course to Meeting the ABET professional Component :
ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science	:	1.5 credit for 50%
Human and social science	:	1.5 credit for 50 %

Course relationship matrix to ABET EC 2000 Program outcome.

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	2		2		3								
2	3		2		3								
3										3			
4									3		2		
5				2			2						
Course contribution	3*		2	2	3		2		2	2	1		

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared By: Abubakr A. Ishak Date: February 01, 2008

IE 411: Operations Research II (3:3,1)

Core Course

2008 Course (Catalog) Description:

Non-linear programming. Dynamic programming. Inventory models. Waiting line models. Markov analysis. Introduction to Game theory. Applications in industrial, service and public systems.

Prerequisite:	IE 311, IE332
Text Book:	Quantitative Analysis for Management, Barry Render, Ralph M. Stair (Jr) and Michael Henna, Prentice Hall International Inc., 9th Edition (2006)
References:	i) Operations Research: Hamdy A. Taha., John Wiley & Sons, Inc., 7th Edition, 2002 ii) Introduction to Operations Research, Hillier, F.S., and Lieberman, G.J., Mc Graw Hill Company, 8th Edition, 2004

Class Schedule:

Lecture: three, 50 minutes sessions each per week and Tutorial: one, 2 hours per week

Course Learning Objectives:

1. Develop the knowledge of analytical techniques of OR-II
2. Understand the basic principles and techniques of OR-II
3. Comprehend the Nonlinear programming and its applications
4. Waiting line models and queuing theory
5. Comprehend the dynamic programming and its applications
6. Understand and apply Inventory models
7. Understand and apply Markov analysis
8. Understand Game Theory and its applications
9. Analyze & solve a real life problem for Term project with a team
10. Realize the computer software applications and solve OR-II problems
11. Interpret the results of OR-II problems after the computer or manual solutions

Topics to be Covered during the class

1. Non-linear Programming; graphical illustration, concave and convex functions, unconstraint optimization; one & multi variables, one dimensional search alg., gradient search method, Khun Tucker conditions, Frank Wolfe alg.	15 classes
2. Waiting Lines and Queuing Theory Models: characteristics of models. single, multi channel models, constant service time model, finite population model.	10 classes
3. Dynamic Programming; shortest route problem by DP, terminology, notations, knapsack problem, air transportation service problem, resource allocation problems, distribution of effort problem.	10 classes
4. Inventory models, elements of inventory control, inventory control systems, economic order quantity models, quantity discounts, reorder point, order quantity for a periodic inventory system.	10 classes
5. Markov Analysis: introduction, states & state probabilities, transition matrix, predicting future market share, equilibrium conditions, absorbing states & the fundamental matrix	10 classes
6. Game theory: language of games, the minimax criterion, pure strategy games, mixed strategy games, dominance.	10 classes

Computer Usage: OR Software such as Win QSB, DS for windows, MS Project and LINGO

Laboratory Projects: Computer exercises in the Computer laboratory for solving tutorial problems

Contribution of course to Meeting the ABET Professional Component

ABET category contents as estimated by faculty member who prepared this course description.

- Math and Basic Science : 1 Credit or 25%
- Engineering Design : 3 Credits or 75%

Course Relationship to Program Outcomes

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	3				3			3			3		
2	3				3			3			3		
3	3				3			3			3		3
4	3				3			3			3		3
5	3				3			3			3		3
6	3				3			3			3		3
7	3			3	3			3			3		3
8	3			3	3			3			3		3
9	2			3	3			3			3		3
10	3			3	3			3			3		3
Course contribution	3			3	3			3			3		3

(Level of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 1, 2 & 3 indicate Low, Medium and High relevance respectively)

Prepared By: Dr. Osman Taylan Updated : February 10, 2008

IE 422 Industrial Systems Simulation (4:3,2)

Core Course

2008 Course (Catalog) Description:

Basic theory of industrial simulation. Building simulation models. Organization of simulation studies. Simulation modeling and application to medium and large-scale production and service system problems. Output analysis. Variance reduction and optimization. Use of software such as ARENA for discrete and continuous system simulation.

Prerequisites:	IE 322, and IE 332
Text Book:	Simulation with Arena, W. David Kelton, Randall P. Sadowski, and David T. Sturrock, 3rd Ed., 2004, McGraw-Hill.
References:	Simulation Modeling and Analysis 3rd Edition, A. L. Law, David Kelton, 3rd Ed, 2000, McGraw-Hill.

Class Schedule:

- Lecture: Two 1.5 hour sessions per week.
- Tutorial: One 2 hours session per week.

Course Objectives:

Students will understand the basic techniques for computer simulation, statistical analysis, building simulation models, organization of simulation studies, modeling concepts and its application to the medium and large-scale production and services system problems. The basic objectives of this course are:

1. Provide a comprehensive understanding of fundamental simulation concepts and ideas in general and the Arena simulation software in particular.
2. Ability to study and analyze systems under investigations, and define the statement of the problem under consideration.
3. Develop a skill to build basic, intermediate, and detailed operation models, analyze input data, verify, validate, well-animate and run these models using Arena simulation software.
4. Develop an ability to design experiments, analyze and interrupt the simulation results, and to present the findings effectively.
5. Demonstrate effective communication by working in teams and through writing proficiency at the level expected for a senior engineering student.

Topics Covered during the class:

1: What is Simulation?	(1 lecture)
2: Fundamental Simulation Concepts	(1 week).
3: A Guided Tour through Arena	(2 weeks).
4: Modeling Basic Operations and Input	(2 weeks).
5: Modeling detailed Operations	(3 weeks)
6: Statistical Analysis of Output from Terminating Simulations	(1 week).
7: Intermediate Modeling and Steady-State Statistical Analysis	(1 week).
8: Entity Transfer	(1 week).
9: Further Statistical Issues	(1 week).
10: Conducting Simulation Studies	(1 week).

Assessment Methods:

HA	QZ	M1	M2	ME	M3	OP	TP	IV	LRI	LRT	OE	AT
20	5	10	10	20	10	5	20					

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (M3) major 3, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (AT) Attendance.

Computer Usage: Arena Simulation Software, Input Analyzer, Output Analyzer, Process Analyzer, Opt Quest for Arena, Microsoft Excel, and Microsoft Word.

Laboratory: Not applicable

Contribution of course to Meeting the ABET professional Component :
ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science	:	1 credit for 25%
Engineering Design	:	1 credit for 25%
Mathematical science	:	1 credit for 25%
Human and social science	:	1 credit for 25 %

Course relationship matrix to ABET EC 2000 Program outcome.

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1		3	3		3						3		
2		3			3						3		
3		3	3		3						3		
4		3	3		3						3		
5											2		
Course contribution		3	3		3						3		

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared by: Dr Seraj Yousef Abed Dated: February, 2008

IE 431 Industrial Quality Control (3:3,1)

Core Course

2008 Course (Catalog) Description

Introduction to quality systems. Cost of quality. Total quality management. Quality systems and standards: six sigma and ISO. Reengineering. Statistical quality control: control charts for variables and attributes, process capability analysis, acceptance sampling plans. Quality function deployment. Quality circles. Quality loss functions.

Prerequisite:	IE332 Engineering Statistics, IE 352 System Analysis and design
Text Book:	Introduction to Statistical Quality Control, 4th Edition. Douglas C. Montgomery, John Wiley & Sons, 2001, ISBN 0-471-31648-2
References:	Quality Planning & Analysis. J. M, Juran & F. M. Gryna. Mc GRAW-HILL International Editions, 1993 Class notes and handouts material are provided by the instructor

Class Schedule:

The class meets three times a week. Twice as regular sessions of 1hour 20 minutes lecture each on Sunday and Tuesday from 8:00 to 9:20 AM and once for tutorial for 2 hours on Sunday from 14:30 to 16:30 PM.

Course Objectives:

The objective is to give students a sound understanding of principles and the basic notations

1. of probability and probability distribution, point and interval estimation of quality parameters
2. of statistical hypothesis testing from the quality engineering viewpoint
3. of the basic methods of statistical process control (SPC) as problem solving tools and methods for process capability analysis and statistical inferences
4. of describing the statistical basis of Control charts for variables and attributes outcomes
5. of developing team work for meeting challenges in professional life
6. of building professional skills and ethical behavior in professional life
7. of developing ability to adopt a scientific approach to any type of problems faced by individuals or society
8. of developing and extend the students knowledge of analytical techniques and application of statistical methods

Topics Covered During the Class:

1. Introduction to quality – Cost of Quality.
2. Review of statistical concepts/ methods.
3. Process control.
4. Control charts.
5. Acceptance sampling.
6. Operating characteristics curves.
7. Process capability.
8. Quality Systems:

a. Total Quality Management.
b. Reengineering concepts.
c. ISO systems.
d. Taguchi – Loss function.

9. Introduction to quality – Cost of Quality.
10. Review of statistical concepts/ methods.

Course Assessment Methods

There will be two quizzes, one major examination, one midterm exam, homework assignments for each chapter, in class activities related to real life questions and industrial problems, oral presentation of term project and report submission, extra credits for team works, self projects, final exam, and make up exam.

AT %	HA %	QZ%	M %	ME %	FE %	IC %	TP %
	10	5	20	20	30		15

(AT) Attendance, (HA) Homework Assignment, (IC) In class activities, (QZ) Quizzes, (M) Major, (ME) Midterm Exam, (FE) Final Exam, (TP) Term Project: team work, oral class participations.

Laboratory

Not applicable

Contribution of Course to Meeting the ABET professional Component

ABET category content as estimated by faculty member who prepared this course description.

Math. and Basic Science:	0.8 Credits or 20%
Engineering Science:	2.4 Credits or 60%
Engineering Design:	0.8 Credits or 20%
Human and Social Science:	00 Credits or 00%

Course relationship matrix to ABET EC 2000 Program outcome.

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	3						3				3		
2	3	3									3		
3	3	3	3			3	3				3		
4	3	3	3								3		
5						3	3						
6						3					3		
7	3	3	3								3		
8	3		3								3		
Course contribution	3	3	3			3	3				3		

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 1, 2 & 3 indicate Low, Medium and High relevance respectively.)*

Prepared By: Dr. Ahmad Al-Moreb Date: February, 2008

IE 432: Design Of Industrial Experiments (3:3,1)

Core Course:

2008 Catalogue Description

Principles of experimental design. Randomized complete block designs. Latin square and Graeco-Latin square designs. General factorial designs. 2^k Factorial designs. Response surface methodology and robust design. Planning, performing and analyzing industrial experiments

Prerequisites:	IE332: Engineering Statistics - II
Text Book:	Montgomery Douglas C. (2005), Design & Analysis of Experiments, 6th Ed. John Wiley and Sons, New York
References:	1. Jiju Antony (2003). Design of Experiments for Engineers and Scientists. 1st Ed. Butterworth-Heinemann. 2. Hines and Montgomery. (1990), Probability and Statistics for Engineers, John Wiley and Sons, NY. 3. Ronald D. Moen, Thomas W. Nolan and Lloyd P. Provost (1999) Quality Improvement through Planned Experiments, Mc Graw Hill, New York, 2nd Ed.

Class Schedule

The class meets three times a week. Twice as regular sessions and 50 minutes lecture each on Saturday, Monday and Wednesday from 8.00 to 9.00 a.m. and once for Tutorial on Saturday from 2.30 to 4 pm.

Course Objectives

At the end of the course the students will be able to:

1) Comprehend the fundamentals of experimental designs and basic notations
2) Understand the basic differences between types of experiments
3) Use appropriate methods for representing and analyzing experiments
4) Recognize the role of standards in society and their impact on experiments and results
5) Interpret results of experiments and draw meaningful conclusions and recommendations
6) Use computer skills to analyze experiments
7) Design and conduct experiments as well as to analyze and interpret data
8) Make clear presentation of experiments results and conclusions

Topics Covered during the class:

1: Some typical applications of experimental designs, basic principles, using statistical techniques in experimentation	1 week
2: Basic statistical concepts, sampling and sampling distributions, inferences about differences in means, randomized designs, inferences about differences in means and variances of normal distributions	2 weeks
3: The Analysis of variance: Analysis of the fixed effects model, model adequacy checking, practical interpretation of results, non-parametric methods in the analysis of variance	2 weeks
4: Randomized Blocks, Latin Squares & Related designs: Randomized complete block designs, Latin Square design, the Graeco-Latin Square design, balanced incomplete block designs	1 week
5: Factorial Designs: The advantage of factorials, the two factor factorial designs, the general factorial designs, fitting response surface curves and surfaces, blocking in factorial designs	2 weeks
6: 2^k Factorial Designs: The 2^2 design, the 2^3 design, the General 2^k factorial design, confounding the 2^k factorial design in 2^p blocks	3 weeks
7. Fitting Regression line models, Analysis of Variance for Regression models	2 weeks
8. Introduction to Response Surface Methodology, Robust Designs and Taguchi Methods	1 week

Computer Usage: Students are encouraged to use software such as Minitab and Excel to solve problems. Design Expert, software exclusively used for design of experiments will also be introduced.

Laboratory Projects: Computer exercises in the Computer laboratory for solving tutorial problems and getting trained to work on the Term project.

Assessment Methods:

HA	QZ	M1	M2	ME	FE	OP	TP	PF	LRI	LRT	OE	AT
5	5	10	10	10	30		20	5				5

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (PF) Portfolio file, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (AT) Attendance.

Contribution of Course to Meeting the ABET Professional Component

ABET category content as estimated by faculty member who prepared this curse description

Engineering Statistics	:	1 credit or 25%
Engineering Design	:	3 Credits or 75%

Course Relationship Matrix to ABET EC 2000 Program outcome.

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	1	1			2				1				
2	1	2			1				1		2		1
3		2			1				1		2		
4									1				2
5	3	3											1
6											3		
7	3	3			3		3		3		3		
8							3						
Course contribution	3	3			3		3		3		3		2

*(*Level of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 1, 2 & 3 indicate Low, Medium and High level of relevance*

Prepared by: Dr. Shoukath Ali **Dated: February, 2008**

IE 451 Production Planning and Control (3:3,1)

Core Course

2008 Course (Catalog) Description:

Basic concepts of Production and Operations Management (POM). Design of products and services. Processes and technologies. E-commerce and operations management. Inventory management. Supply-Chain management. Just-in-time and lean production. Forecasting. Material Requirements Planning (MRP). Introduction to Enterprise Requirement Planning (ERP). Capacity and Aggregate planning. Scheduling.

Prerequisites:	IE 311, IE 332, IE 351
Text Book	Heizer J., and Render B., Operations Management, 8th Ed, Pearson Prentice Hall, 2007
Reference	Russell R., Taylor III, B.W., Operations Management, 4th Ed, Pearson Prentice Hall, 2003

Class Schedule:

The classes to be held twice per week for lectures of 80 minutes (Sundays & Tuesdays: 8.00 -9.20 am) and tutorial once in a week for 150 minutes (Sundays: 2.30 - 4.30 pm).

Course Objectives:

At the end of the course the students will be able to:

1. Understand basic concepts of production and operations Management (POM): Various production processes including JIT (Just-in-Time), Aggregate production planning (APP), Material requirement planning (MRP), Capacity Requirement Planning (CRP),Inventory management, Supply chain management system (SCM), Forecasting and Scheduling
2. Design of products and services, techniques for improving design process, technology in design.
3. Explain/use the tools and techniques of various forecasting methods to calculate product demands, different inventory models to calculate reorder points and safety stock
4. Develop/compute aggregate production planning, MRP structure, Master production schedule (MPS), Bill of materials (BOM), Capacity requirement planning (CRP), and Perform Scheduling and loading, and sequencing jobs
5. Work within a team and communicate efficiently to perform the assigned tasks (Home works/Group Project)

Topics Covered during the class:		Week
1. Production and operations management,(POM): Introduction, why study POM , Categories of E-commerce, competitiveness, and productivity	(3 classes)	1
2. Design of products and services: Introduction, techniques for improving design process, technology in design	(3 classes)	2
3. Processes and technologies: Types of production processes, Process planning e-manufacturing	(3 classes)	3
4. Inventory management: Periodic inventory system, ABC classification system, EOQ models, Quantity discounts, Reorder points, Safety stock	(6 classes)	4,5
5. Supply-Chain management: What is SCM, Information in SCM, Distribution and Warehouse management, Transportation methods, Global supply chain	(3 classes)	6
6. Forecasting: Strategic role of forecasting, Time series methods (Moving average, Weighted moving average, Exponential smoothing, Regression method	(6 classes)	7,8
7. Just-in-time (JIT) and Lean production: Elements of JIT, The pull system, Kanban production system	(3 classes)	9
8. Capacity and Aggregate planning: What are Capacity planning and Aggregate production planning (APP), Inputs and Outputs to APP, APP using pure and mixed strategies, APP by linear programming model, Available-to-Promise (ATP), Aggregate Planning for Services, Yield Management	(6 classes)	10,11

9. Material Requirements Planning (MRP) and Enterprise Resource Planning (ERP): MRP structure, Master production schedule (MPS), Bill of materials, Lot-sizing techniques, and ERP fundamentals (6 classes) 12,13

10. Scheduling: Objectives, Loading and sequencing jobs in work centers (3 classes) 14

Assessment Methods/ Grading Policy:

HA	QZ	M1	ME	M2	FE	TP & OP	IV	LRI/LRT	OE	CP
10	10	10	15	10	30	10	-	-	-	5

HA: Homework Assignment, QZ: Quiz, M1: Major-1, ME: Midterm Exam, M2: Major-2, FE: Final Exam, OP: Oral presentation, TP: Term Project, IV: Report of industrial visits, LRI: Individual Laboratory reports, LRT: Team Laboratory Reports, OE: Oral Examination, CP: Class Participation

Laboratory: Not applicable

Contribution of course to Meeting the ABET professionals Component

- ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science	:	0.75 credit for 25%
Human and social science	:	0.75 credit for 25%
Engineering Design	:	0.6 credit for 20%
Math and Basic Sciences	:	0.9 credit for 30%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objective	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	1						2				1		
2	1				1						1		
3	2				2		2				3		
4	2				2		2				3		
5					2		3			1			
Course contribution	2				2		3			1	3		

*(*Level of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3 ,2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared by: Dr. Md. Rashidur Rotab Khan Date: February 24, 2008

IE 453 Facilities Planning (3:3,1)

Core Course

2008 Course (Catalog) Description:

Fundamentals of facilities planning. Facilities design. Flow, space, and activity relationships. Material handling systems. Layout planning models. Warehouse operations. Quantitative facilities planning models. Preparing, presenting, implementing and maintaining facilities plan.

Prerequisite:	IE 311, IE 332, IE 352
Text Book:	Facilities Planning (3rd edition) by Tompkins, White et al. John Wiley, New Jersey, 2003, ISBN 0-471-41389-5
Reference(s):	Manufacturing Facilities Design and Material Handling (3rd edition), Fred E. Meyers and Mathew Stephens, Pearson Prentice Hall, New Jersey, 2005, ISBN 0-13-112535-4

Class Schedule:

The classes to be held twice per week for lectures of 80 minutes Sat, Mon at 1:00-2:20 pm) and Tutorial once in a week for 150 minutes (Tues at 2.30 - 4.30 pm)

Course Objectives:

At the end of the course the students will be able to:

1. Understand the integrated nature of the discipline.
2. Apply the knowledge of flow process analysis to develop the material movement strategies.
3. Identify and develop different facilities layouts and solve real life industrial problems
4. Emphasize the importance and role of facilities planning in cost reduction and increased productivity
5. Work individually or within a team and communicate effectively to perform the assigned tasked (Homeworks/Group Project)

Topics Covered during the class:

1. Introduction to Facilities Planning - Week 1 (3 classes)
   - Objectives of Facilities Planning
   - Strategic Facilities Planning
2. Product, and Schedule Design Week 2 (3 classes)
   - Scrap Estimates, Equipment Fractions, and Facilities Design
3. Flow, Space, and Activity relationships Week 3-4 (6 classes)
   - Departmental Planning, Activity Planning
   - Flow Patterns and Measuring Flow
   - Space Requirements
4. Material Handling Week 5-6 (6 classes)
   - Scope, Definitions and Principles of Material Handling
   - Designing Material Handling Systems
   - Unit Load Design
   - Estimating Material Handling Costs
5. Layout Planning Models Week 7-8 (6 classes)
   - Basic Layout Types and Layout Procedures
   - Developing Layout Alternatives
   - Commercial Facility Layout Packages
6. Warehouse Operations Week 9 (3 classes)
   - Missions of a Warehouse and Functions in the Warehouse
   - Receiving and Shipping Operations
   - Dock Locations, and Storage Operations
7. Facilities Planning Models Week 10-11 (6 classes)

Facility Location Models
Location Allocation Model
Linear Assignment Model

8. Supply Chain Management — Week 12-13 (6 classes)
   - Elements of Supply Chain Management
   - Movement within a Facility
   - Incoming and Outgoing Shipments
   - Creating an Effective Supply Chain

9. Implementing and Maintaining the Facilities Plan — Week 14 (3 classes)
   - Preparing the Facilities Plan
   - Implementing the Facilities Plan
   - Maintaining the Facilities Plan

Assessment Methods:

HA	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	OE	CP
5	10	10	20	10	30		10					5

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (CP) Class Participation; Laboratory: Not applicable

Contribution of course to Meeting the ABET professional Component:
ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science : 2 credit for 67%
Human and social science : 1 credit for 33 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes [ABET EC 2000 criteria]												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	1						2				1		
2	1				1						1		
3	2				2		2				3		
4	2				2		2				3		
5					2		3			1			
Course contribution	2				2		3			1	3		

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared by: Dr. Md. Rashidur Rotab Khan — Date: February 24, 2008

IE 499 : SENIOR PROJECT (CAPSTONE DESIGN) (4:3,1)

Core Course

2008 Course (Catalog) Description:

Technical writing skills. Project work: a team-based capstone design work involving a practical, open ended, real life unstructured problem having a set of alternative solutions; emphasis on synthesis of knowledge and skills to assimilate and demonstrate a professional attitude and ethics in problem solving with assessment of environmental, cultural and social impacts; final output in the form of written report based on specified standard format, followed by a multimedia presentation of the work undertaken in the project..

Prerequisites: IE 411 & IE 422

Reference Books:

1. Dieter, E. "Engineering Design", P edition, McGraw-Hill, 2000. 2.
2. Fogler, and LaBlanc, "Strategies for Creative Problem Solving", Prentice Hall, 1995.
3. Software manuals

Web-page for the Course: Group name: project-ie-499
Group home page: خطأ! مرجع الارتباط التشعبي غير صالح.;
Group email: project-ie-499@yahoogroups.com

Class Schedule:

The classes are held twice per week for lectures (Technical Report Writing part) and once in a week while meeting with the advisor(s) (Project part).

Course Objectives: At the end of the course the students will be able to:

1. Apply the fundamentals developed in the curriculum to an actual design project.
2. Foster and develop creative, conceptual and analytical thinking skills.
3. Create proficiency with modem design tools including statistical tools and software systems' applications.
4. Develop teamwork concepts and understand the importance of developing good team dynamics.
5. Enhance written and oral communication skills, and
6. Implant a sense of ethics and professionalism.

Topics Covered during the class (Technical Report Writing part):

1. Design Methodology, Synthesis, Creativity and Conceptualization
2. Project Management Techniques
3. Problem Solving Heuristic
4. Teamwork Skills
5. Communication Skills; Written and Oral
6. Use of standards and design codes
7. Software Tutorials (e.g. MS Info Path, Mind Manager, MS Project, Arena etc.)
8. Cost Analysis
9. Engineering profession Ethics

Project Work: Students are expected to work in teams under the supervision of a faculty member and an advisor from industry to complete the project. The progress work of the project is discussed and evaluated weekly during the semester. A written report is submitted at the end of the second semester and a final oral examination is held. Advisor(s) and students have to consider the 15 points described in Attachment (1). Students have to prepare project report(s) according to the report guidelines described in Attachment (2).

Computer Usage: Students are encouraged to use appropriate software packages to analyze design systems. Mind manager, MS Info path and MS Project software packages are some of the recommended software examples used in building teamwork skills. Furthermore, Microsoft Power Point or equivalent is used for project presentations.

Assessment Methods: Student work will be assessed (85 %) for the items shown in the Attachment 3 (Forms: A, B, C & D). Technical Report writing part (15 %) would be evaluated separately by the concerned instructor, assigned at the Faculty level.

Contribution of course to meeting the ABET professional component:

ABET category contents as estimated by faculty member who prepared this course description.

Math and Basic Science	:	0 Credits or 0%
Engineering Science	:	1 Credit or 25%
Engineering Design	:	2 Credit or 50%
Human and social science	:	1 Credit or 25 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes [ABET EC 2000 criteria]												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	3	3	3	1							3		
2	3	3	3	1	3				1	2	3	2	2
3	3	3	3	1	3				1	2	3	2	2
4				3		3	3	3	3			2	2
5				3		3	3	3	3	3	3	3	2
6			2	3		3	2	3	3	3	3	3	3
Course contribution	3	3	3	2	3	2	3	3	2	2	3	3	2

Cell entries represent "Level of Relevance" signifying the contribution of the course objectives towards achieving a specific program outcome. [Numerals 1, 2 & 3 indicate High, Medium and Low level of relevance respectively.)

Prepared By: Prof Sayed Aliul Hasan Rizvi dated: February 2008

ELECTIVES

IE 357 Introduction To Entrepreneurship (3:3,2)

Elective Course: (Offered in Alternate Semesters)

2008 Course (Catalog) Description:

This course combines class room lectures with field study and exercises supplemented with guest lectures and case studies on small and medium scale industries. The course offers the basic framework for understanding the process of entrepreneurship, principles of management and related techniques in decision making, planning, marketing, and financial control. Exercises in product design and prototype development, preparation of workable project feasibility reports, practical ideas about launching their own enterprises are also covered.

Prerequisite: IE255:Engineering Economy

Books:

1. Jeffry A. Timmons and Stephen Spinelli, New Venture Creation: Entrepreneurship for the 21st Century, ISBN: 0072498404, Irwin/McGraw-Hill, 6th Ed, (2004).
2. Donald F. Kuratko and Richard M. Hodgetts, Entrepreneurship: Theory, Process, and Practice (with InfoTrac), ISBN: 0324258267, South-Western College Pub; 6th Ed (2003).
3. Jack M. Kaplan, Getting Started in Entrepreneurship, ISBN: 0-471- 9456-X, John Wiley, (2001).
4. Class notes/handouts materials provided by the instructor.
5. Web-page for the Course: Group name: ent1-kau ; Group home page: http://groups.yahoo.com/group/ent1-kau ; Group email: ent1-kau1@yahoogroups.com

Class Schedule: The classes are held twice per week for lectures and once in a week for tutorials.

Course Learning Objectives: At the end of the course the students will be able to:

CLO_1 Explain the entrepreneurial traits and skills.
CLO_2 Select and evaluate a business idea against a personal vision involving lifestyle, and professional and financial goals.
CLO_3 Manage a small/medium scale industry in terms of human resource management (HRM), marketing, finance and project management, and successfully interact with experts in the field for developing an understanding of the practical aspects of the entrepreneurship.
CLO_4 Apply analytical and critical thinking skills to determine the feasibility of a business concept and build an effective and persuasive case for the feasibility of a selected business concept.
CLO_5 Prepare a technically and financially viable project proposal for submission to financial institutions for approval to start an entrepreneurial venture.

Topics Covered during the class	(number of lecture-DAYS):
Introduction to entrepreneurship	(2) ;
Introduction to small & medium scale industries	(2);
product selection	(2) ;
management of small/ medium scale industries:human resource mangmnt	(3)
management of small/ medium scale industries:marketing	(3) ;
Management of small/ medium scale industries: financial management	(6);
Project management	(3);
feasibility studies: operational aspects	(2);
feasibility studies: technological aspects	(1);
prototype development	(8).

Assessment Methods:

HA with OP	QZ	M1	ME	M2	FE	TP with FS PD & OP	IV	LRI/LRT	OE	AT
6nos.x 5= 30	6nos.x 5 =30	-	10	-	-	15+10+5= 30		-	-	-

[HA : Home Assignment/Research work QZ : Quiz, M1: Major-1, ME: Midterm Exam, M2: Major-2, FE: Final Exam, OP : Oral presentation, TP : Term Project, IV : Report of industrial visits, LRI: Individual Laboratory reports, LRT : Team Laboratory Reports, OE : Oral Examination, AT: Attendance FS: Feasibility Studies, PD: Prototype development]

Contribution of course to meeting the ABET professional component:

ABET category contents as estimated by faculty member who prepared this course description.

Engineering Design	:	2	Credit
Human and social science	:	1	Credit

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Learning Objectives(CLO)	Program Outcomes [ABET EC 2000 criteria]												
	a	b	c	d	e	f	g	h	i	j	k	l	m
CLO_1						3	3				2		
CLO_2						2		2					
CLO_3											2		
CLO_4				2		3					2		
CLO_5				3		3		2			2		3
Course contribution				3		3	3	2			2		3

Cell entries represent "Level of Relevance" signifying the contribution of the course objectives towards achieving a specific program outcome. [Numerals 1, 2 & 3 indicate High, Medium and Low level of relevance respectively.)

Prepared By: Prof Sayed Aliul Hasan Rizvi Date: February, 2008

IE 412 Decision Analysis (3:3, 1)

Elective Course
2008 Course (Catalog) Description:

Principles of decision making under uncertainty. Decision models: influence diagram and decision tree. Solution and analysis of decision problems. Value of information. Attitudes towards risk. Utility theory. Multiattribute decision problems.

Prerequisites:	IE 311, IE 331
Text Book:	MAKING HARD DECISIONS: AN INTRODUCTION TO DECISION ANALYSIS Robert T. Clemen, 2nd Ed., 1996, Duxbury Press, ISBN 0-534-26034-9
References:	Decision Making Under Uncertainty: Models and Choices, 1979, Charles A. Holloway, Prentice Hall, ISBN 0-13-197749-0

Class Schedule:
The class meets four times a week. Three times are for regular sessions of 50 minutes of lecture times and 2 hours of tutorial time. Ramadan times are 35 min. of lecture times and 1 hour of tutorial time.

Course Objectives:
At the end of the course, students will be able to:

1. Explain fundamentals of decision analysis with logical and chronological thinking.
2. Model decision problems under uncertainty.
3. Solve decision problems using the rolling back procedure.
4. Identify structure of decision problems.
5. Perform sensitivity analysis of decision problems.
6. Compute the value of information.
7. Explain attitudes towards risk.
8. Do projects in decision analysis, and use various computer skills.
9. Work in teams to solve homework problems and do projects.

Topics Covered during the class:

- Introduction to Decision Analysis: Why are decisions hard? Subjective judgments in decision-making, the decision-analysis process, requisite decision models, where is decision analysis used? (1 week)
- Modeling Decisions: Elements of Decision Problems: Values and objectives, making money: a special objective, sequential decisions, uncertain events, consequences, the time value of money: a special kind of trade-off (1 week)
- Structuring Decisions: Structuring values, structuring decisions: influence diagrams, sequential decisions, intermediate calculations, structuring decisions: decision trees, decision details: defining elements of the decision, defining measurement scales for fundamental objectives (2 weeks)
- Making Choices: decision trees and expected monetary value, solving influence diagrams: overview, risk profiles, dominance: an alternative to EMV, making decisions with multiple objectives, assessing trade-off weights (2 weeks)
- Sensitivity Analysis: one-way sensitivity analysis, Rainbow diagrams, Tornado diagrams, dominance considerations, two-way sensitivity analysis, sensitivity to probabilities, two-way sensitivity analysis for three alternatives (2 weeks)
- Value of Information: Value of information: some basic ideas, expected value of perfect information, expected value of imperfect information, value of information and experts (2 weeks)

- Modeling Preferences: Risk Attitudes: Risk, risk attitudes, expected utility, certainty equivalents, and risk premiums, utility function assessment, risk tolerance and the exponential utility function, decreasing and constant risk aversion (2 weeks)

- Conflicting Objectives: Objectives and attributes, Multiple-Objective decisions, Multiattribute utility models (2 weeks)

Assessment Methods:

HA	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	OE	AT
15		15		20	25		20					5

(HA) Homework Assignment (QZ) Quiz, (M1) Major1, (ME) Midterm Exam, (M2) Major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (AT) Attendance

Laboratory: Tutorial Sessions

Contribution of course to Meeting the ABET professional Component:
ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science	:	1.5 Credit for 50%
Engineering Design	:	0.5 Credit for 17%
Human and social science	:	1.0 Credit for 33 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	3				3								
2	3				3								
3	3				3								
4	3				3								
5	3				3						3		
6	3				3						2		
7	3				3								
8	3				3		1		2	2			
9	3			3	3								
Course contribution	3*			3	3		1		2	2	3		

(**Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.*)

Prepared by: Dr Ibrahim Al-Darrab Dated: February 2008

IE 413 Network Analysis (3:3,1)

Elective Course
2008 Course (Catalog) Description:

Introduction to network analysis with industrial applications. Systems modeling and analysis using network techniques. CPM with LP formulation, PERT with LP formulation and cost analysis. Other network algorithms: Minimum spanning tree, shortest path and Maximal flow problem. Flowgraph theory. GERT: exclusive OR networks.

Prerequisites:	IE 311, IE 331
Text Book:	SYSTEMS ANALYSIS AND DESIGN USING NETWORK TECHNIQUES Gary E. Whitehouse, 2nd Ed., 1973, Prentice-Hall, Inc., ISBN 0-13-881474-0
References:	Project Management with CPM and PERT, Joseph J. Moder and Cecil R. Phillips, 2nd Ed., 1970, Van Nostrand Reinhold Company, ISBN 0-442-15666-9 Linear Programming and Network Flows, 2nd Ed., Mokhtar S. Bazaraa, John J. Jarvis, and Hanif D. Sherali, 1990, John Wiley & Sons, Inc., ISBN 0-471-63681-9 World Wide Web (The internet)

Class Schedule:
The class meets four times a week. Three times are for regular sessions of 1 hour of lecture time and 2 hours of tutorial time.

Course Objectives:
At the end of the course, students will be able to:

1. Comprehend the fundamentals of network analysis and basic notations.
2. Comprehend network models and representations for project management and generate project schedules.
3. Apply various algorithms for solving network problems.
4. Comprehend network problems and know how to solve them using available techniques.
5. Comprehend the logic of introducing uncertainty into network models.
6. Use of computer software in solving network problems.
7. Work in teams to solve network problems.
8. Apply network algorithms to a real life problem using various sources such as the internet and investigate various relevant areas of knowledge.
9. Make clear presentations of network problems and solutions.

Topics Covered during the class:

- Introduction: Systems Modeling and Analysis Using Network Techniques, system modeling, types of models to be studied, advantages and disadvantages of network modeling techniques (1 week)
- Activity Networks: PERT and CPM, arrow diagrams, PERT: Program Evaluation and Review Technique, CPM: Critical Path Method, project control, using Microsoft Office Project, linear programming formulation and using Excel (3 weeks)
- Shortest Path Algorithms: Directed acyclic networks, directed cyclic networks, Dijkstra's algorithm, the revised cascade method, some applications, other related algorithms to be obtained from the internet and presented in class such as minimum spanning tree algorithm (3 weeks)

- Maximal Flow Analysis: Ford and Fulkerson's labeling procedure, Max-Flow-Min-Cut theorem, the matrix approach, relationship between linear programming and maximal flow problem, other applications (2 weeks)
- Flowgraph Analysis: Definition of flowgraph analysis, methods of solution of flowgraphs, topological equivalence, node reduction methods, applications of flowgraphs for system modeling (3 weeks)
- Stochastic Networks: GERT – An analytical approach to stochastic networks, Elements of the GERT network, evaluation of Exclusive-OR GERT network, counters and conditional MGF's, applications of Stochastic Networks (3 weeks)

Assessment Methods:

HA	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	OE	AT
10	10	15		15	25		20					5

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (AT) Attendance

Laboratory: Not applicable

Contribution of course to Meeting the ABET professional Component:
ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science	:	1.5 Credit or 50%
Engineering Design	:	1.0 Credit or 35%
Human and social science	:	0.5 Credit or 15 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	2			3	3								
2	2			3	3								
3	3			2	3								
4	3			3	3								
5	2			2	3								
6				2	3						3		
7				2	3	2							
8									2				
9				2			2						
Course contribution	3*			3	3	2	2		2		3		

(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)

Prepared by: Dr Ibrahim Al-Darrab Dated: February, 2008

IE 421: Industrial Information Systems (3:3, 1)

Elective Course
2008 Course (Catalog) Description:

General concepts. Values and attributes of information. Different types of information systems. Concepts of managerial information systems. Emphasis on analysis, design, and development of industrial information systems. Developing information systems by using microcomputers.

Prerequisites:	IE 323
Textbook:	Management Information Systems – Managing the Digital Firm: Laudon & Laudon Prentice Hall: ISBN: 0-13-153841-1
References:	Management Information Systems: Effy OzThomson: ISBN 0-619-21538-0 Class notes and handouts material by the instructor is available on website at http://elearning.alhaque.com . The site requires registration by the students.

Class Schedule:
This is a Departmental Elective Course. The class meets 3 times a week for lectures, and tutorial. The lecture is of 80 minutes, and the tutorial is for 110 minutes.

Course Objectives:
As a consequent of the classroom experience, the students will be able to:

1. Explain the importance of Information Systems for business & management.
2. Identify ethical implications of Information Systems.
3. Describe how enterprise applications promote business process integration
4. Identify how to improve organizational performance with Information Systems
5. Explain the Strategic Role of Information Systems in Organizations
6. Analyze how internet technology has changed value propositions and business models
7. Identify the challenges posed by enterprise applications and management solutions
8. Describe how building new systems produce organizational change.
9. Demonstrate harmony by communicating effectively in multi-disciplinary teams
10. Deliver clear oral and written presentation using visual aids
11. Demonstrate Information Systems' fundamentals during class project using computers

Topics Covered during the class:

		Classes
1.	Introduction to Information Systems	(3 classes)
2.	Information Systems for Competitive Advantage	(2 classes)
3.	Using Information Technology to Engage in Electronic Commerce	(3 classes)
4.	System Users and Developers	(3 classes)
5.	Systems Development	(4 classes)
6.	Information in Action	(3 classes)
7.	Information Security	(3 classes)
8.	Ethical Implications of Information Technology	(3 classes)
9.	Decision Support Systems	(4 classes)
10.	Web /HTML Project Using Microsoft FrontPage – I	(3 classes)
11.	Web/HTML Project Using Microsoft FrontPage - II	(3 classes)
12.	Class Project	(2 classes)

Assessment Methods:

HA	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	CP	CE
10	15		20		30		15				5	5

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (CP) Class Participation, (CE) Class Exercises

Topics Covered During Laboratory:

Computer Usage Microsoft: Word, Excel, PowerPoint, Internet Explorer, Windows XP

Contribution of Course to Meeting the ABET professional Component

ABET category content as estimated by faculty member who prepared this course description.

-

Math and Basic Science:
Engineering Science: 25 %
Engineering Design: 50 %
Human and Social Science: 25 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1					2		2						
2				2		2							
3					2		2						
4				2									
5					2		2						
6					2								
7					2						2		
8				2	2								
9				3	3								
10				3	3	2	3						
11		3		3	3		3				2		
Course contribution		3		3	3	2	3				2		

(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)

Prepared By: Dr Muhammad E Ulhaque Date: May 09, 2008

IE 423 Computer Aided Manufacturing System (3:3,1)

Elective Course

2008 Course (Catalog) Description:

Foundation of CAD/CAM. Fundamentals of CAM. Computer graphics software and data. Computer aided manufacturing: numerical control, NC part programming, NC, DNC and CNC systems. Industrial robots and applications. Computer Integrated manufacturing systems (CIMS).

Prerequisites:	IE 321, MENG 130
Instructor:	Dr. Raed R. Obaid
Text Book:	Valentino J., and Goldenberg J., Introduction to Computer Numerical Control, 3rd Ed, Prentice Hall, 2003
Reference:	Weatherall A., Computer Integrated manufacturing, Butterworth Heinmann, 1985 Seamens W.S., Computer Numerical Control – Concepts and Programming, Delmar, 1983

Class Schedule:

The classes to be held twice per week for lectures of 80 minutes (Sundays & Tuesdays: 8.00 -9.20 am) and tutorial once in a week for 150 minutes (Sundays: 2.30 - 4.30 pm).

Course Objectives:

At the end of the course the students will be able to:

1. Understand basic concepts of Computer Numerical Control (CNC) machines
2. Develop/compute the process plan of simple components from drawing, write the part program in Machine Language and execute it on a model CNC machine (We use Spectra light model CNC lathe and milling machines). Also, students learn to write part program in APT for simple 2-D components
3. Explain/use the working principles of different types of Robots and be able to write programs in VAL II. Also, explain the philosophy and methods of Group Technology (GT) and develop some ability to design machine cells based on GT. Explain the basic principles of CAPP and how CIMS work. Also, explain the philosophy and working principles of Flexible Manufacturing System (FMS)
4. Work individually or within a team and communicate efficiently to perform the assigned tasks(Assignments//Home works/Group Project)

Topics Covered during the class:		Week
1. Introduction: Introduction to CNC manufacturing, modern machine tool control, 2. safety instruction	(2 classes)	1
3. Drilling and Milling Operations: Introduction, Tooling for drilling and milling 4. operations, features of CNC machining centers, word address programming	(4 classes)	2,3
5. Hole Operations: Programming hole operations	(2 classes)	4
6. Profile Programming: Programming linear profile, programming circular profile 7. cutter diameter compensation	(4 classes)	5,6
8. Subprogramming: Programming with subprograms	(2 classes)	7
9. Lathe Operation: Introduction to CNC lathe operation, CNC lathe programming	(4 classes)	8,9
10. Computer Aided Part Programming: What are CAPP, using APT programming	(4 classes)	10,11
11. Robot Technology: Physical configurations, basic motions, work cell control, 12. robot programming methods, VAL II programming, application of robot structure	(2 classes)	12
13. Group Technology: Part families, classification and coding systems, 14. group technology and machine cells	(2 classes)	13
15. Computer Integrated Manufacturing: Benefits of CIM, machine tools and related		

16. systems, automated material handling system, flexible manufacturing system (FMS)(2 classes) 14

Assessment Methods:

HA	QZ	M1	ME	M2	FE	TP & OP	IV	LRI/LRT	OE	CP
10	10	10	15	10	30	10	-	-	-	5

HA: Homework Assignment, QZ: Quiz, M1: Major-1, ME: Midterm Exam, M2: Major-2, FE: Final Exam, OP: Oral presentation, TP: Term Project, IV: Report of industrial visits, LRI: Individual Laboratory reports, LRT: Team Laboratory Reports, OE: Oral Examination, CP: Class Participation, Laboratory: Not applicable

Contribution of course to Meeting the ABET professionals Component
ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science	:	0.75 credit for 25%
Human and social science	:	0.75 credit for 25%
Engineering Design	:	0.6 credit for 20%
Math and Basic Sciences	:	0.9 credit for 30%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objective	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	1						2				1		
2	1				1						1		
3	2				2		2				3		
4	2				2		2				3		
5					2		3			1			
Course contribution	2				2		3			1	3		

*(*Level of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3 , 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared by: Dr. Raed R. Obaid Date: June 16, 2008

IE 424: Data Processing Operations Credit (3:3, 1)

Elective Course
2008 Course (Catalog) Description:

Concepts of advanced database management system design, principles, and techniques. Entity relationship diagram. Normalization. Object oriented and object relational databases. Data warehousing. Data mining. Web and semi structural data. Data Security.

Prerequisite(s): IE 323 Computer Application In Industrial Engineering I

Text Book: Database Systems By Thomas Connolly , Carolyn Begg
Publisher: Addison-Wesley Copyright: 2005 4th Edition
ISBN: 9780321294012

Resource Material All Material is available on the website WWW.WAHMAD.NET / WWW.WAHMAD.COM . You need to register yourself in order to access the resource material . Your computer No is your user name select your password accordingly

Reference: Oracle Database 10g Certification SQL Exam Guide By: Jason Price, Jason Price
ISBN: 0072229810

Enterprise Data Center Design and Methodology: Rob Snevely ISBN: 0-13-047393-6: Publisher: Prentice Hall: Copyright: 2002

Class Schedule
This is a Departmental Elective Course. The class meets 2 times a week for lectures, and tutorial. The lecture is of 80 minutes, and the tutorial is for 110 minutes.

Course Objectives :
This course is designed to introduce to the students:

1. Understand two important stages of a database development project: data modelling and database design
2. Understand and demonstrate popular design methods of a relational database such as normal forms and entity relationship diagrams.
3. Demonstrate and understand the backup and restore procedures and disaster recovery methods.
4. Develop and implement a SQL/PLSQL relational database system.
5. Management of Data warehousing, Data Mining , and distributed systems.
6. To research, write and present technical report using modern engineering tools.

Topics Covered during the class :

- Introduction to Databases (1 week)
- Database Theory (1 week)
- Database Application Lifecycle (1 week)
- Oracle Forms and Triggers (3 week)
- Data Modeling (1 week)
- Database Users and Administration (1 week)
- PLSQL control structures and loops (2 week)
- Database Security, Integrity and Recovery (1 week)
- Object Databases (1 week)
- Client Server, Distributed and Internet Databases (1 week)
- Data Warehousing, Mining and Web Tools (1 week)

Computer Usage : ER-win Software, Oracle 9i or 10g, developer 2000

Laboratory : Software Demonstration
Problem Solving Session in Computer Laboratory.
Term Projects

Assessment Methods:
Detailed marks distribution for the course is given in the following table.

HA	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	OE	AT
10	10	10	10	10	35		10					5

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (AT) Attendance

Contribution of course to Meeting the ABET professionals Component
ABET category content as estimated by faculty member who prepared this course description.

Engineering Science: 2 Credits or 50%
Engineering Design: 1 Credit or 25%
Human and Social science: 1 Credit or 25%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1			3		3				3		2		
2			3		3						2		
3			3		3						2		
4			3		3								
5			3		3				2		3		
6			3		3				2		3		
Course contribution			3		3				3		3		

(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)

Prepared by: Dr Waqar Ahmed Date: February, 2008

IE 433 Reliability Engineering (3:3,1)

Elective Course

2008 Course (Catalog) Description:

Introduction to reliability analysis. Reliability measures: reliability function, expected life, hazard function of important distribution functions. Hazard models and product life. Extreme value distribution. Static reliability models. Dynamic reliability models. System effectiveness measures. Reliability allocation and optimization. Introduction to fault tree analysis and human reliability.

Prerequisites:	IE 332, IE 411
Text Book:	RELIABILITY IN ENGINEERING DESIGN K.C. Kapur and, L. R. Lamberson 1977, John Wiley & Sons, Inc., ISBN 0-471-51191-9 INTRODUCTION TO RELIABILITY IN DESIGN Charles O. Smith and E.Robert, 1983, Krieger Publishing Company, Inc., Malabar, Florida, ISBN 0-89874-553-5
References:	**أسس الهندسة الصناعية**، عبد الرزاق ع. أبو النور ، محمد الصادق ع. الجفري ، مصطفى م. الباسوسي ، علي م. رشدي ، مركز النشر العلمي ، جامعة الملك عبد العزيز ، جدة ، ١٤٢٠هـ - ١٩٩٩م.

Class Schedule:

The class meets four times a week. Three times are for regular sessions of 50 minutes of lecture times and 2 hours of tutorial time. Ramadan times are 35 min. of lecture times and 1 hour of tutorial time.

Course Objectives:

At the end of the course, students will be able to:

1. Explain fundamentals of reliability analysis.
2. Model and analyze reliability problems.
3. Study static reliability models and solve various static reliability problems.
4. Study dynamic reliability models and solve various dynamic reliability problems.
5. Study and analyze extreme value problems in relation to reliability systems.
6. Apply system effectiveness measures.
7. Explain reliability optimization and fault tree analysis.
8. Effectively use computer packages to solve reliability problems.
9. Search the internet for being updated with recent developments in reliability studies.

Topics Covered during the class:

- Introduction to reliability and Reliability Measures: Reliability Function, the expected life, the failure rate and hazard function, Reliability and hazard function for well-known distribution functions. (2 week)
- Hazard models and product life: constant, linearly increasing, bathtub, power function and exponential model, Estimating the hazard function, Distribution selection: exponential, Weibull, and geometric distributions, the extreme value distribution and applications. (3 week)
- Static Reliability Models: Series systems, parallel systems, combinations, complex system analysis, Reliability considerations in design, (2 weeks)
- Dynamic Reliability Models: The series system, series chain, parallel system, parallel redundant systems, and standby redundant systems. Perfect switching and imperfect (2 weeks)

switching. Shared load parallel models.

- System Effectiveness Measures: Maintainability, operational readiness, availability, intrinsic availability. (1 weeks)
- Introduction to life testing. Reliability allocation and optimization algorithms and approaches. (2 weeks)
- Introduction to fault Tree Analysis and its engineering applications. (2 weeks)

Assessment Methods:

HA	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	OE	AT
15			25		35		20					5

(HA) Homework Assignment (QZ) Quiz, (M1) Major1, (ME) Midterm Exam, (M2) Major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (AT) Attendance

Laboratory: Tutorial Sessions

Contribution of course to Meeting the ABET professional Component:

- ABET category contents as estimated by faculty member who prepared this course description.

Math and Basic Science	:	1.0 Credit or 33%
Engineering Science	:	1.0 Credit for 33%
Engineering Design	:	1.0 Credit for 33 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	3	1			2								
2	3	1			2								
3	3	1			3								
4	3	1			3								
5	3				3								
6	3				3						2		
7	3		3		3								
8		1			3						3		
9				3	3		2		2	1			
Course contribution	3*	1	3	3	3		2		2	1	3		

(**Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.*)

Prepared by: Dr Ibrahim Al-Darrab Date: February 2008

IE434: Industrial Stochastic Systems (3:3, 1)

Elective Course

2008 Course (Catalog) Description:

Deterministic and stochastic processes. Poisson process and related distributions. Birth and death processes. Markov processes with continuous state space. Renewal process and theory. Markovian decision processes in industry. Markovian and non-Markovian systems. Stochastic models for transportation and maintenance systems. Introduction to simulation modeling of stochastic systems

Prerequisites:	IE332: Engineering Statistics - II
Text Book:	Tijms, H.C; A First Course in Stochastic Models (2003), Wiley New York

References:

1) Donald Gross, Carl M. Harris; Fundamentals of Queuing Theory, 3rd Edition, John Wiley and Sons, New York (1998)
2) Tijms, H.C; Stochastic Models – An Algorithmic Approach (1994), Wiley New York
3) Barlette, M.S; An Introduction to Stochastic Processes, Cambridge University Press, London (1978)
4) E.Wong and B.Hajek; Stochastic Processes in Engineering Systems, Springer Verlag, New York (1985)

Class Schedule

The class meets three times a week. Twice as regular sessions and 50 minutes lecture each on Saturday, Monday and Wednesday from 8.00 to 9.00 a.m. and once for Tutorial on Saturday from 2.30 to 4 pm.

Course Objectives

At the end of the course the students will be able to:

1. Realize and identify the fact that most of the natural processes are stochastic in nature
2. Apply engineering sciences and theory related to processes of stochastic nature
3. Identify, formulate, analyze and solve engineering problems
4. To provide professional expertise in solving problems in industrial systems of society.
5. To provide expertise in using appropriate modern techniques, skills and engineering tools, in classroom, laboratories, and other educational settings.
6. Function effectively in multidisciplinary teams, in a wide range of organizations,
7. Communicate effectively in written and oral media,
8. To provide students with the necessary education to understand the impact of engineering solutions in local and global societal contexts

Topics Covered during the class:

1: Stochastic and deterministic processes, Poisson process and related distributions, birth and death processes	1 week
2: Markov processes with discrete state space, definition and examples of Markov chains	1 week
3: Transition probabilities, statistical inference on Markov chains	1 week
4: Markov processes with continuous state space, Renewal process and theory	1 week
5: Time series models, statistical analysis of time series	2 weeks
6: Markovian decision processes in industry and service sectors	2 weeks
7: Modeling and design and queuing systems, steady state and transient behavior in queuing systems, Non-Markovian queuing systems	2 weeks
8: Probabilistic inventory models, single period and multi-period inventory models, perishable inventory system modeling	2 weeks
9: Stochastic modeling of transportation systems	2 weeks

10: Simulation modeling of stochastic systems 2 weeks

Computer Usage: Software such as Design Expert, Minitab and Excel shall be amply used to solve problems.

Laboratory Projects: Computer exercises in the Computer laboratory for solving tutorial problems and getting trained to work on the Term project.

Course Assessment Methods

The course grade will be determined in the following way:

Quizzes & Assignments	Major1	Midterm	Major II	Final Exam	Term Project	Attendance	Total
10	10	15	10	35	15	5	100

Contribution of Course to Meeting the ABET Professional Component

ABET category content as estimated by faculty member who prepared this curse description

Engineering Statistics: 1 credit or 25%

Engineering Design: 3 Credits or 75%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	1	1			2				1				
2	1	2			1				1		2		1
3		2			1				1		2		
4									1				2
5	3	3											1
6											3		
7	3	3			3		3		3		3		
8							3						
Course contribution	3	3			3		3		3		3		2

*(*Level of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 1, 2 & 3 indicate Low, Medium and High level of relevance*

Prepared By: Dr. Shoukath Ali Date: February, 2008

IE 435: Queuing Analyses (3: 3, 2)

Elective Course
2008 Course (Catalog) Description:

Description and characteristics of queuing systems, measures of effectiveness, single and multiple Markovian queues. Queues with general arrival and service rates. Steady state and transient solutions. Optimization problems in queuing. Application case studies in production, transportation communication and public service systems.

Prerequisites:	IE332: Engineering Statistics - II
Text Book:	Donald Gross and Carl M. Harris (2002). Fundamentals of Queuing Theory. John Wiley & Sons
References:	1. Sanjay K. Bose (2002). An Introduction to Queuing Systems. Kluwer Academic. 2. Saaty T.L. (1991) Elements of Queuing Theory with Applications, McGraw Hill, NY

Course Objectives
At the end of the course the students will be able to:

1. Understand formulation of queuing systems of different types.
2. Learn the concepts of analytical modeling techniques.
3. Get exposed to the converting real life systems into mode Is.
4. Be trained to use these models for analyzing and predicting responses of real life systems to changing factors that influence their behavior.
5. Develop ability to adopt a scientific approach to any type problems faced by individuals or society.
6. Improve their overall outlook of facing difficult situations in life.
7. Learn the use of advanced software packages needed in professional life.
8. Acquire an overall improvement in analytical and computing power.

Topics Covered during the class:

- Basic concepts of waiting line theory.
- Analysis of Queuing systems and Performance measures.
- Markovian Queues. Birth-Death Process Modeling.
- Steady state and Transient behavior.
- Non-Markovian Queuing systems.
- Optimization problems in queuing.
- Simulation of Queuing Systems.
- Applications of Queuing Theory in industry and service organizations, Communication, Computer Networks etc.
- Applications and case studies in production, transportation communication and public service systems.
- Software Applications

Computer Usage: Students are encouraged to use software such as WinQSB, TORA, LINDO and LINGO to solve problems.

Laboratory Projects: Software demonstrations Problem Solving Sessions in Computer Laboratory
Term Projects

Course Assessment Methods

Quizzes & Assignments	Major1	Midterm	Major II	Final Exam	Term Project	Attendance	Portfolio File	Total
10	10	10	10	30	20	5	5	100

Contribution of Course to Meeting the ABET Professional Component

ABET category content as estimated by faculty member who prepared this course

Mathematics and Basic Science	1 Credit or 25%
Engineering Science	2 Credits or 50%
Engineering Design	1 Credit or 25%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	٣		٣		٣				3			٢	
2	٣		٣		٢				٣		٣	٣	
3	٣		٢		١		٢		٢		٢		
4	٣		٢						١				
5	٣		٢				١					١	
6											٢		
7											٢		
8	٢						١						
Course contribution	3		3		3		2		3		3	٣	

*(*Level of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 1, 2 & 3 indicate Low, Medium and High level of relevance*

Prepared By: Dr. Shoukath Ali Date: February, 2008

IE-436 Dynamic Forecasting (3: 3,1)

Elective Course:

2008 Course (Catalog) Description:

Time series and forecasting. Forecasting accuracy. Monitoring and controlling forecasts. Linear and multiple regression with forecasting applications. Box-Jenkins (ARIMA) methodology. Introduction to fundamental and technical analysis with applications in financial markets. Introduction to neural networks. Judgmental forecasting.

Prerequisite: IE 332

Textbook: 1. Business Forecasting by Hanke &Wichern, 8th. Edition, Pearson Prentice Hall, 2005.
2. Operations management by R.Russell & B. W. Taylor III, 4th Edition, Pearson Prentice Hall, 2005.

Class Schedule:

The class meets 3 times a week for lectures and tutorial. The lecture is of 80 minutes and the tutorial is for 110 minutes.

Course Objectives:

When students complete this course, they should be able to:

1- Understand the difference between time series forecasting and causal (regression) forecasting.
2- Compute forecasts using the various methods and tools presented in the course outline.
3- Measure forecast accuracy.
4- Learn how to use forecasting packages (Minitab and Excel) for various forecasting.
5- Apply Box-Jinkins (ARIMA) methodology for forecasting.
6- Work in a group for case studies analysis and reporting.
7- Develop & use power-point for case studies oral presentation.

Topics Covered during the class:

1	Introduction to Forecasting	1 week
2	Exploring data Patterns	1 week
3	Choosing a Forecasting Technique	½ week
4	Measures of forecasting accuracy	½ week
5	Moving averages	1 week
6	Exponential smoothing	1 week
7	Trend, Seasonal & cyclic variations in data	2 week
8	Simple Linear regression	1 week
9	Multiple Regression Analysis	1 week
10	Introduction to Box-Jenkins (ARIMA) Methodology	2 week
11	Judgmental Forecasting	1 week
12	Case Study	2 weeks

Assessment Methods:

HA	AT	OP	TP	M1	M2	FE
5	5	10	10	20	20	30

(HA) Homework Assignment, (M1) Major-1 Exam, (M2) major-2 Exam, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, reports. (AT) Attendance

Laboratory: Not applicable

Contribution of course to Meeting the ABET professional Components

- ABET category contents as estimated by the faculty member who prepared this course description.

Engineering Science	:	1 credit for 33 %
Math and Basic Sciences	:	2 credits for 67%

Course relationship matrix to ABET EC 2000 Program outcome.

Course Objectives	Program Outcomes As of ABET EC 2000 criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	3				3						3		
2	3	3											
3	3				3						3		
4		3			3						3		
5	3				3						3		
6		3			3						3		
7							3						
Course contribution	3	2			3		1				3		

*(*Level Of Relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation 3, 2 & 1 indicate High, Medium and Low relevance respectively.)*

Prepared By: Prof. Said Ali Hassan Date: June 17, 2008

IE 441 Industrial Safety Engineering (3:3,1)

Elective Course
2008 Course (Catalog) Description:

Accident: causes and costs. Appraising safety performance and risk assessment. Analysis of accident causes. Accident reports and records. Job safety analysis. Plant inspection. Accident investigation. Plant layout and arrangement. Plant housekeeping. Maintenance and safety. Material handling and safety. Machine guarding. Explosion and fire prevention. Personal protection. First aid. Planning for emergencies.

Prerequisites:	IE342
Textbook:	Industrial Safety and Health Management, 5/e, Asfahl, C.R., Prentice Hall Upper Saddle River, New Jersey, © 2005.
Reference:	Accident Prevention Manual for Business and Industry: Administration and Programs (Vol. I), Engineering and Technology (Vol. II), 11/e, Krieger, G.R., (Ed), National Safety Council, Itasca © 1997.

Class Schedule:
The class meets three times in week. Two times are for regular sessions of 1 hour 20 minutes of lecture times and 3 hours of laboratory time.

Course Objectives:
At the end of the course the students should be able to:

1. Anticipate and recognize work hazards and accident causes, analyze them and assess their impact on productivity.
2. Initiate and maintain a safety program for an organization.
3. Comprehend safety aspects and control of work accidents.
4. Improve communication skills with industry for solving industrial safety problems.

Topics Covered during the Class:

• Safety instructions	(1 class)
• Accident during work: cost and causes	(2 classes)
• Appraising safety performance and risk assessment	(2 classes)
• Analysis of accident causes	(2 classes)
• Accident report and records	(2 classes)
• Job safety analysis	(2 classes)
• Plant inspection	(2 classes)
• Accident investigation	(2 classes)
• Plant layout and arrangement	(2 classes)
• Plant housekeeping	(2 classes)
• Maintenance and safety	(2 classes)
• Material handling and safety	(2 classes)
• Machine guarding	(1 class)
• Explosion and fire prevention	(2 classes)
• Personal protection	(2 classes)
• First aid	(1 class)
• Planning for emergencies	(2 classes)

Term Projects:
Students' projects for appraising safety performance in some of the local industries.

Assessment Methods:

HAs	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	OE	AT
10	-	10	10	10	40	10	10	-	-	-	-	-

(HA): Homework Assignment, (QZ): Quiz, (M1): Major 1, (ME): Midterm Exam, (M2): Major 2, (FE): Final Exam, (OP): Oral Presentation, (TP): Term Project, (IV): Report of Industrial Visits, (LRI): Individual Laboratories Reports, (LRT): Team Laboratory Reports, (OE): Oral Examination, (AT): Attendance.

Contribution of Course to Meeting ABET Professional Component:

ABET category contents as estimated by faculty member who prepared this course description.

- Engineering Science : 1.5 credit for 50%
- Engineering Design : 1.0 credit for 33%
- Human and Social Science : 0.5 credit for 17%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes as of ABET EC 2000 Criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	1	2			3			3					
2			3										
3	1		2		2								
4							1			2			
Course Contribution	1	2	3		3		1	3		2			

(Level of relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation3,2&1 indicate High, Medium and Low relevance respectively).

Prepared by: Prof. Madbuli H. Noweir Date: March 20, 2008

IE 442 Industrial Hygiene Engineering (3:3,1)

Elective Course

2008 Course (Catalog) Description:

Occupational exposure: permissible levels and legal aspects. Hazards' anticipation and recognition. Physical hazards particularly heat, noise and vibration, light, non-ionizing and ionizing radiations: assessment and control. Chemical agents: assessment and control. Industrial ventilation. Design of local exhaust systems.

Prerequisites :	IE 342
Textbook:	The Occupational Environment: its Evaluation and Control. Di Nardi, S.R. (Ed), American Industrial Hygiene Association, Fairfax, VA (1997). Class notes and handouts by the instructor
Reference	Patty's Industrial Hygiene (Vol. 1,2,3&4), Harris, R. (ed), 5th ed. American Industrial Hygiene Association, Fairfax, VA (2000). Plog, B.A.; Niland, J.; Quinlan, P.J.: Fundamentals of Industrial Hygiene. National Safety council, Itasca, III., USA.

Class Schedule :

The class meets three times in week. Two times are for regular sessions of 1 hour 20 minutes of lecture times and 3 hours of laboratory time.

Course Objectives:

At the end of the course the students should be able to:

1. Anticipate effects of environmental conditions on human health and productivity, and in particular as related to developing countries.
2. Anticipate and recognize environmental hazards arising from or during work.
3. Evaluate environmental hazards and assess risk.
4. Solve environmental and work problems, eliminate hazards and abate and control work hazards.
5. Communicate with industry and community for solving industrial environmental problems (case studies).

Topics Covered during the Class:

- Introduction and background: philosophy and history of industrial hygiene (1 class)
- Occupational exposure limits and legal aspects (3 classes)
- Occupational hazards: anticipation and recognition (2 classes)
- Physical hazards: recognition, assessment and control: heat, noise, light, non-ionizing and ionizing radiations (10 classes)
- Chemical agents in industry: recognition, assessment and control:
  - i. Particulates: fate of industrial particles
  - ii. Non-particulates: entry, absorption, detoxification, elimination and effects (6 classes)
- Permissible levels: development and application (2 classes)
- Industrial ventilation: general ventilation vs. local exhaust, design of local exhaust system: operating and maintenance (6 classes)

Laboratory Projects:

- Experiments on assessment of heat, noise, illumination, and air contaminants: particulates and gases and vapors, and in testing ventilation system's efficiency.
- Students' projects: air pollution and study of industrial hygiene problems in some local industries.

Assessment Methods:

HAs	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	OE	AT
10	-	5	10	5	30	5	10	5	5	10	-	5

(HA): Homework Assignment, (QZ): Quiz, (M1): Major 1, (ME): Midterm Exam, (M2): Major 2, (FE): Final Exam, (OP): Oral Presentation, (TP): Term Project, (IV): Report of Industrial Visits, (LRI): Individual Laboratories Reports, (LRT): Team Laboratory Reports, (OE): Oral Examination, (AT): Attendance.

Contribution of Course to Meeting ABET Professional Component:

ABET category contents as estimated by faculty member who prepared this course description.

- Engineering Science : 1.5 credit for 50%
- Engineering Design : 1.0 credit for 33%
- Human and Social Science : 0.5 credit for 17%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes as of ABET EC 2000 Criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1						2		3					
2		2			3								
3		3			3						1		
4			2		3								
5								2		2	1		
Course Contribution		3	2		3	2		3		2	1		

(Level of relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation3,2&1 indicate High, Medium and Low relevance respectively).

Prepared by: Prof. Madbuli H. Noweir Date: March 21, 2008

IE 443 Industrial Environmental Engineering (3:3,1)

Elective Course
2008 Course (Catalog) Description:

Basics of natural systems. Industrial environment as part of the ecological system. Water quality management. Waste water treatment. Air pollution. Noise pollution. Solid waste management. Hazardous waste management. Ionizing radiation. Case studies.

Prerequisites:	IE 342; Human Factors Engineering
Textbook	Principles of Environmental Engineering and Science 1/e, Davis, M.L., Masten, S.J., Mc Graw-Hill, 2004.
Reference:	Handbook of Environmental Health Vols I&II, 4/e, Koren, H., Bisesi, M., CRC Press, 2002.

Class Schedule:
The class meets three times a week. Two times are for regular sessions of 1 hour 20 minutes of lecture times and 2 hours of tutorial and laboratory time.

Course Objectives:
At the end of the course the students should be able to:

1. Anticipate the impact of natural and man-made factors on the ecosystem and on human health, activity and productivity.
2. Anticipate and recognize environmental hazards arising from or during human activities.
3. Evaluate environmental hazards and assess risks.
4. Solve environmental and human activities problems, eliminate hazards and abate and control environmental hazards.
5. Communicate with governmental agencies, industry and community for solving environmental problems (case studies).

Topics Covered during the Class:

• Introduction to environmental engineering and science	(1 class)
• Environmental legislation, regulation and ethics	(1 class)
• Basics of natural systems	(1 class)
• Industrial environment as a part of ecological system	(1 class)
• Risk assessment and management	(1 class)
• Materials and energy balances	(1 class)
• Water quality management	(3 classes)
• Water treatment	(2 classes)
• Waste water treatment	(3 classes)
• Air pollution	(3 classes)
• Air pollution control	(3 classes)
• Solid waste management	(2 classes)
• Hazardous waste management	(1 class)
• Noise pollution	(2 classes)
• Ionizing radiation	(2 classes)

Laboratory Projects:
Experiments on assessment of some environmental hazards, e.g., heat stress, community noise and air pollutants (particulates, and gases and vapors).

Assessment Methods:

HAs	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	OE	AT
10	5	10	10	10	35	-	10	-	5	-	-	5

(HA): Homework Assignment, (QZ): Quiz, (M1): Major 1, (ME): Midterm Exam, (M2): Major 2, (FE): Final Exam, (OP): Oral Presentation, (TP): Term Project, (IV): Report of Institutional Visits, (LRI): Individual Laboratories Reports, (LRT): Team Laboratory Reports, (OE): Oral Examination, (AT): Attendance.

Contribution of Course to Meeting ABET Professional Component:

- ABET category contents as estimated by faculty member who prepared this course description.
  - Engineering Science : 1.5 credit for 50%
  - Engineering Design : 1.00 credit for 34%
  - Human and Social Science : 0.50 credit for 16%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes as of ABET EC 2000 Criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	1					2		2					
2	1							3					
3	2							3			2		
4	2				3								
5										1			
Course Contribution	2				3	2		3		1	2		

(Level of relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation3,2&1 indicate High, Medium and Low relevance respectively).

Prepared by: Dr. Mohamed A. Zytoon Date: February 9, 2008

IE 444: Occupational Biomechanics Credit Hours: (3: 3, 2)

Elective Course

2008 Course (Catalog) Description:

Introduction to Occupational Biomechanics. Review of kinematics and kinetics. Anthropometry. Mechanical work-capacity evaluation. Bio-instrumentation for Occupational Biomechanics. Biomechanical models. Methods of classifying and evaluating manual work. Manual material handling limits. Biomechanical considerations in machine control and workplace design. Hand tool design guidelines. Guidelines for seated work.

Prerequisite:	IE 342: Human Factors Engineering
Text Book:	Occupational Biomechanics (3rd edition) by D.B. Chaffin, G.B.J. Andersson, and B.J. Martin, John Wiley, New Jersey, 2006, ISBN 978-0-471-72343-1.
Reference Books:	1. Ergonomics: How to Design for Ease and Efficiency (2nd edition) by K.H.E Kroemer, H.B. Kroemer, and K.E. Kroemer-Elbert, Prentice Hall, New Jersey, 2000, ISBN 978-0137524785. 2. Tayyari, F & Smith, J, 1997, Occupational Ergonomics, Principles & Applications, Chapman & Hall: London. [SITE: www.thomson.com] 3. Bridger, R S, 1995, Introduction to Ergonomics, New York: Mc Graw Hill 4. Class notes/handouts materials provided by the instructor.

Class Schedule:

The class meets three times a week. Two times are for regular sessions of 1 hour 20 minutes of lecture times and 2 hours of tutorial and laboratory time.

Course Objectives: At the end of the course the students will be able to:

1. Explain the Basic Concepts of Occupational Biomechanics.
2. Solve for forces, moments and/or moment arms for a given free body diagram that is said to be in static equilibrium.
3. Estimate all required anthropometric values necessary in the equations of motion.
4. Model a given joint with appropriate anatomical structures and then calculate the muscular and joint reaction forces which are required to maintain static equilibrium in the joint.
5. List the risk factors for occupational low back, neck, hand/wrist, elbow, shoulder etc. injuries and be able to identify them in a given work situation.
6. Work in a Team and communicate effectively.

Topics Covered during the class (number of weeks):

Definition of Occupational Biomechanics. Historical Development of Occupational Biomechanics. The Need for an Occupational Biomechanics Specialty. Who Uses Occupational Biomechanics? (1 week), Connective Tissue, Skeletal Muscle, Joints. (1 week), Measurement of Physical Properties of Body Segments, Anthropometric Data for Biomechanical Studies in Industry, Summary of Anthropometry in Occupational Biomechanics. (1 week), Joint Motion: Methods and Data, Muscle Strength Evaluation, Summary and Limitations of Mechanical Work-Capacity Data. (1 week), Why Model?. Planar Static Biomechanical Models, Three-dimensional Modeling of Static Strength Dynamic Biomechanical Models, Special-purpose Biomechanical Models of Occupational Tasks (2 weeks), Traditional Methods of classifying and evaluating manual work, Traditional Work Analysis System, Contemporary Biomechanical Job Analysis (2 weeks), Lifting Limits in Manual Material Handling, Pushing and Pulling Capabilities, Recommendations for improving Manual Materials Handling Tasks (1 week), Practical Guidelines for Workplace and machine Control Layout, Maintaining the Facilities Plan (1 week), The Need for Biomechanical Concepts in Design, Shape and Size considerations, Hand-Tool Weight and Use Considerations, Force Reaction Considerations in Powered Hand-tool Design Keyboard Design Considerations (2 weeks), General Considerations

Related to Sitting Postures, Anthropometric Aspects of Seated Workers, Comfort, The Spine and Sitting The Shoulder and Sitting, The Legs and Sitting, The Sitting Workplace (2 weeks)

Assessment Methods:

HA	QZ	M1	ME	M2	FE	TP & OP
5	5	10	20	10	40	10

HA : Homework Assignment, QZ : Quiz, M1: Major-1, ME: Midterm Exam, M2 : Major-2, FE: Final Exam, OP : Oral presentation, TP : Term Project,

Contribution of course to meeting the ABET professional component:

ABET category contents as estimated by faculty member who prepared this course description.

Math and Basic Science	:	1 Credits or 25%
Engineering Science	:	1 Credit or 25%
Engineering Design	:	1 Credit or 25%
Human and social science	:	1 Credit or 25 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes [ABET EC 2000 criteria]												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	1												
2	3				2								
3	2				2								
4	1		2									2	1
5								2					
6				3			2						
Course contribution	3		2	3	2	-	2	2	-	-	-	2	1

Cell entries represent " Level Of Relevance" signifying the contribution of the course objectives towards achieving a specific program outcome. [Numerals 3, 2 & 1 indicate High, Medium and Low level of relevance respectively.)

Prepared By: Dr. Zahid Akhtar Khan Date: February 03, 2008

IE 452: Maintenance & Replacement Policies (4:3,2)

Elective Course

2008 Course (Catalog) Description:

Maintenance systems. Maintenance operation and control. Preventive Maintenance: concepts, modeling, and analysis. Maintenance planning and scheduling. Maintenance material control. Computerized Maintenance Management Systems. Replacement studies. Case studies.

Prerequisite :	IE 332: Engineering Statistics & IE 351: Industrial Management
Text Book:	Duffuaa, S O, Raouf, A & Campbell, J D, 1999, Planning & Control of Maintenance Systems, Modeling and Analysis, John Wiley & Sons, New York, USA. [ISBN: 0-471-17981-7]
Reference Books:	1. Campbell, J D, 1995, Strategies for Excellence in Maintenance Management, Productivity Press, Portland. 2. British Standard Institute, Glossary of General Terms in Maintenance Management: BS 3811. 3. Smith, A M, 1993, Reliability Centered Maintenance, McGraw Hill, New York. 4. Palmer, D, 1999, Maintenance Planning and Scheduling Handbook, McGraw Hill, New York. 5. Class notes/handouts materials provided by the instructor. 6. Web-page for the Course: Group name: mrp2 Group home page: http://groups.yahoo.com/group/mrp2 Group email: mrp2@yahoogroups.com

Class Schedule:

The classes are held twice per week for lectures (Sundays & Tuesdays during 0930-1050 Hours) and once in a week for Tutorials(Tuesdays: 1430-1600 Hours).

Course Learning Objectives:

At the end of the course the students will be able to:

CLO_1. Explain maintenance-function as a system.
CLO_2. Operate and control a maintenance system.
CLO_3. Explain the mechanism of the breakdown repair.
CLO_4. Explain and design complete maintenance system based on maintenance planning, scheduling and control, and also demonstrate how to handle and evaluate various computerized maintenance management systems (CMMS s).

Topics Covered during the class (number of lectures):

Maintenance systems	(6);
Maintenance operation and control	(6);
Preventive maintenance, concepts, modeling and analysis	(8);
Maintenance planning and scheduling	(8);
Maintenance material control	(4);
Computerized maintenance management systems	(6);
Replacement studies	(4);
Case studies	(4).

Assessment Methods:

HA/TUT	QZ	M1	ME	M2	FE	TP& OP	IV	LRI/LRT	OE	AT
10	10	10	20	10	30	10	-	-	-	-

[HA : Homework Assignment, TUT :Tutorial works QZ : Quiz, M1: Major-1, ME: Midterm Exam, M2: Major-2, FE: Final Exam, OP : Oral presentation, TP : Term Project, IV : Report of industrial visits, LRI: Individual Laboratory reports, LRT : Team Laboratory Reports, OE : Oral Examination, AT: Attendance]

Contribution of course to meeting the ABET professional component:

ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science : 1 Credit

Engineering Design : 2 Credits

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Learning Objectives(CLO)	Program Outcomes [ABET EC 2000 criteria]												
	a	b	c	d	e	f	g	h	i	j	k	l	m
CLO_1	3		2										
CLO_2	3		3										
CLO_3	3		3		2						3		
CLO_4	3		3		3		2				3		
Course contribution	3		3		3		2				3		

Cell entries represent " Level Of Relevance" signifying the contribution of the course objectives towards achieving a specific program outcome. [Numerals 3, 2 & 1, as per Bloom's Taxonomy, indicate High (Synthesis/Evaluation), Medium Application / Analysis) and Low(Knowledge/ Comprehension) level of skill respectively.]

Prepared By: Prof Sayed Aliul Hasan Rizvi Date: February 09, 2008

IE 454: Engineering Cost Analysis (3:3,1)

Elective Course

2008 Course (Catalog) Description:

Importance of cost analysis in engineering. Cost terms and concepts. Cost estimation for decision making: cost-volume-profit analysis, measuring relevant costs and revenues, cost assignment, and activity-based costing. Cost evaluation of engineering alternatives. Case studies.

Prerequisite(s):	IE 332 , IE 351
Text Book:	Management Accounting For business By Colin Drury Publisher: Thomson Learning 2005 ISBN 1-84480-152-7
Resource Material:	All Material is available on the website **WWW.WAHMAD.NET /WWW.WAHMAD.COM** . You need to register yourself in order to access the resource material . Your computer No is your user name select your password accordingly

Class Schedule

The classes are held twice per week for lectures (Sundays & Tuesdays during 0930-1050 Hours) and once in a week for Tutorials(Wednesday: 1430-1600 Hours).

Course Objectives:

At the end of this course, students will be able to :

1. understand the concepts of cost analysis , cost terms and management accounting.
2. calculate and apply Cost-Volume-Profit Analysis
3. Make decisions by Measuring relevant cost and revenues.
4. Calculate and explain the cost assignment.
5. Compute and explain Activity based costing
6. An ability to use the techniques, skills, and modern engineering tools necessary for cost decision practices

Topics Covered during the class:

- Introduction to Cost Analysis and Management Accounting (2 classes)
- Introduction to Cost Terms (3 classes)
- Cost-Volume-Profit Analysis (3 classes)
- Measuring Relevant Costs and Revenues for Decision-Making (4 classes)
- Cost Assignment (5 classes)
- Distinguish between cause-and-effect and arbitrary cost (5 classes)
- Activity Based costing (6 classes)

Computer Usage :	Microsoft Excel
Laboratory :	Problem Solving Session

Assessment Methods:

Detailed marks distribution for the course is given in the following table.

HA	QZ	M1	ME	M2	FE	OP	TP	IV	LRI	LRT	OE	AT
10	10	10	10	10	35		10					5

(HA)Homework Assignment (QZ)Quiz, (M1) Major1, (ME) Midterm Exam, (M2) major 2, (FE) Final Exam, (OP) Oral presentation, (TP) Term Project, (IV) Report of industrial visits, (LRI) Individual Laboratory reports, (LRT) Team Laboratory Reports, (OE) Oral Examination, (AT) Attendance

Contribution of course to Meeting the ABET professional Component :

- ABET category contents as estimated by faculty member who prepared this course description.

Math and Basic Science:	1 Credit or 25%
Engineering Science:	2 Credits or 50%
Engineering Design:	1 Credit or 25%

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes as of ABET EC 2000 Criteria												
	a	b	c	d	e	F	g	h	i	j	k	l	m
1	3				3								
2					3								
3	3				3								
4	3				3								
5	3				3								
6											3		
Course Contribution	3				3						3		

Cell entries represent " Level Of Relevance" signifying the contribution of the course objectives towards achieving a specific program outcome. [Numerals 3, 2 & 1, as per Bloom's Taxonomy, indicate High (Synthesis/Evaluation), Medium Application / Analysis) and Low(Knowledge/ Comprehension) level of skill respectively.]

Prepared By: Dr Waqar Ahmed Date: February 09, 2008

IE 455: Material Handling And Packaging (3: 3, 1)

Elective Course

2008 Course (Catalog) Description:

Historical development of material handling and packaging. Objectives and principles of material handling. Material handling concepts: unit load, containerization, ASRS. Types of material handling equipment and their economics. Role of packaging in material handling. Areas of special importance to packaging. Package design. Economics of packaging. Package research and testing. Management of the packaging function.

Prerequisites:	IE 332: Engineering Statistics, IE 351: Industrial Management
Text Books:	1. Material handling by Raymond A. Kulwiec, John Wiley, New Jersey, 1985. 2. Fundamentals of Packaging Technology by Klalter Soroka, Richard Warrington, 1995.
Reference Book:	Materials Handling Equipment by N. Rudenko, Mir Publications, Moscow, 1969.

Class Schedule:

The class meets three times a week. Two times are for regular sessions of 1 hour 20 minutes of lecture times and 2 hours of tutorial and laboratory time.

Course Objectives: At the end of the course the students will be able to:

1. Learn fundamental principles of material handling systems.
2. Develop understanding of special concepts in material handling.
3. Learn analytical procedures for the study of different material handling equipment.
4. Learn fundamental principles of packaging.
5. Improve presentation and team work skills.

Topics Covered during the class:

Basis for material handling analysis	(4 classes),
Principles of material handling	(8 classes),
The unit load concept	(4 classes),
Packaging principles	(8 classes),
Materials used for Packaging	(10 classes),
Equipment selection Procedure	(8 classes),
Material handling cost concepts	(8 classes),
Storage and Warehousing	(6 classes)

Assessment Methods:

HA	QZ	M1	ME	M2	FE	TP & OP
10	10	10	15	10	30	15

HA : Homework Assignment, QZ : Quiz, M1: Major-1, ME: Midterm Exam, M2 : Major-2, FE: Final Exam, OP : Oral presentation, TP : Term Project,

Contribution of course to meeting the ABET professional component:

ABET category contents as estimated by faculty member who prepared this course description.

Math and Basic Science : 1 Credits or 25%

Engineering Science : 1 Credit or 25%
Engineering Design : 1 Credit or 25%
Human and social science : 1 Credit or 25 %

Relationship matrix of Course Objectives to Program outcomes (Criterion 3: ABET EC 2000).

Course Objectives	Program Outcomes [ABET EC 2000 criteria]												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	1								2				
2	2								3				
3	2				3								
4	1								2				
5				2			3						
Course contribution	2			2	3		3		3	-	-		

(Cell entries represent " Level Of Relevance" signifying the contribution of the course objectives towards achieving a specific program outcome. [Numerals 3, 2 & 1 indicate High, Medium and Low level of relevance respectively.)

Prepared By: Dr. Zahid Akhtar Khan Date: February 03, 2008

IE 456 Industrial Engineering Practice (3:1,3)

Elective Course:

2008 Catalog Course Description:

Overview of all areas of Industrial Engineering (IE). Identification of specific IE tools for industrial and managerial enterprises. Brainstorming sessions of several pre selected industrial and business enterprises. Visiting the sites and conducting walk-through surveys. On-site studies of IE applications and practices. Preparation of visit-reports containing findings, comments and recommendations pertaining to every visit. Multimedia-based presentation of visit-reports.

Prerequisites:	IE451.
Textbook:	Heizer J. and Render B.: Production and Operation Management, 7th Ed, Pearson Prentice Hall, 2005.
Reference:	1. Tompkins, W., et al: Facilities Planning, 3rd Ed. John Wiley & Sons, 2003. 2. Kanawati, G. (Ed): Introduction to Work Study, 4th Ed. International Labour Organization, Geneve, 1992. 3. Asfahl, C.R.: Industrial Safety and Health Management, 5th Ed. Prentice Hall, 2005.

Class Schedule:

The class meets twice weekly. One for regular session of 1 hour 20 minutes for preparation of the forthcoming field visit, and presentation and discussion as related to the previous one; the second session of 4-6 hours for the field visit of the selected industrial, service and/or business enterprise.

Course Objectives:

At the end of the course the students should be able to:

1. Use industrial engineering knowledge in actual life situations, in general, and in particular as related to the following aspects..
2. Apply the skills of "productivity-enhancement" in industrial and non-industrial environments of work; as well as comparing and contrasting the prevalent economic systems, verifying the significance of human resource management, the organization structure and design in professional life..
3. Understand the strategic role of Information Systems in organizations, and their application for promoting business process integration and improving organizational performance..
4. Anticipate, recognize and suggest controls for work and environmental hazards, as well as accident causes.
5. Work efficiently in multidisciplinary team, and work efficiently in assigned work.
6. Communicate effectively in written/oral communication skills.

Topics and Activities Covered during the Class:

The students visit selected industrial and business enterprises (twelve visits during one semester) with the following objectives:

1. Walk-through survey of the industrial operations, reviewing:
a) Facility layout and general design of workplace and workstations.
b) Job design and performance.
2. Discussion with key manager(s) as related to the application of IE principles in:
a) Operation planning and control.
b) Management systems design.
c) Work measurement and design.
d) Application of information systems.
e) Quality control.
f) Financial and personnel management(s).

The students are divided into 5-6 teams, who are rotating their interest in the field visits towards the different IE aspects. The teams prepare and present in one class outlines and basic information for the forthcoming visit, as well as present reports in class for the previous visit, including students' observation, comments, recommendations, and have discussion among each other, directed by the coordinator(s), of all their technical interests in the visit.

Assessment Methods:

HA1	HA2	OP1	OP2	AT1	AT2	TVR	IC	IV
10	10	10	15	10	10	15	10	10

(HA1): Homework Assignment (visit preparation report), (HA2): Homework Assignment (visit description individual report), (OP1): Oral Presentation (visit preparation), (OP2): Oral Presentation (visit results and discussion), (AT1): Attendance of visits, (AT2): Attendance of presentations, (TVR): Team Visit Report, (IC): In Class discussion, (IV): In Visit interest and discussions.

Contribution of Course to Meeting ABET Professional Component:

- ABET category contents as estimated by faculty member who prepared this course description.

Engineering Science	:	1.5 credit for 50%
Engineering Design	:	0.75 credit for 25%
Human and Social Science	:	0.75 credit for 25%

Course Relationship Matrix to ABET EC 2000 Program Outcomes:

Course Objectives	Program Outcomes as of ABET EC 2000 Criteria												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1				2	2	1	2			2	3		
2				2	2	1	2			2	3		
3				2	2	1	2			2	3		
4				3	2	1	2			2	3		
5				3	2	1	2			2	3		
6				3	2	1	2			2	3		
Course Contribution				3	2	1	2			2	3		

(Level of relevance signifies the contribution of the course objectives towards achieving a specific program outcome. Numeral designation3,2&1 indicate High, Medium and Low relevance respectively).

Prepared by: Prof. Madbuli H. Noweir, Sc.D. Date: January 15, 2008