Faculty of Engineering – King Khalid University

Industrial Engineering Program

Study Plan

Contents

Distribution of Courses

over

Different Levels

Industrial Engineering Department

First Year-Common Engineering Year

LEVEL 1:

Course No.	Course Code	Course Title	No. of credit hours	Weekly hours distribution		Prerequisite
				Lecture	Practical	
013	ENG	Intensive English (1)	6	--	6	
107	CHEM	General chemistry	4	3	1	
119	MATH	Differentiation and Integration	3	3	--	
111	GME	Engineering Drawing (1)	3	--	3	
Total No. of Credits			**16**	**6**	**10**	

LEVEL 2:

Course No.	Course Code	Course Title	No. of credit hours	Weekly hours distribution		Prerequisite
				Lecture	Practical	
111	IC	Islamic Culture (1)	2	2	--	
014	ENG	Intensive English (2)	6	--	6	ENG 013
129	MATH	Algebra and Geometry	3	3	--	
129	PHYS	Physics (1)	4	3	1	
121	ME	Production Technology and Workshop	3	1	2	GME 111
Total No. of Credits			**18**	**9**	**9**	

Industrial Engineering Department

LEVEL 3:

Course No.	Course Code	Course Title	No. of credit hours	Weekly hours distribution		Prerequisite
				Lecture	Practical	
101	COMP	Computer Science	3	2	1	
112	IC	Islamic Culture (2)	2	2	--	
201	ARAB	skills of Arabic Language	2	2	--	
211	ME	Engineering Mechanics	4	3	1	
219	MATH	Differentiation and Integration (1)	3	3	--	MATH 119
212	ME	Material science (1)	3	2	1	MATH 129 + PHYS 129
Total No. of Credits			**17**	**14**	**3**	

LEVEL 4:

Course No.	Course Code	Course Title	No. of credit hours	Weekly hours distribution		Prerequisite
				Lecture	Practical	
113	IC	Islamic Culture (3)	2	2	--	
202	ARAB	Arabic Writing	2	2	----	ARAB 201
221	IE	Introduction to Industrial Engineering	3	3	--	
222	ME	Strength of Materials and Testing	3	2	1	
224	ME	Engineering Drawing (2)	3	1	2	+ ME 121 COMP 101
229	MATH	Differentiation and Integration (2)	3	3	--	MATH 219
Total No. of Credits			**16**	**13**	**3**	

Industrial Engineering Department

LEVEL 5:

Course No.	Course Code	Course Title	No. of credit hours	Weekly hours distribution		Prerequisite
				Lecture	Practical	
114	IC	Islamic Culture (4)	2	2	--	
301	ENG	Technical Reports Writing	2	2	--	ENG 014
411	ME	Machines Design (1)	3	2	1	ME 222
312	IE	Measurement Instruments	3	2	1	ME 121
218	EE	Electric Engineering (1)	3	2	1	MATH 129 + PHYS 129
319	MATH	Differential Equations	3	3	--	MATH 219
Total No. of Credits			**16**	**13**	**3**	

LEVEL 6:

Course No.	Course Code	Course Title	No. of credit hours	Weekly hours distribution		Prerequisite
				Lecture	Practical	
012	COMP	Computer Programming (1)	3	2	1	COMP 101
322	IE	Operation Researches (1)	3	2	1	
323	IE	Industrial Quality Control	3	2	1	
324	IE	Manufacturing Engineering (1)	3	2	1	ME 121
328	ME	Fluids and Thermodynamics	3	2	1	PHYS 129
329	STAT	Principles of Statistics and Probability	2	2	--	
Total No. of Credits			**17**	**12**	**5**	

Industrial Engineering Department

LEVEL 7:

Course No.	Course Code	Course Title	No. of credit hours	Weekly hours distribution		Prerequisite
				Lecture	Practical	
411	IE	Industrial Systems Simulation	3	2	1	STAT 329
412	IE	Manufacturing Engineering (2)	3	2	1	IE 324
413	IE	Production Planning	3	3	--	
414	IE	Operation Researches (2)	3	2	1	IE 322
415	IE	Computer Aided Manufacturing-(CAM)	3	2	1	IE 324
419	MATH	Numerical Methods	3	3	--	COMP 101 + MATH 319
Total No. of Credits			**18**	**14**	**4**	

LEVEL 8:

Course No.	Course Code	Course Title	No. of credit hours	Weekly hours distribution		Prerequisite
				Lecture	Practical	
421	IE	Human Factors Engineering	3	2	1	
422	IE	Environment Engineering	2	2	--	
423	IE	Inventory Control and Materials Handling	3	2	1	
424	IE	Engineering Economy	2	2	--	
425	IE	Plant Layout	3	3	---	
328	EE	Electric Engineering (2)	3	2	1	EE 218
Total No. of Credits			**16**	**13**	**3**	

Industrial Engineering Department

LEVEL 9:

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Course No.	Course Code	Course Title	No. of credit hours	Weekly hours distribution		Prerequisite
				Lecture	Practical	
511	IE	Engineering Reliability and Maintenance	2	2	--	
512	IE	Industrial Safety	2	2	--	IE 422
513	IE	Industrial Operations Analysis	2	2	--	IE 412
514	IE	Industrial Projects management	2	2	--	
515	IE	Automatic Control	3	2	1	MATH 319
516	IE	Costs Analysis and Value Engineering	2	2	---	IE 424
591	IE	Graduation Project*	3	--	3	
Total No. of Credits			**16**	**12**	**4**	

Registration for the graduation project is eligible when the student has not more than 36 credit hours left for graduation. Work within the graduation project should continue for two semesters. The student will be given incomplete at the end of the first semester. The final degree of the project will be given in the following semester

LEVEL 10:

Course No.	Course Code	Course Title	No. of credit hours	Weekly hours distribution		Prerequisite
				Lecture	Practical	
521	IE	Industrial Robots	3	2	1	IE 515
522	IE	Computer Applications in Industrial Engineering	2	---	2	COMP 012
523	IE	Work Study	3	2	1	
524	IE	Design and Analysis of Industrial Systems	3	2	1	IE 513
525	IE	Design of Experiments	2	2	--	STAT 329
Total No. of Credits			13	8	5	

Course Syllabi and Description
for
Common First Year
(Common Engineering Program)

Course Syllabi and Description
for
Second year

Department : Industrial Engineering

Course Description	***Introduction to Industrial Engineering and Systems***
Course Number	***IE221***
Credit(*Theoretical + Tutorial/Lab*)	***3(3+0)***
Level /year	***4 -2***
Prerequisites	**-**

1) Brief Course Description:

This course deals with the definition of Industrial Engineering and founded and its history and its importance and areas of work, the subjects for which the industrial engineer, studied in addition to the knowledge of the basic concepts that help students in how to collect industrial information and benefit from, and the possibility of handling the student with a network of information and knowledge of the tasks entrusted to the industrial engineer

2) Course objectives

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

1. Understand the industrial engineering definition, history, and future.
2. Analysis the different divisions of industrial engineering and its branches.
3. Design the jobs of industrial engineers and how to services the society.
4. Understand how to searching and developing in industry.
5. Use to transfer and apply the modern systems to industry.
6. Understand an overview of what industrial engineering is, what industrial engineers do and how to services the society.
7. Design presentations about different aspects of industrial engineering, analytical techniques, system design approaches, and the types of activities that industrial engineers in practice engage in.

3) Course Contents

Introduction to industrial engineering-definition- history and future- the different branches of industrial engineering- Computer integrated manufacturing- industrial engineers and society - information management and how to analysis it's to take the decision and special topics in industrial engineering.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..….. (40 %)
- Practical Work …… …….. (10 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures
- Practical exercises

6) Textbook

- " Introduction to Industrial and Systems Engineering " , 2001. Kuncicky

7) References

- Abu-elnour, A."Basics of Industrial Engineering ",KAAU, Jaddah,1999 .

Course Syllabi and Description
for
Third year

Department: Industrial Engineering

Course Title	***Metrology and Measurements***
Course Code	***IE312***
No. of units *(Theoretical + Tutorial/Lab)*	***3(2+1)***
Level-Year	***5-3***
Prerequisite (if any)	***IE121***

1) Brief Course Description

This course is intended for industrial engineering students and concentrates on the general basics of metrology such as measuring methods and measuring devices used in different types of measurements. Measuring accuracy, fits and tolerances, linear measurements, angular measurements, screw thread measurements surface measurements, leveling measurement devices, circular and cylindrical measurements, block gages, rules of using measuring instruments, workshop measurements.

2) Course Objectives

At the end of this course, the student should be able to

1. Practicing different measuring methods**.**
2. Listing the different types of measurement instruments**.**
3. Determine measurements needed for any engineering product.
4. Practice the skills of calibrating different measuring instruments.
5. Practice the skills of using all measuring instruments and devices.
6. Taking measurements using different methods.

3) Course Contents

Introduction to metrology, accuracy, fits and tolerances, linear measurements, angular measurements, screw thread measurements, surface roughness, gage blocks, rules of using measuring tools, machine tool metrology

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..….. (35%)
- Practical Work …… …….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises (Tutorial + Labs).

6) Textbook

- Connie L Dotson, " Fundamentals Of Dimensional Metrology ", Thomson Delmar Learning; 5 edition, 2006.

7) References:

- Laudon, K. J, "Management Information Systems" Fifth Edition , Prentice-Hall ,2003

Industrial Engineering Department

Course Description	***Operation Research (1)***
Course Number	***IE322***
No. of units *(Theoretical + Tutorial/Lab)*	***3(2+1)***
Level-Year	***6-3***
Prerequisite (if any)	**-**

1) Course Description:

This course deals with the principles and applications of operations research and operations modeling and formulating problems in mathematical models and different ways of solving them, as well as sensitivity analysis and the duplication and transport issues, assignment and business networks.

2) Course objectives

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

1. Understand students with basic knowledge of the operations research and to explain some of the basic OR topics.
2. Analysis the solution of Linear programming techniques by using programming as LINDO, LINGO, TORA.
3. Design sensitivity analysis to decision making problems and interpret the solutions **of the** problems.

3) Course Contents

formulate Operation Research problems- linear programming- simplex algorithm- Big M method- duality and economical analysis- sensitivity analysis- transportation models- assignment- networks models and computer applications.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) …….. (35%)
- Practical Work …… …….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures
- Practical exercises
- Computer applications

6) Textbook

- Taha, H., "Operations Research : An **Introduction** " , Seventh Edition , Prentice-Hall, 2003 .

7) References

- Hillier and Lieberman," Introduction to Operation Research", Eighth Edition, 2005.

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Department : Industrial Engineering

Course Description	***Operation Research (1)***
Course Number	***I.E. 322***
No. of units *(Theoretical + Tutorial/Lab)*	***3(2+1)***
Level-Year	***6-3***
Prerequisite (if any)	**-**

1) Course Description:

This course deals with the principles and applications of operations research and operations modeling and formulating problems in mathematical models and different ways of solving them, as well as sensitivity analysis and the duplication and transport issues, assignment and business networks.

2) Course objectives

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

1. Understand students with basic knowledge of the operations research and to explain some of the basic OR topics.
2. Analysis the solution of Linear programming techniques by using programming as LINDO, LINGO, TORA.
3. Design sensitivity analysis to decision making problems and interpret the solutions of the problems.

3) Course Contents

formulate Operation Research problems- linear programming- simplex algorithm- Big M method- duality and economical analysis- sensitivity analysis- transportation models- assignment- networks models and computer applications.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..….. (35%)
- Practical Work …… …….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures
- Practical exercises
- Computer applications

6) Textbook

- Taha, H., "Operations Research : **An Introduction** " , Seventh Edition , Prentice-Hall, 2003 .

7) References

- Hillier and Lieberman," Introduction to Operation Research", Eighth Edition, 2005.

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Department: Industrial Engineering

Course Title	***Industrial Quality Control***
Course Code	***IE 323***
No. of units *(Theoretical + Tutorial/Lab)*	***3 (2+2)***
Level-Year	***6-3***
Prerequisite (if any)	

1) Brief Course Description

This course introduce the basic concepts of quality, Total Quality Management, ISO standards, Quality Cost, Quality impact on productivity, Quality control and assurance systems, Conrol charts for attributes and variables.

2) Course Objectives

At the end of this course, the student should be able to

1. Understand the basic concepts of Quality and its methods.
2. Develop abilities to use statistical process control of industrial quality, to develop control charts with computer applications.
3. Develop skills of use the computer in statistical analysis.

3) Course Contents

Quality Concepts, Quality improvement, quality cost and its impact on productivity, Total Quality Management, ISO Quality standards, statistical process control, Control charts for attributes and variables and their application in manufacturing process, Statistical analysis and development of integrated systems for quality control, case studies, computer applications.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) …….…….. (35 %)
- Practical Work …… …….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises.
- Computer applications.

6) Textbook

- Besterfield, D.H.,"Quality Control " , Prentice-Hall ,2004.

7) References

- Montgomey,D.C., "Statistical Quality Control " , J.Wiley ,2001 .

Department: Industrial Engineering

Course Title	***Manufacturing Engineering (1)***
Course Code	***IE324***
No. of units *(Theoretical + Tutorial/Lab)*	***3 (2+1)***
Level-Year	***6-3***
Prerequisite (if any)	***ME121***

1) Brief Course Description

This course deals with engineering manufacturing processes, methods and techniques. It deals also with the materials properties during manufacturing processes.

2) Course Objectives

At the end of this course the student should be able to

1. Defining the different types of casting processes.
2. Defining the different types of welding.
3. Differentiate between the cold and hot working processes.
4. Choosing the best manufacturing method for engineering materials
5. Calculating needed power for different manufacturing processes.
6. Practicing casting, welding and extrusion technologies.

3) Course Contents

Casting technology, sand casting methods, mold materials and properties, casting equipment, alloy solidification, castings defects, inspection methods, die casting, welding technology, hot and cold forming, forging processes, sheet forming and calculations, rolling operations, drawing operations, deep drawing, wire drawing, hot and cold extrusion, and applications on power calculations.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..….. (35 %)
- Lab tests …… …….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises (Tutorial + Labs).

6) Textbook

- Scrope Kalpakajian and Steven R. Schmid , " Manufacturing Engineering and Technology " , 2005.

7) References:

- Niebel,B.W." Modern Manufacturing Processes Engineering " ,Mc Graw Hill. 2002
- Mikell P. Groover, " Fundamentals of modern Manufacturing ",2006.

Course Syllabi and Description
for
Fourth year

Department: Mechanical Engineering

Course Title	***Simulation of Industrial Systems***
Course Code	***IE411***
No. of units *(Theoretical + Tutorial/Lab)*	***3 (2+1)***
Level-Year	***7-4***
Prerequisite (if any)	***STAT 329***

1) Brief Course Description

This course is mainly concentrates on the concepts of simulation systems, random number generators, building simulation models, simulation software, models evaluation and results analysis, performance measures, simulation uses in the analysis of production systems and services. Also this courses discusses models of queueing theory and queues formation. This course includes a practical session to train students on using Arena software.

2) Course Objectives

Upon the completion of this course, the student will be able to:

1. Understand industrial simulation systems and its uses to solve industrial problems.

2. Understand simulation models and waiting lines.

3. Gain the information analysis skills and uses of simulation in production and services systems.

4. Use simulation in the analysis of production systems and services.

5. Gain the skills of building simulation models on simulation software such as Arena software.

3) Course Contents

The essential principles for building simulation models, simulation software, random number generators, generating random numbers, models evaluation and results analysis, simulation uses in the analysis of production systems and services, design and analysis of queueing theory and queues formation, performance measures. This course includes a practical session to train students on using Arena software.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) …….…….. (35 %)
- Practical Work …… …….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises.
- Computer applications.

6) Textbook

- Sheldon M. Ross, " Simulation " , Fourth Edition by academic pressm Newjersey, 2007.

7) References:

- Paul Glasserman, " Monte Carlo Methods in Financial Engineering (Stochastic Modelling and Applied Probability) , Springer; 1 edition, 2007.
- Taha, H., "Operations Research : An Introduction " , Seventh Edition , Prentice-Hall, 2003.

Department: Industrial Engineering

Course Title	***Manufacturing Engineering (2)***
Course Code	***IE 412***
No. of units (Theoretical + Tutorial/Lab)	***3 (2+1)***
Level-Year	***7-4***
Prerequisite (if any)	***IE 324***

1) Brief Course Description

The overall aim of the present course is to explain some of the conventional and nonconventional machining processes, equipments, and tools, as well as the determination of the machining time for every operation which may be useful in better understanding of the manufacturing operations.

2) Course Objectives

At the end of this course, the student should be able to:

1. Acquire a general knowledge about the manufacturing of materials.

2. Understand the different parameters which control the manufacturing processes.

3. Handle the manufacturing techniques, to produce products of greater precision and longer useful life, to increase the production rates, and to reduce the production costs.

3) Course Contents

Introduction to metal cutting and chip formation – Cutting tool geometry – Cutting conditions – Conventional machining processes (Turning, Drilling, Shaping, Milling, Grinding) – Nonconventional cutting processes – Design and selection of the machining operations.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..….. (35 %)
- Practical Work …….. (15 %)
- Final Exam. ……..….. (50 %)

5) Teaching Methods

- Lectures.
- Practical workshop training.
- Interacting through E-learning.

6) Textbooks

- Manufacturing Engineering notes by (kku staff members).
- Manufacturing processes for engineering materials by Serope Kalpakjian and Steven R. Schmid, Prentice Hall, 2003.

7) References:

- Modern Manufacturing processes Engineering by Niebel, B. W., Mc Graw Hill, 2002.
- Fundamentals of modern Manufacturing by Mikell P. Groover, 2006.

Department: Industrial Engineering

Course Title	***Production Planning***
Course Code	***IE 413***
No. of Units (*Theoretical + Tutorial/Lab*)	***3 (3 +0)***
Level-Year	***7-3***
Prerequisite (if any)	***None***

1) Brief course description

The purpose of this course is to introduce the basics of design and analysis, production systems control, planning of production system that include operations planning, capacity planning, machine loading, work order sequencing, assigning the production machines, and the integrated production planning.

2) Course Objectives

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

1. Understand the strategy of completion of production orders, machine loading, work order assignment, and assembly line balancing.
2. Understand the technical decision making to plan and audit the production.
3. Understand the profession of operations management and the production methods and capacity.

3) Course Contents

Production processes – planning and analyzing the industrial processes – decision making for controlling the production – remanufacturing processes – manufacturing technology - capacity planning – integrated production planning – customer order satisfaction – production planning models for one and multi periods – machine loading and work order assignment – work orders sequencing – labor employment – assembly line balancing.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..….. (35 %)
- Practical Work …….. (15 %)
- Final Exam. ……..….. (50 %)

5) Teaching Methods

- Lectures.
- Practical workshop training.
- Interacting through E-learning.

6) Textbooks

- Stephen N. Chapman, "Fundamentals of Production Planning and Control", 2005.

7) References

- Michael, L., Pinedo, "Planning and Scheduling in Manufacturing and Series in Operations Research and Financial Engineering", 2006.

Department: Industrial Engineering

Course Title	***Operations Research(2)***
Course Code	***IE414***
No. of units *(Theoretical + Tutorial/Lab)*	***3(2+1)***
Level-Year	***7-4***
Prerequisite (if any)	***IE322***

1) Brief Course Description

This course includes the advanced subjects in linear programming, e.g. dynamic programming and integer programming, and introduction to stochastic processes and Markov chains.

2) Course Objectives

At the end of this course the student should be able to

1. Understand advanced linear programming in operations research
2. Gain about advance techniques to formulate the optimal solution for industrial problems
3. Understand the strategic games and solve its problems
4. Gain about using computer programs to solve the complex problems in operations research

3) Course Contents

Review in networks and project management, integer programming, dynamic programming, goals programming, theory of games, stochastic models, Markovian decision process, computer applications using TORA, LINGO, LINDO.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..…….. (35 %)
- Practical tests …… …….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises
- Computer applications

6) Textbook

- Taha, H. "Operations Research: An introduction", seventh edition, Prentice-Hall, 2003

7) References:

- Hillier and Lieberman, " Introduction to operations Research", Eighth Edition, 2005.

Department: Industrial Engineering

Course Description	***Computer Aided Manufacturing***
Course Number	***IE 415***
No. of units *(Theoretical + Tutorial/Lab)*	***3(2+1)***
Level -year	***7-4***
Prerequisites	***IE 324***

1) Brief Course Description

This course introduces to computer aided manufacturing, modern manufacturing systems. Computer aided design, , and computer Integrated manufacturing systems Theoretical and practical.

2) Course objectives

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

1. Understand drawings with all the necessary details

   (dimensions, tolerances, and surface finish)
2. Design the drawings using WINCC software.
3. Design program NC codes manually
4. Apply NC codes using commercial CAM package
5. Understanding of process capability, tolerances, the cost model, and manufacturability.
6. Use the current status of CAD/CAM

3) Course Contents

The important theory, concept, technology of CAD/CAM- part design specification- methods of programming CNC (Lathe & Milling) machines- NC programming- APT Programming Language- computer integrated manufacturing models, automatically material handling, practical computer applications on lathe and milling.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..…….. (35 %)
- Practical tests …… …….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises
- Computer applications

6) Textbook

- James A. Rehg , and Henry W. Kraebber; "Computer Integrated Manufacturing" 2004.

7) References

- Tien Chien Chang ," Computer- Aided Manufacturing", 2005.

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Department: Industrial Engineering

Course Title	***Human Factors Engineering***
Course Code	***IE 421***
No. of Units (*Theoretical + Tutorial/Lab*)	***3(2 +1)***
Level-Year	***8-4***
Prerequisite (if any)	***None***

1) Brief course description

The purpose of this course is to give students an introduction to the relationship between man and environment and machine. It includes anatomy physiology and labor capabilities. The labor response and limitations with machine. The sociological attributes for work. In addition to a lab where student apply specific tasks in course.

2) Course Objectives

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

1. Understand the concept of human factors engineering and its objectives.
2. Understand the effect of HFs in manufacturing and design.
3. Understand the methods of effective utilization of human capabilities in operating machines and production components.
4. Understand the evaluation of environment for labors and solution methods for incompatibility.
5. Apply the lifting skills and its evaluation.

3) Course Contents

introduction to Man-machine and environment – the optimal relation between man and machine through (human anatomy – the human capability – the forces affecting human body in static and dynamic movement –professional disease and protection methods – anthropometry – workspace evaluation – the lifting methods and evaluation – work environment – lighting – noise and evaluation methods of lighting and noise.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..…….. (35 %)
- Practical tests …… …….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises
- Computer applications

6) Textbooks

- Mc Cormick & Sanders, "Introduction to Ergonomics", Mc Graw Hill, UK, 2003.

7) References

- Alexander, D., and Rabourm, R., "Applied Ergonomics", Taylor and Francis, UK, 2001.

Department: Industrial Engineering

Course Title	***Environmental Engineering***
Course Code	***IE422***
No. of units (*Theoretical + Tutorial/Lab*)	***2(2+0)***
Level-Year	***8-4***
Prerequisite (if any)	

1) Brief Course Description

This course addresses the fundamentals of the natural environment and addressing the sources of industrial pollution and hazardous waste is also interested in ways that the environmental control.

2) Course Objectives

At the end of this course, the student should be able to

1. study the problems of pollution in the environment and the risks
2. understand the types of pollution and how to control pollutants and disposal.

3) Course Assessment

4)

The basics of environmental systems - industrial environment - the causes of environmental problems and the role of industry in environmental pollution - types of pollution - air pollution - pollution of water - soil pollution - hazardous waste solid and liquid - industrial pollution - pollution Noise - Methods of control and treatment of environmental pollutants - environmental studies for industrial projects

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..…….. (40 %)
- Practical tests …… …….. (10 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises

- Computer applications

6) References:

- Mackenzie L Davis A Cornwell, "Introduction to environmental engineering" McGraw-Hill Science/Engineering/Math 4 edtion.2006.
- Graedel T, B. Allenby "Health and environment protection,, Industrial Ecology" McGraw- Hill,2004.

Department: Industrial Engineering

Course Title	***Inventory control and Material Handling***
Course Code	***IE423***
No. of units *(Theoretical + Tutorial/Lab)*	***3(2+1)***
Level-Year	***8-4***
Prerequisite (if any)	**-**

1) Brief Course Description

This course is concerned by the concepts of inventory planning and control in raw material, spare parts, and production requirements, analysis and design inventory systems. Also, this course deal within the material handling techniques in factories, lifting, transfer, handling equipments and their design, also study the material handling system.

2) Course Objectives

At the end of this course, the student should be able to

1. Determine the concepts and techniques of inventory planning and control.
2. Determine the transfer, handling, and lifting equipments in industrial facilities
3. Understand the factors to select the material handling equipments.
4. Understand the importance of stores and material handling equipments selection as economical factor.
5. Gain about the design some material handling equipments.

3) Course Contents

Design and analysis of inventory systems, inventory costs, inventory approaches, Evaluation of inventory performance level, Deterministic and probabilistic inventory models, determine the economic order quantity, reorder quantity, safety stock, material and resources requirements planning, computer applications in inventory control.
Introduction to material transfer, handling and lifting equipments and their descriptions, design and select the lifting equipments and theirs parts, e.g., ropes, pulleys, chains. Design and select the transfer e.g. belts, screws, design handling equipments e.g. vehicles, trucks, and pallets. Case study for material handling systems.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..…….. (35 %)
- Practical tests …… …….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises .

6) Textbook

- Max Muller, " Essentials of Inventory Management" 2002.
- Tony Wild, " Best practice in inventory Management" second edition, 2002.

7) References:

- Buffa & Miller G. " Production. Inventory systems: planning and control" seventh edition, Illionis, Richard, Irwin, Inc. 1999.

Department: Industrial Engineering

Course Title	***Engineering Economy***
Course Code	***IE 424***
No. of units *(Theoretical + Tutorial/Lab)*	***2 (2+0)***
Level-Year	***8 - 4***
Prerequisite (if any)	

1) Brief Course Description

This course seeks to highlight the application of the basic concepts of economic analysis and its techniques in the projects and problems of engineering.

2) Course Objectives

At the end of this course the student should be able to

1. Understand the basic concepts of engineering economics.
2. Comprehend the principal concepts used in cost terminology.
3. Understand the fundamentals of the time - value relationships.
4. Understand the different measures used in comparing alternatives and economic decision making.
5. Develop abilities to compute depreciations related to machines, evaluate and analysis the engineering projects and their feasibility studies.
6. Develop skills of estimating cost, exchange rates, budget and revenues.

3) Course Contents

Introduction to engineering economy, Cost concepts and design economics, Money-time relationships and equivalence, Calculating Present worth, Future Worth and Equivalent Uniform Annual Series, Comparing Alternatives and Decision making criteria, Methods of Depreciation, Evaluation and Analysis of engineering projects and feasibility study, Dealing with risk and uncertainty, Cost estimating techniques, Market research and exchange rates, Balance sheet and trading account.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..…….. (50 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises .

6) Textbook

- William G. Sullivan. Elin M. Wicks and James Luxhoj "Engineering Economy" 13th ed., Prentice Hall, 2005.

7) References

- White, Agee, and Case, "Principles of Engineering Economic Analysis", 4th Ed. 2001.

Department: Industrial Engineering

Course Title	***Plant layout***
Course Code	***IE425***
No. of units *(Theoretical + Tutorial/Lab)*	***3(3+0)***
Level-Year	***8-4***
Prerequisite (if any)	**-**

1) Brief Course Description

This course deals with the universal design of industrial and service facilities and facilities locations selection. The course is used to study the interrelationships between service facilities, processes design, and the formal coordinate work for the industrial facilities. This is used computer in facilities layout, facilities system design, and analysis the facilities location selection models.

2) Course Objectives

At the end of this course, the student should be able to

1. Determine the techniques of the design, plan, and layout of facilities
2. Determine the method of facilities locations selection
3. Understand the facilities layout methods according to product, process, or group layouts
4. Gain about analysis the data for universal design
5. Gain about factory design and planning

3) Course Contents

Facilities location selection- selection factors- facilities layout techniques – facilities layout types: product – process – group or cell. Mathematical model for facilities location selection – facilities system design – computer applications in facilities layout and location.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) …….…….. (40 %)
- Reports and assignments…… …….. (10 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises .
- Computer applications

6) Textbook

- Francis R., Mc Ginnisl, & White J., " Facility Layout and Location: Analytical approach" Prentice-Hall, Latest ed.

7) References:

- White T., Frazelle B. & Trevino J. " Facilities planning problems" John Wiley & Sons, 1996.

Course Syllabi and Description
for
Fifth year

Department: Industrial Engineering

Course Title	***GRADUATION PROJECT***
Course Code	***IE591***
No. of units *(Theoretical + Tutorial/Lab)*	***3(0+3)***
Level-Year	***9 - 10***
Prerequisite (if any)	***MOST OF EE COURSES***

1) Brief Course Description

This course provide to the student through the analysis and design of engineering integrated system using the principles and foundations and engineering skills by the Capacitated during the years of study. Train students to methods of analysis and design achieved the requirements of the assets of the work, computer applications of mathematical simulation of the system designer and laboratory tests if necessary and develop the skill to have it on the future application in the field of engineering work.

2) Course Objectives

At the end of this course, the student should be able to:

1. Identify methods for the analysis and design of integrated system engineering.

2. The use of the principles and foundations and engineering skills by the Capacitated during the years of study to achieve this system.

3. Acquire job skills programs on the system using the computer in the lab.

4. Using a practical model of the system in the lab if possible.

5. Apply skills in writing the final report of the project in the form of integrated business

3. Course Contents

Students have to learn how to analyze and design an engineering integrated system using the principles and foundations and engineering skills by the Capacitated during the years of study. The project report submitted in details for the steps of the student analysis and design achieved. Also includes maps, graphics and engineering necessary to implement the system engineering designer. The student must demonstrate in the main subject when discussing the project and to understand and fully absorb the principles and foundations and architectural elements based upon his ability to work in the field of applied engineering in the future.

4) Course Assessment

- Report 1-2, Presentation and Practical Work ……..…….. (50%)
- Final dissection……..…… (50 %)

5) Teaching Methods

- Research work
- Experimental work.
- Measurements
- Technical report writing.

6) Textbook

- All books related to the student project (it's a research study)

7) References

- Internet
- Reference books related to the project title

Department: Industrial Engineering

Course Title	***Reliability Engineering and Maintenance***
Course Code	***IE 511***
No. of units *(Theoretical + Tutorial/Lab)*	***2 (2+0)***
Level-Year	***9-5***
Prerequisite (if any)	

1) Brief Course Description

This course presents the basic concepts related to reliability engineering, modeling techniques and prevision of reliability, fault tree analysis and decision table. . Also, it gives knowledge on maintenance types, maintenance tactics, maintenance cost, maintenance planning and scheduling and materials management.

2) Course Objectives

At the end of this course, the student should be able to

1. Understand the basic concepts of reliability engineering.
2. Comprehend the different maintenance type and its mathematical models.
3. Develop skills of managing materials and spare parts.

3) Course Contents

Course Introduction, Reliability Engineering, Reliability Models, Fault Tree Analysis, Table Decision, Maintenance objectives, Maintenance types and strategies, Maintenance planning, Maintenance cost, Maintenance scheduling, Maintenance control, Materials planning and management, Replacement Models, Industrials applications.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..….. (40%)
- Assignments …… …….. (10 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.

- Training exercises.
- Case studies Reports

6) Textbook

- Nakagawa, Toshio, "Maintenance Theory of Reliability " , 2005.

7) References

- Joel A. Nachlas, " Reliability Engineering : Probabilistic Models and Maintenance Methods ", 2005.

Department: Industrial Engineering

Course Title	***Industrial safety***
Course Code	***IE512***
No. of units *(Theoretical + Tutorial/Lab)*	***2 (2+0)***
Level-Year	***9-5***
Prerequisite (if any)	***IE422***

1) Brief Course Description

This course deals with industrial safety and health disciplines concerning human and environment. This course also deals with standards of working safely and management safety systems and law.

2) Course Objective

At the end of this course the student should be able to

1. Perform engineering tasks safely.
2. Explain the law of applying safety and health systems.
3. Perform accident investigation process
4. Identify the hazards of different industrial tasks and propose corrective actions.

3) Course Contents

Introduction to safety and health, objective of safety and health, engineering principles to prevent accidents, safety programs, working accidents and their causes, first aids, types of hazards, safety and health organizations, chemical hazards, fire hazards, fire fighting, machine tool hazards and safe guards, electrical hazards, materials handling hazards, management responsibility about safety, safety and productivity, fault tree analysis, emergency plans, accident investigation.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.)…….…….. (40 %)
- Assignments……...…….. (10 %)
- Final Exam. ……..…… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises.

6) Textbook

- Ray. C Asfahl.," Industrial Safety and Health Management " Prentice Hall , 2003.

7) References

- Wuntz,C.A.,Safety , Healthy and Enviromental Protection " Mc Graw-Hill , 1998 .

Department: Industrial Engineering

Course Title	***Industrial safety***
Course Code	***IE512***
No. of units *(Theoretical + Tutorial/Lab)*	***2 (2+0)***
Level-Year	***9-5***
Prerequisite (if any)	***IE422***

1) Brief Course Description

This course deals with industrial safety and health disciplines concerning human and environment. This course also deals with standards of working safely and management safety systems and law.

2) Course Objective

At the end of this course, the student should be able to

1. Perform engineering tasks safely.
2. Explain the law of applying safety and health systems.
3. Perform accident investigation process
4. Identify the hazards of different industrial tasks and propose corrective actions.

3) Course Contents

Introduction to safety and health, objective of safety and health, engineering principles to prevent accidents, safety programs, working accidents and their causes, first aids, types of hazards, safety and health organizations, chemical hazards, fire hazards, fire fighting, machine tool hazards and safe guards, electrical hazards, materials handling hazards, management responsibility about safety, safety and productivity, fault tree analysis, emergency plans, accident investigation.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.)……..…….. (40 %)
- Assignments……...…….. (10 %)
- Final Exam. ……..…….…… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises.

6) Textbook

- Ray. C Asfahl.," Industrial Safety and Health Management " Prentice Hall , 2003.

7) References

- Wuntz,C.A.,Safety , Healthy and Enviromental Protection " Mc Graw-Hill , 1998 .

Department: Industrial Engineering

Course Title	***Industrial Operations Analysis***
Course Code	***IE513***
No. of units *(Theoretical + Tutorial/Lab)*	***2(2+0)***
Level-Year	***9-5***
Prerequisite (if any)	***IE412***

1) Brief Course Description

This course is concerned by analysis and design of industrial processes problems, job-shop production scheduling, or batch production scheduling, or mass production scheduling, design of production lines, manufacturing systems, industrial processes planning, study the performance rating.

2) Course Objectives

At the end of this course, the student should be able to

1. Determine the techniques of analysis and design of industrial processes
2. Understand the alternatives to reduced the cost and manufacturing time.
3. Determine processes planning and production line balancing.

3) Course Contents

Introduction – product analysis and manufacturing approaches – manufacturing system and industrial processes – economical aspects – processes planning – simulation of manufacturing systems: batch production, job shop production, mass production, group technology- just in time – performances rating – industrial process control – production line balancing – practical cases and computer applications.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..….. (40 %)
- Assignments and reports…….. (10 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises
- Practical reports

6) Textbook

- Morton T. & D. Pertico, Heuristic Scheduling Systems, with applications to Production Systems, John Wiley & Sons, Latest Edition.

7) References:

- Russell,R.& Tylor,B.W."Operations Management " , Prentice-Hall, 2000.

Department: Industrial Engineering

Course Title	***Industrial and Project Management***
Course Code	***IE 514***
No. of Units (*Theoretical + Tutorial/Lab*)	***2 (2 +0)***
Level-Year	***9- 5***
Prerequisite (if any)	***None***

1) Brief Course Description

The purpose of this course is to give students an introduction to industrial management principles and techniques for industrial institutions, resource management, time management, and project management focusing on practical applications and preparing technical reports for industrial management techniques.

2) Course Objectives

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

1. Understand the principles of industrial management and projects.
2. Understand the principle factors affecting of the success of industrial's institution management.
3. Apply the necessary computer applications.

3) Course Contents

The principles of industrial management – the principles of an industrial system – industrial institution management – the basis of industrial management – management of engineering professions – industrial organization – energy resources management – water management – raw material management – time management – work analysis – industrial project management - computer applications.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.)……..…….. (35 %)
- Assignments…….. (15 %)
- Final Exam. ……..…….…… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises.

6) Textbooks

- Albert Thumann, P.E., C.E.M. and Ropert Hoshide, C.E.M., "Engineering Management Guide for Government Buildings", academic press, Newjersey, 2007.
- Anthony J. Pansini, "Engineering Economic Analysis Guideboo:"academec press, Newjersey, 2007, ISBN:0133894215.

7) References

- Russell, R. & Tylor, B.W." Operations Mangemnt", Prentice Hall. 2000.
- Render,B.&Hanna, M.,"Quantitative Analysis for Mangement", Eight Edition, Prentice-Hall,2003.
- Lawrence,J.&Basternack,B.,"Applied Mangement Science", Second Edition, John Wiley & Sons, 2002.

Department: Industrial Engineering

Course Title	***Automatic Control***
Course Code	**IE515**
No. of units *(Theoretical + Tutorial/Lab)*	**3(2+1)**
Level-Year	***9-5***
Prerequisite (if any)	**Math319**

1) Brief Course Description

This course deals with the principles of automatic control science, the different types of control systems, the mathematical modeling for the different control systems, the relation between control signals and systems output, and control systems response and stability

2) Course Objectives

At the end of this course, the student should be able to

1. Determine the different control systems
2. Understand industrial control systems
3. Use the mathematical model and find the transfer functions for control systems.
4. Understand the systems accuracy and error analysis
5. Determine the systems stability and their analysis methods
6. Use the computer programs in different applications.

3) Course Contents

Introduction – Automatic control systems – Open loop system- Closed loop (Feedback) system – Types of control systems in industry – Mathematical analysis for automatic control systems – Laplace method – Differential equations solution by Laplace method – Transfer function – Block diagrams – Mathematical modeling for electrical systems, Mechanical systems, Hydraulic systems, Pneumatic systems – Control systems response : First order systems, Second order systems, and error analysis – Control systems stability: Routh-Hurwitz Criterion, Nyquist Criterion.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..…….. (35%)
- Practical tests …… ……..…….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises .

6) Textbook

- **Benjamen C. Kuo and M. Farid Golnaraghi, " Automatic Control Systems" Eighth edition, 2003**

- **Kabuhiko Ogata, " System Dynamics " Fourth edition, 2004**

7) References:

- **Gene F. Franklin, J. David Powell, and Abbas Emami-Naeini " Feedbak Control of Dynamic Systems" Fourth edition, 2002**

Department: Industrial Engineering

Course Title	***Cost Analysis and Value Engineering***
Course Code	***IE516***
No. of units *(Theoretical + Tutorial/Lab)*	***2(2+0)***
Level-Year	***9-5***
Prerequisite (if any)	***IE 424***

1) Brief Course Description

This deals with the production cost analysis and control including the materials, labor and overhead as well as the projects and alternatives evaluation. This course also discusses the value engineering concepts.

2) Course Objectives

At the end of this course the student should be able to

1. Determine the manufacturing costs
2. Perform alternatives evaluations
3. Define the value engineering concepts

3) Course Contents

Elements of manufacturing costs, cost analysis, cost centers, manufacturing costs control, manufacturing costs in linear and non linear systems, standard costing systems, cost accounting methods, alternatives evaluation, decision making, product evaluation, value engineering, revenues levels.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……... (40 %)
- Assignments …… …….. (10 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises (Tutorial + Labs).

6) Textbook

- Riggs,H.," Finanical and Cost Analysis for Engineering and Technological Management " , J.W.& Jons , 1995.

7) References:

- White J. " Principle of Engineering Economic Analysis " Fifth Edition , John Wiley & Sons , 2000 .

Department: Industrial Engineering

Course Title	***Industrial Robotics***
Course Code	***IE521***
No. of units *(Theoretical + Tutorial/Lab)*	***3(2+1)***
Level-Year	***10-5***
Prerequisite (if any)	***IE515***

1) Brief Course Description

This course introduces the introduction to industrial robotics and covering the robots history, the principles concepts for robotics technology and programming and using the industrial robots in manufacturing processes and material handling.

2) Course Objectives

At the end of this course, the student should be able to

1. Understand the robotics technology and automation
2. Use the industrial robotics
3. Understand the design and programming of robotic cells

3) Course Contents

Introduction to industrial robotics – Automation – Robotics history in industry – Robots safety – Basic concepts of Robots technology – Structure of Robotics – Robotics motion analysis – Robotics programming and languages – Robots applications in manufacturing and material handling.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..…….. (35%)
- Practical tests …… ……..….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises .

6) Textbook

- Jorge Angeless, " Fundamentals of Robotic Mechanical Systems: theory methods and algorithms" Mechanical Engineering Series, Third edition, 2006

7) References:

- John J. Craig, "Introduction to Robotics: Mechanics and control" Prentice Hall, Third edition, 2003

Department: Industrial Engineering

Course Name	***Computer applications in Industrial Engineering***
Course Number	***IE 522***
Credit (Theoretical + Practical)	***2 (0 + 2)***
Level - year	***10-5***
Prerequisites	***COMP 012***

1) Course Description:

This course is intended for higher level industrial engineering students and concentrates on the general basics of data structure, building of algorithms and using softwares in industrial engineering. Rules for understanding and formulating problems, industrial engineering applications in wages calculation, engineering project management, work study, inventory and spare parts control, facilities layout, resources management, productivity measures and other industrial applications.

2) Objectives:

Upon completion of this course, students will be able to:

1. Understanding general basics of data structure**.**
2. Gain the skills of problems formulation and building of algorithms**.**
3. Gain the skills of using certain softwares in industrial engineering.

3) Course Contents

Introduction – the basic principles of understanding problem and formulating algorithms – the general data structure – the IE application in estimating wages – industrial project management – work study – spare parts and inventory control – facilities planning and design – resource management – site planning selection – productivity measures – industrial applications.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..…….. (40%)
- Practical tests …… ……..…….. (10 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises .

6) Textbook

- Andrew G Favert "Introduction to Digital Computer Applications", Reinhold industrial engineering and management science series, 2007.

7) References:

- Ammeraal, L., "Computers Graphics for Java Programmers", John Wiley & Sons, 1999.

Department: Mechanical Engineering

Course Title	***Work Study***
Course Code	***IE523***
No. of units *(Theoretical + Tutorial/Lab)*	***3 (2+1)***
Level-Year	***10-5***
Prerequisite (if any)	***No Prerequisite***

1) Brief Course Description

This course is mainly concentrates on the relationship between the man and his work, methods of work station design, measurement of worker efficiency, measurement of the required motion and time to execute a job (motion and time study), in addition to practical sessions that include experiments to cover subjects related to motion and time study.

2) Course Objectives

Upon the completion of this course, the student will be able to:

1. Understand the methods used in design and analysis of work place, motion and time study.
2. Gain the skills of work station design, and work measurement efficiency.
3. Gain the measurement skills of time and motion study.

3) Course Contents

Introduction, history of motion and time study (work study), importance of motion and time study, methods of work station design, motion study, time study, analysis processes of work study, discuss the techniques of motion and time study, measurement of worker efficiency, computer application in work study.

4) Course Assessment

- Mid-Term Tests ……...…….. (35 %)
- Practical Work ……..….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises (Tutorial + Labs).
- Computer applications

6) Textbook

- **Andris Freivalds , Methods, Standards, and Work Design, 11 th Edition , 2002.**

7) References:

- **Grooven, M. & Zimmers E. " Motion and Time Study : Improving Work Methods and Management " Amazon Publishing Co.,2004.**

Department: Industrial Engineering

Course Title	***Design and analysis of industrial systems***
Course Code	***IE 524***
No. of units *(Theoretical + Tutorial/Lab)*	***3(2+1)***
Level-Year	***10-5***
Prerequisite (if any)	***IE 513***

1) Brief Course Description

This course deals with the modeling of industrial systems, analysis and design of industrial systems techniques, techniques of integrated manufacturing, flexible manufacturing systems, economical analysis of industrial systems, techniques of group technology, computer programs and applications for industrial systems.

2) Course Objectives

At the end of this course, the student should be able to

1. Determine techniques and modeling of industrial systems
2. Gain about analysis and design of industrial systems and Computer Integrated Manufacturing
3. Use the applications to analysis and design of industrial systems.

3) Course Contents

Production engineering systems – modeling of industrial systems – product planning – process planning – layout planning – group technology – cellular and flexible manufacturing systems – computer aided manufacturing – economics of industrial systems – computer programs and applications.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..…….. (35 %)
- Practical tests …… …….. (15 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises
- Applications and tasks.

6) Textbook

- Moffer J., &J.Valacich " Modern Systems Analysis and Design 3nd Ed ,Prentice-Hall , 2003

7) References:

- Russell,R.& Tylor,B.W."Operations Management " , Prentice-Hall, 2000.

Department: Industrial Engineering

Course Title	***Design of Experiments***
Course Code	**IE525**
No. of units *(Theoretical + Tutorial/Lab)*	**2(2+0)**
Level-Year	***10-5***
Prerequisite (if any)	**STAT 329**

1) Brief Course Description

This course deals with the models and methods of design of experiments and their analysis and industrial applications. Also, introduces methods of hypotheses tests on means and variables, errors analysis, and fixed, mixed random design types in industrial engineering field and results evaluation.

2) Course Objectives

At the end of this course, the student should be able to

1. Determine the necessary information to design of experiments and their applications in industrial engineering
2. Determine the different design models
3. Gain about errors analysis and results evaluation.
4. Gain about making the models

3) Course Contents

Introduction to design of experiments and their applications in industrial engineering field – hypotheses tests – analysis of variance in fixed and mixed effects models – block designs – errors analysis – results evaluation – making models and practical applications.

4) Course Assessment

- Mid-Term Tests (Not less than two Exams.) ……..…….. (40%)
- Assignments and reports…… …….. (10 %)
- Final Exam. …… (50 %)

5) Teaching Methods

- Lectures.
- Training exercises .

6) Textbook

- Cox, D. R., Reid N. , " the theory of the design of experiments", 2000

7) References:

- Robert L. Mason, Richard F. Gunst, James L. Hess, " Statistical design and analysis of experiments with applications to engineering and science" 2003.

Elective Courses Syllabu

Courses Taught Outside The Department