DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 361 Fundamentals of Data Base Systems	3	4	3
	CONTACT HRS: 7		

Pre-requisites	NONE	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

This is the first course in database management systems, teaching database concepts, data modelling and database design. Fundamental database concepts, Relational Data Manipulation, Data modelling, Capturing Business Rules, Normalization, Database system development process, Transaction, Processing, Distributed Processing, Data Warehouses, and Databases on the Web. Concepts and tools will be integrated in a small-group term project by designing and implementing an actual information system.

Instructor's Name & Contact Information:

Dr. Naim Ben Ali
Room B14-S-043
E-mail: naimgi2@yahoo.fr; na.benali@uoh.edu.sa

Textbooks:

- Database Processing Fund, Design & Implementation, David M. Kroenke, 12th edition, 2011, Prentice Hall, ISBN 0132145375

References:

- Colin Ritchie, Database Principles and Design, Cengage Learning EMEA – 2008 (ISBN 9781844805402)
- Carlos Coronel, Steven Morris et Peter Rob, Database Systems: Design, Implementation, and Management, Cengage Learning - 2012, (ISBN 9781111969608)
- Philip J. Pratt et Joseph J. Adamski, Concepts of Database Management, Cengage Learning – 2011 (ISBN 9781111825911)
- Toby J. Teorey, Sam S. Lightstone, Tom Nadeau, H.V. Jagadish, Database Modeling

and Design: Logical Design, Fifth Edition, Elsevier – 2011 (ISBN 9780123820204)

Supplemental Materials:

Students use computer software: Microsoft Office Access/ Oracle.

Course Learning Outcomes:

By the completion of the course the students should be able to:
1. Understating and have knowledge about the fundamental of database and information systems.
2. To familiarize the students with the concepts of database management such as data modelling and normalization.
3. Ability to write Data modelling, Transaction, Processing, and Distributed Processing.
4. Develop and analyze an information system using database management system.
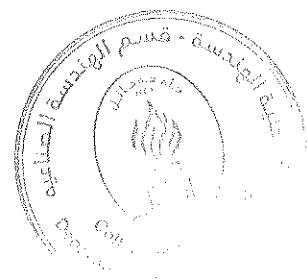5. Ability to evaluate Data Warehouses, and Databases on the Web.

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

1	2	3	4	5	6	7
		✓		✓	✓	

Brief List of Topics to be Covered:

1	Introduction to database System
2	The MERISE method
3	Conceptual Data Model
4	Logical Data Model
5	Data Warehouses, and Databases on the Web
6	Term project

Date of Last Update: 01 September 2022

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 391 Industrial Engineering Design	1	3	2
	CONTACT HRS: 5		

Pre-requisites	ISE 205	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

Introduction to engineering design, formulation of design problems, the design process, design phases, IE and the design process, Quality function deployment for specifying design requirements, design strategies, generating alternatives, probabilistic consideration in design, communication issues, design evaluation, selection and implementation. Discussion of case studies including operations systems, manufacturing, quality, ergonomics, layout and scheduling. Includes team project with an application in manufacturing or service industry.

Instructor's Name & Contact Information:

Dr. Serhan Alshammari
Room B14-S-032
E-mail: s.alshammari@uoh.edu.sa

Textbooks:

- Product Design and Development, Karl Ulrich and Steven Eppinger, 5th Edition, Irwin McGraw-Hill, 2012

References:

- Fundamentals Of Engineering Design, Barry Hymen, 2nd edition, Prentice Hall, ISBN 0130467126, 2002

Supplemental Materials:

Students using computer

Course Learning Outcomes:

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

1. Identify and formalize the need for a design project.
2. Apply the principles of design methodology to modify existing engineering systems or to develop new artifacts and generate alternative designs.
3. Develop criteria to evaluate alternative designs.
4. Communicate design ideas, concepts and issues, orally and in writing, in a professionally relevant manner.
5. Consider ethical issues involved in design.
6. Adopt appropriate roles in group activities and demonstrate ability to plan work in terms of time plans and deliverables.

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

1	2	3	4	5	6	7
✓	✓	✓	✓	✓	✓	

Brief List of Topics to be Covered:

1 Introduction to engineering design

2 Product Development Process and Organization

3 Opportunity Identification

4 Product Planning

5 Identifying Customer Needs

6 Product Specifications

7 Concept Generation

8 Concept Selection

9 Concept Testing

10 Product Architecture

11 Industrial Design

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
	1	0	1
ISE 390 Seminar	CONTACT HRS: 1		

Pre-requisites	NIL	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

The purpose of this course is to raise students' awareness of contemporary issues in their discipline and otherwise. The student has to attend a required number of seminars, workshops, professional societal meetings or governmental agency conferences; at least half of these should address issues in his discipline. The student has to attend a required number of seminars.

Instructor's Name & Contact Information:

Dr. Serhan Alshammari
Room B14-S-387
E-mail: s.alshammari@uoh.edu.sa

***Textbooks*:**

- The Manufacturer's Book of Lists Paperback – October 25, 2013
- Micro and Nanomanufacturing Mark J. Jackson, 2007
- Economics and Financial Studies for Engineers, Leech, D.J., Ellis Horwood Ltd, 1989
- Understanding the Balanced Scorecard in a Week, Bourne, M., Bourne, P., Institute of Mgt Accounting, 2000
- Effective Notetaking, Fiona McPherson, ED 3, 2012
- How to Run Seminars and Workshops: Presentation Skills for Consultants, Trainers, Teachers, and Salespeople, Robert L. Jolles, 2017
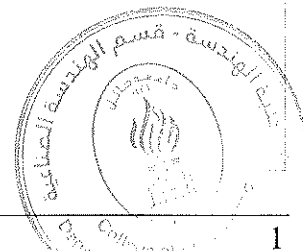
References:

- Advanced Engineering Economics, Park, C.S., Sharp-Bette, G.P., Wiley, 1990
- A Simple Practical Guide to Solar Energy – Designing and Installing Photovoltaic Solar Electric Systems, Solar Electricity Handbook, 2014

Supplemental Materials:

Course Learning Outcomes:

By the completion of the course the students should be able to:
1. To acquire knowledge on contemporary topics by attending seminars.
2. To be able to take note and summary of seminars and workshops and describe new information, knowledge, or methods learned from the presentation.
3. To practice criticizing seminars and methods of evaluation of the presentation.
4. To form team to conduct research and prepare presentation.
5. To practice doing research on science, technology and engineering topic.

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

1	2	3	4	5	6	7
		✓				✓

Brief List of Topics to be Covered:

1	Introduction of Seminar
2	The role of seminar in contemporary topics
3	Teamwork
4	How to take note
5	How to criticize a presentation
6	How to run a workshop
7	Recent trend in Science
8	Recent trend in technology
9	Recent trend in industry

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DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 402 Production Systems & Inventory Control	3	0	3
	CONTACT HRS: 4		

Pre-requisites	ISE 205	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

Element of functional organization. Forecasting in production systems. Product and process design considerations. Deterministic and stochastic inventory systems. Production scheduling and line balancing. Capacity planning. Material requirement planning (MRP). Computer applications in production control. Case studies and applications.

Instructor's Name & Contact Information:

Dr. Mohamed Boujelbene
Room B14-S-033
E-mail: mboujelbene@yahoo.fr

Textbooks:

- Operations Management by R. Dan Reid & Nada R. Sanders, 4th Edition, Wiley 2010

References:

- FACTORY PHYSICS Foundations of Manufacturing Management, Wallace J. Hopp, Mark L., Second Edition ISBN 0-256-24795-1 McGraw-Hill Higher Education, 2000
- Inventory Management and Production Planning and Scheduling, Edward A. Silver, David F. Pyke, Rein Peterson, 1998

Supplemental Materials:
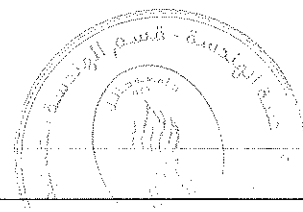
Course Learning Outcomes:

By the completion of the course the students should be able to:
1. Understand the element of functional organization.
2. Recognize the engineering production, the organizations and Structures, the Forecasting production systems.
3. Define the Takt Time, the Just-In-Time (JIT) Systems, the Assembly Line Balancing, the Capacity planning and material Requirements Planning MRP.
4. Analyze and calculate the Forecasting and the Inventory Systems.
5. Design and calculate the forecasting production, the Takt Time, the Just-In-Time (JIT) Systems, the Assembly Line Balancing.
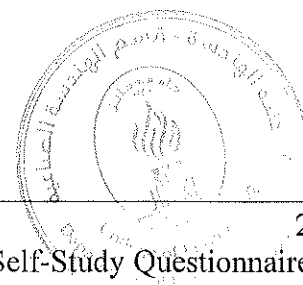
Student Outcomes addressed by the course: (Put a ✓ sign)

1	2	3	4	5	6	7
✓	✓					

Brief List of Topics to be Covered:

| 1 | Organizations and Structures |

1   Organizations and Structures

2   Production Planning and Inventory Control

3   Forecasting in production systems

4   Product and Process Design considerations

5   Inventory Systems

6   Takt Time

7   Lean Manufacturing

8   Just-In-Time (JIT) Systems

9   Assembly Line Balancing

10   Capacity planning

11   Material Requirements Planning MRP

12   Production Control - Industrial Automation & Computer Integrated Manufacturing

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 405 Stochastic Systems Simulation	2	1	3
	CONTACT HRS: 7		

Pre-requisites	ISE 205	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

Basic discrete-event simulation modeling, queuing models, simulation languages, review of basic probability and statistics, random-number generators, generating random variables, output data analysis, validation of simulation models. A simulation language is used in the lab to illustrate simulation models on real case studies.

Instructor's Name & Contact Information:

    Dr. Yassine Bouazzi
    Room B14-S-014
    E-mail: y.bouazzi@uoh.edu.sa

Textbooks:

- Discrete-Event System Simulation, J. Banks, J. S. Carson, B. L. Nelson, and D. M. Nicol, 5th Edition, Prentice Hall, 2010

References:

- Simulation Modeling and Analysis, A. Law and D. Kelton, McGraw-Hill, 4th Edition 2001
- Simulation with Arena, W. David Kelton, Randall P. Sadowski and David T. Sturrock, 4th Edition, McGraw-Hill, 2006

Supplemental Materials:

    Microsoft Excel, Python and ARENA software.
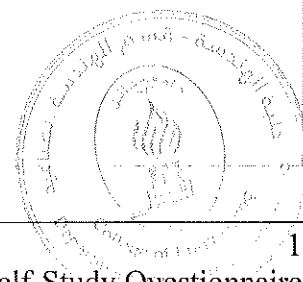
Course Learning Outcomes:

By the completion of the course the students should be able to:
1. Understand the basic concepts of stochastic processes; particularly, discrete and continuous processes.
2. Understand the basic concepts and applications of queueing theory.
3. Understand the key concepts of discrete event system simulation.
4. Be able to build and use probabilistic and computer simulation models to evaluate system performance and select from among design alternatives.
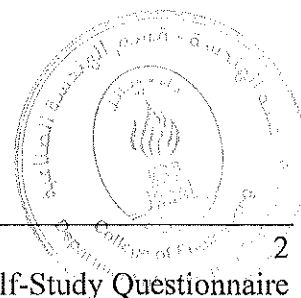
Student Outcomes addressed by the course: (Put a ✓ sign)

1	2	3	4	5	6	7
✓					✓	

Brief List of Topics to be Covered:

1   Introduction to Simulation

2   Simulation Examples

3   Mathematical and Statistical Models

4   Queuing Theory and Models

5   Random Number Generation

6   Random-Variate Generation

7   Input Modeling

8   Output Analysis

8   Work Shop Problem

9   Call Center Problem

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DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 201 Introduction to Industrial & Systems Engineering	2	0	2
	CONTACT HRS: 3		

Pre-requisites	MATH 102	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

This course is an introduction to and overview of the profession of industrial engineering (IE), including the multifaceted roles of an IE engineer, the different skills he/she should possess and sectors of employment. In addition, selected areas of IE, such as operations research, productivity, manufacturing techniques and systems, supply chain, decision making, quality and ethics, will be introduced.

**Instructor's Name & Contact Information:**

Dr. Attia Boudjemline
Room B14 -F037
E-mail: a.boudjemline@uoh.edu.sa

Textbooks:

- Martand T. Telsang, Industrial Engineering and Production Management, 3rd Edition, S. Chand and Company Limited, New Delhi, India, 2018.
- Avraham Shtub and Yuval Cohen, Introduction to Industrial Engineering, 2nd Edition, CRC Press, 2016.
- Ravi Shankar. Industrial Engineering and Management, 2nd Edition, Galgotia Publications Pvt. Ltd., New Delhi, India, 2009

References:

- Gavriel Salvendy, Handbook of Industrial Engineering - Technology and Operations Management, 3rd Edition, John Wiley & Sons, Inc., 2001.
- Hamdy A. Taha, Operations Research - An Introduction, 10th Edition, Pearson, 2017.
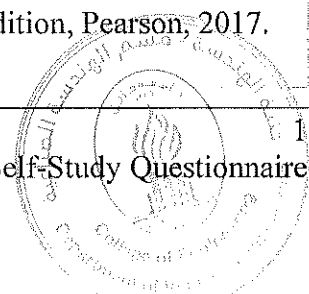
Supplemental Materials:

- Professional videos from the internet

Course Learning Outcomes:

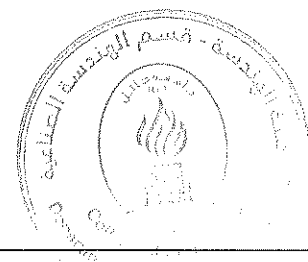By the completion of the course the students should be able to:
1. Describe the concepts and importance of industrial engineering (IE), and operations management.
2. Discuss the nature of manufacturing and identify the various manufacturing processes employed in addition to the different production systems and layouts encountered in a manufacturing workplace.
3. Identify and calculate different types of productivity.
4. Make decisions using basic techniques.
5. Explain supply chain and carry out calculations related to inventory.
6. Formulate Linear Programming (LP) problems in the field of operations research and solve simple LP problems using the graphical method.
7. Define quality, its importance and management in an IE setup.
8. Explain ergonomics and its relevance in workplace.
9. Gather information from references and the internet to solve IE problems.

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

1	2	3	4	5	6	7
✓						✓

Brief List of Topics to be Covered:

1   Introduction to Industrial Engineering

2   Operations Management

3   Nature of Manufacturing and Manufacturing Systems

4   Supply Chain Management

5   Decision Theory

6   Operations Research (Linear Programming)

7   Introduction to Quality Management

8   Introduction to Ergonomics

9   Engineering Ethics

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DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 205 Engineering Probability and Statistics	3	0	3
	CONTACT HRS: 4		

Pre-requisites	MATH 201	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Math & Basic Sci

Catalogue Description:

Data description and presentation. Basic concepts in probability. Random variables and probability distributions. Sampling distribution. Point estimation of parameters. Statistical intervals for a single sample. Statistical intervals for two samples. Laboratory projects consisting of selected applications.

Instructor's Name & Contact Information:

Dr. Ayyaz Ahmed
Room B14-S-035
E-mail: ay.ahmed@uoh.edu.sa

Textbooks:

- Applied Statistics and Probability for Engineers by Douglas C. Montgomery et al., 5th ed, 2011

References:

- Lund Research Ltd. "Descriptive and Inferential Statistics". statistics.laerd.com
- Investigating Statistical Concepts, Applications, and Methods, Hance, Beth L.; Rossman, Allan J., Duxbury Press. ISBN 978-0-495-05064-3, 2005

Supplemental Materials:

Course Learning Outcomes:

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

1. Display, analyze, and interpret sample data using the techniques of exploratory descriptive data analysis.
2. Recognize some special distributions and apply their specific formulas.
3. Calculate probabilities and conditional probabilities
4. The students will be able to calculate probabilities using modeling sample spaces and applying rules of permutations and combinations, additive and multiplicative laws, and conditional probability
5. The students will explain and interpret a general knowledge of statistics and random samples, sampling experiments, the sampling distribution for a sample mean, and the sampling distribution of a sample proportion.

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

1	2	3	4	5	6	7
✓						

Brief List of Topics to be Covered:

1   Introduction to Engineering Statistics

2   Introduction to statistics and data analysis

3   Probability

4   Random Variables and Discrete Probability Distributions

5   Continuous Probability Distributions

6   Fundamentals of Sampling Distributions and Point Estimations

7   Statistical Quality Control – Part 1 – Statistical Process Control (SPC)

8   Statistical Quality Control – Part 2 – Process Capability

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DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 301 Numerical Methods	3	0	3
	CONTACT HRS: 4		

Pre-requisites	Math 201, ICS 103	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Math & Basic Sci

Catalogue Description:

Roots of nonlinear equations. Solutions of systems of linear algebraic equations. Numerical differentiation and integration. Interpolation. Least squares and regression analysis. Numerical solution of ordinary and partial differential equations. Introduction to error analysis. Engineering case studies.

Instructor's Name & Contact Information:

Dr. Houssem Jerbi
Room B14-S-022
E-mail: houssem.jerbi@gmail.com; h.jerbi@uoh.edu.sa

Textbooks:

- Numerical Methods for Engineers, Steven C. Chapra and Raymond P. Canale, 6th Edition, 2010

References:

- Elementary Numerical Analysis, K. Atkinson and W. Han, 3rd Ed., Wiley, 2004
- Numerical Methods Using MATLAB, J. Mathews and K. Fink, 4th Ed. Prentice Hall 2004
- http://www.mathworks.com/academia/student_version/techkit_conf.html

Supplemental Materials:
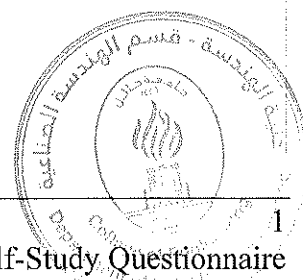
Course Learning Outcomes:

By the completion of the course the students should be able to:
1. Understand why computational methods are important in modern Industrial Engineering
2. Identify the appropriate problem class (nonlinear equations, ordinary differential equations, integration, etc.
3. Write algorithms and software for solving mathematical problems in Industrial Engineering.
4. Implement the mathematical knowledge into algorithms and programming on hypothetical cases.
5. Connect the different lessons in the course with their applications in Industrial Engineering by solving a variety of simple problems using first the programming knowledge acquired before and then the ability to use the built-in functions of the commercial codes such as MATLAB.
6. Think about the different design applications by taking deep reasoning problems in written exams, quizzes and especially in computer projects as well as open discussions.
7. Demonstrate effective communication through written reports and presentation notes.
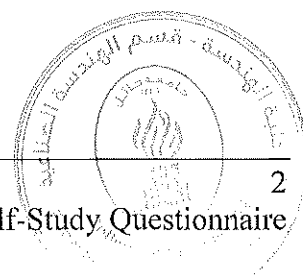8. Use of MATLAB based simulations.

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

1	2	3	4	5	6	7
✓	✓				✓	

Brief List of Topics to be Covered:

1   Simple Mathematical Model
2   Absolute and relative errors, Rounding and chopping, Computer errors in representing numbers. Review of Taylor series
3   Locating Roots of Algebraic Equations: Graphical Methods, Bisection Method; Newton Method; Secant Method; System of nonlinear equations
4   System of Linear Equations: Naïve Gaussian Elimination; Gaussian elimination with scaled partial pivoting and Tri-diagonal systems.
5   The Least Square Method; Linear Regression, Polynomial Regression
6   Interpolation: Newton's Divided Difference Method; Lagrange interpolation, Inverse interpolation
7   Numerical integration: Trapezoidal rule; Romberg Algorithm; Gauss Quadrature
8   Numerical differentiation: Estimating derivatives and Richardson Extrapolation

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DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 302 Linear Control Systems	2	1	3
	CONTACT HRS: 7		

Pre-requisites	MATH 260, EE 202	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective:*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg. Topic

Catalogue Description:

Linear systems, Modeling of physical systems, Ordinary Differential equations models, Laplace Transform, transfer functions, block diagram manipulation. Open loop and close loop systems, time domain analysis, response of systems to different test signals, Steady state analysis. Concept of stability, Routh-Hurwitz criteria, controller design. Laboratory activities include modeling, analysis and simulation of physical processes.

Instructor's Name & Contact Information:

Dr. Houssem JERBI
Room B14-S-022
E-mail: houssem.jerbi@gmail.com; h.jerbi@uoh.edu.sa

Textbooks:

- System Dynamics, by K. Ogata, 5th Edition, Prentice Hall, 2004

References:

- Linear Control Systems Analysis and Design with MATLAB, 5th edition, J. D'Azzo and S. Sheldon, Marcel Dekker, 2003
- Automatic Control Systems, Benjamin Kuo, Prentice-Hall 2002
- Shinner, S. Modern Control System Theory and Design, 2nd edition, Interscience, 1998

Supplemental Materials:

Course Learning Outcomes:

By the completion of the course the students should be able to:
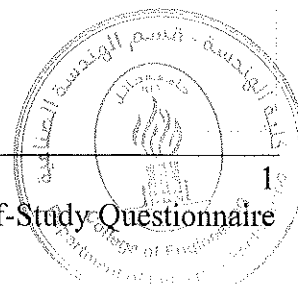
1. Apply basic mathematics, physical sciences and engineering principles to derive mathematical models of typical engineering processes
2. Outline the role of a control engineer in multi-disciplinary teams
3. Provide a basic knowledge of control system analysis and design tools, with emphasis on computer aided design
4. Identify, formulate, and solve control engineering problems
5. Analyze and interpret experimental data
6. Attain skills to carry out active search for technical problems
7. Demonstrate effective communication through written reports and presentation notes
8. Use of MATLAB based simulations
9. Operate efficiently basic test equipment (Cassy lab terminal, function generator, power supply) servomechanisms of control test beds, and a PC-based controller that checks specified control laws using the SIMULINK environment

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

1	2	3	4	5	6	7
✓	✓				✓	

Brief List of Topics to be Covered:

1 Introduction to systems dynamics

2 Laplace transform

3 Mechanical systems

4 Transfer function approach to modeling dynamic systems

5 Electrical and electromechanical systems

6 Fluid systems and Thermal systems

7 Time-domain analysis of dynamic systems

8 Frequency-domain analysis of dynamic systems.

9 Time domain analysis and design of control systems:
   - Block diagrams and their simplification
   - Transient response specifications for a second order system (rise time, overshoot, settling time, etc.),
   - Steady state error and system type
   - Routh stability criterion
   - Control actions (P, PI, PD, and PID controllers)
   - Root-locus method

10 Analysis and design of control systems in frequency domain:
   - Bode plots
   - Stability Measures in frequency domain (Phase and gain margins)

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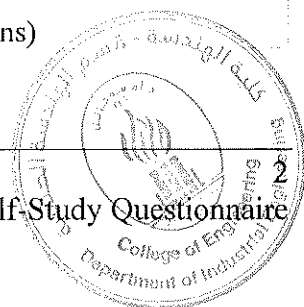
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER AND NAME	CREDITS / CONTACTS		
	LEC	**LAB**	**Total**
ISE 303 Operations Research I	3	0	3
	CONTACT HRS: 4		

Pre-requisites	ISE 201, ISE 205	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

This course is an introduction to the application of Operations Research (OR) in industrial engineering. It explains the need for and importance of OR for rational decision-making in industrial activities. It introduces the basic OR concepts and techniques to identify and apply appropriate solutions to particular problems.

Students will acquire the essential tools of OR that enable them to model and make scientifically based decisions in economic and production environments.

Instructor's Name & Contact Information:

Dr. Attia Boudjemline
Room B14-S-037
E-mail: a.boudjemline@uoh.edu.sa

Textbooks:

- Hamdy A. Taha, Operations Research - An Introduction, 10th Edition, Pearson, 2017.
- Frederick S. Hillier and Gerald J. Lieberman, Introduction to Operations Research, 10th Edition, McGraw Hill, 2015.
- Jay Heizer, Barry Render, Chuck Munson, Paul Griffin. Operations Management - Sustainability and Supply Chain Management, 3rd Canadian Edition, Pearson, 2020

References:

- Operations Research - Applications & Algorithms, Wayne L Winston, 2004
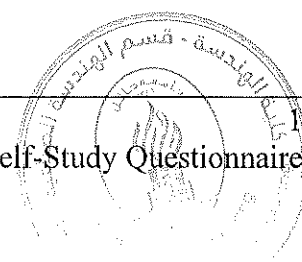
Supplemental Materials:

- Professional videos from the internet
- The Operational Research Society: https://www.theorsociety.com/
- The International Federation of Operational Research Societies (IFORS): https://www.ifors.org/

Course Learning Outcomes:

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

1. Understand the concept of Operations Research (OR) and modeling in OR.
2. Formulate Linear Programming (LP) problems.
3. Solve LP problems using different methods and carry out sensitivity analysis.
4. Understand the concept of Duality, formulate the dual problem, describe its economic interpretation, and interpret its solution.
5. Formulate and solve transportation and assignment problems.
6. Understand Network Models and solve related problems.
7. Understand Goal Programming and solve related problems.
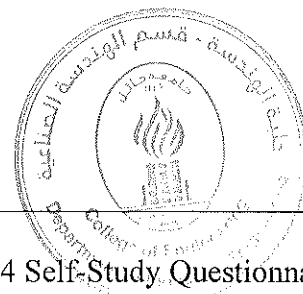8. Gather information from references and the internet to solve problems related to the course.

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

1	2	3	4	5	6	7
✓						✓

Brief List of Topics to be Covered:

1	Introduction to Operations Research (OR) and modelling in OR
2	Linear Programming
3	Simplex Methods
4	Sensitivity Analysis
5	Duality
6	Transportation & Assignment Problems
7	Network Models
8	Goal Programming

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 304 Principles of Industrial Cost	3	0	3
	CONTACT HRS: 4		

Pre-requisites	ISE 205	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

Introduction to basic costing concepts and behavior, with emphasis on manufacturing optimization through labor and materials cost analysis, operation and overhead cost calculations, product cost estimating, and finally setting product selling price. Study of the principles of costing systems and techniques of analysis and cost control. Emphasis on interpretation and use of costing principles for decision making.

Instructor's Name & Contact Information:

Dr. Mohamed Boujelbene
Room B14-S-033
E-mail: mboujelbene@yahoo.fr

Textbooks:

- Fundamentals of Cost Accounting, William N. Lanen, Shannon W. Anderson, Michael W. Maher, Fourth Edition Published by McGraw-Hill/Irwin, 2014

References:

- Management and Cost Accounting, Andreas Taschner, Michel Charifzadeh, ISBN: 978-3-527-50822-8, 2016
- Activity Accounting: An Activity-Based Costing Approach Brimson, James A., Wiley, 1991

Supplemental Materials:
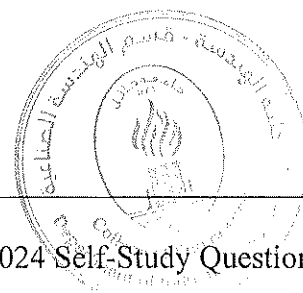
Course Learning Outcomes:

By the completion of the course the students should be able to:
1. Outline the concepts of cost and strategies used in industrial engineering.
2. Recognize the technical, cost and financial problems in manufacturing engineering.
3. Analyze the solution alternatives and choose the optimum design through the application of the Fundamentals of Cost.
4. Interpret engineering techniques considering Cost-Volume-Profit Analysis.

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

1	2	3	4	5	6	7
✓	✓				✓	

Brief List of Topics to be Covered:

1	Cost Accounting - Information for Decision Making
2	Cost Concepts and Behavior
3	Fundamentals of Cost-Volume-Profit Analysis
4	Fundamentals of Cost Analysis for Decision Making
5	Cost Estimation
6	Fundamentals of Product and Service Costing
7	Job Costing
8	Process Costing
9	Activity-Based Costing

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 307 Engineering Economic Analysis	3	0	3
	CONTACT HRS: 4		

Pre-requisites	NONE	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

Introduction to concepts of economic decision-making from a cash flow viewpoint. It includes present worth analysis, cash flow equivalence, rates of return, replacement analysis, benefit-cost analysis, depreciation and taxes, and projects break-even point, selection, and sensitivity analysis.

**Instructor's Name & Contact Information:**

Dr Imran Ali Chaudhry
Room B14-F-036
E-mail: i.chaudhry@uoh.edu.sa

Textbooks:

- Park, Chan S. (2021), Fundamentals of Engineering Economics, 4th Ed., Prentice Hall, ISBN: 9780137524761
- Blank, Leland T. and Tarquin, Anthony J., (2018) Basics of Engineering Economy, 8th Edition., McGraw-Hill, ISBN: 978-0073523439

References:

- Donald G Newnan, Jerome P Lavelle, Ted G Eschenbach (2015), Engineering Economic Analysis, 12th Ed, New York Oxford University Press, ISBN: 9780199339280
- William G. Sullivan, Elin M. Wicks, C. Patrick Koelling (2015), Engineering Economy 16th Ed, Pearson, ISBN 978-0133439274
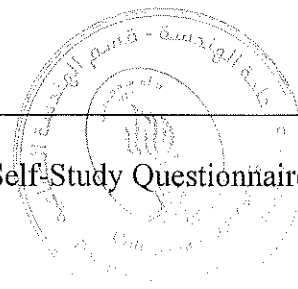
Supplemental Materials:

Course Learning Outcomes:

By the completion of the course the students should be able to:
1. Apply the present value, future value, and constant value concepts.
2. Perform economic analysis for different situations, projects etc.
3. Assess the impact of depreciation, taxation and other economic factors on projects' feasibility.
4. Understanding and apply the concept of depreciation.
5. Develop policies for assets replacement.
6. Make comparison and selection of alternatives by using variety of analytical techniques including PW, AW, FW analysis, rate of return analysis, benefit-cost ratio, sensitivity and breakeven analysis, and payback period analysis.
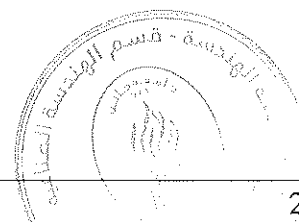
Student Outcomes addressed by the course: (Put a ✓ sign)

1	2	3	4	5	6	7
✓					✓	

Brief List of Topics to be Covered:

1   Engineering Economic Decisions

2   Time Value of Money

3   Understanding Money Management

4   Equivalence Calculations under Inflation

5   Present Worth Analysis

6   Annual Equivalent Analysis

7   Rate of Return Analysis

8   Depreciation and Income Taxes

9   Handling Project Uncertainty

10   Replacement Decision

11   Benefit-Cost Analysis

Date of last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	**LAB**	**Total**
ISE 320 Industrial Quality Control	3	0	3
	CONTACT HRS: 4		

Pre-requisites	ISE 205	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

The main purpose of this course is to provide the student with a clear and thorough understanding of quality control tools and statistical methods used in industries and manufacturing. The course covers the following subjects: Introduction to quality control and process improvement. Concepts of variation. Statistical process control (S.P.C tools). Control charts for variables and Control charts for attributes and their applications in process control. Process capability studies. Acceptance sampling. Cost of quality and the effects of quality on productivity.

Instructor's Name & Contact Information:

Prof. Mohamed AICHOUNI
Room B14-S-038
E-mail: m.aichouni@uoh.edu.sa

Textbooks:

- Quality Improvement (9th Edition), Dale H. Besterfield , Publisher: Prentice Hall; 9th edition (2012), ISBN-10: 0132624419

References:

- Statistical Methods for Quality Improvement, THOMAS P. RYAN, Third Edition, John Wiley & Sons, Ltd, 3rd Ed, 2011.
- محمد أحمد عيشوني، ضبط الجودة الإحصائي باستخدام برامج الإكسل وسفت إكسل والمينيتاب، مركز النشر العلمي والترجمة، جامعة حائل، 2013

Supplemental Materials:

- Course Web Page: http://www.uoh.edu.sa/facultymembers/en/M.AICHOUNI/Pages/ISE320.aspx
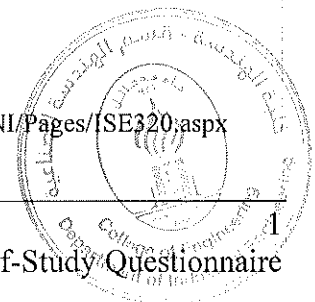
Course Learning Outcomes:

By the completion of the course the students should be able to:
1. Understating the fundamental concepts of Industrial Statistics and Quality Control.
2. Select and use quality tools and their applications in manufacturing and services.
3. Effectively make use of quality tools in engineering problem solving.

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

1	2	3	4	5	6	7
✓	✓					

Brief List of Topics to be Covered:

1	Introduction to Quality
2	Statistical Process Control – Part 1: Basic Tools
3	Statistical Process Control – Part 2: Process Capability
4	Statistics and Probability distributions in Quality
5	Control Charts for Variables
6	Control Charts for Attributes
7	Measurement Systems Analysis
8	Acceptance Sampling Techniques
9	Management and Planning Tools
10	Advanced Topics in Industrial Statistics

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 323 Work and Process Improvements	2	1	3
	CONTACT HRS: 7		

Pre-requisites	ISE 205		
Co-requisites	NIL		
Course Role in Curriculum	*Required / Elective*		Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*		Engg Topic

Catalogue Description:

Introduction to Process and Process Capability, Process analysis, Work Measurement standard data work sampling, Operations Analysis, Methods Engineering, Term Project, Predetermined Motion Time Systems, Methods design, The introduction to human engineering and Standardization.

Instructor's Name & Contact Information:

Dr. Mohamed Boujelbene
Room B14-S-033
E-mail: mboujelbene@yahoo.fr

Textbooks:

- Work Systems: Methods. Measurements & Management, Mikell P. Groover, Prentice Hall, ISBN 0131406506, 2007

References:

- Operations Management by R. Dan Reid & Nada R. Sanders, 4th Edition, Wiley 2010

Supplemental Materials:

Students using computer.

Course Learning Outcomes:

By the completion of the course the students should be able to:
1. Understand and Define the Methods Design & Work Measurement, Process and Operation analysis.
2. Identify the basic statistics concepts in addition to process capability and analysis and methods design and Standardization.
3. Define and calculate the Process capability and work measurement, standard time and predetermined motion-time systems.
4. Analyze and calculate the different decisions taken upon process analysis and term project.
5. Demonstrate the ability to develop Process capability and analysis and work measurements systems and standard time.
6. Perform the coordination skills needed for the use of fine tool software and equipment during the laboratory.

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

1	2	3	4	5	6	7
✓	✓				✓	

Brief List of Topics to be Covered:

1 Process and Process capability

2 Process analysis.

3 Work Measurement standard data work sampling

4 Operations Analysis, Methods Engineering

5 Term Project

6 Predetermined Motion Time Systems

7 Methods design.

8 The introduction to human engineering.

9 Standardization

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 325 Engineering Statistics	3	0	3
	CONTACT HRS: 4		

Pre-requisites	ISE 205	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Math & Basic Sci

Catalogue Description:

Review for estimation. Test of hypothesis for single and two samples. Applications of test of hypothesis in engineering. Simple and multiple linear regression and their applications. Design and analysis of single-factor experiments: analysis of variance. Design of experiments with several factors. Case studies in engineering statistics.

Instructor's Name & Contact Information:

Dr. Yassine Bouazzi
Room B14-S-014
E-mail : y.bouazzi@uoh.edu.sa

Textbooks:

- Applied Statistics and Probability for Engineers by Douglas C. Montgomery et al., 5th ed, 2011

References:

- Descriptive and Inferential Statistics, Lund Research Ltd. statistics.laerd.com. Retrieved 2014-03-23
- Investigating Statistical Concepts, Applications, and Methods, hance, Beth L.; Rossman, Allan J., Duxbury Press. ISBN 978-0-495-05064-3, 2005
- The Cartoon Guide to Statistics, Gonick, L. and Smith, W. New York: Harper Perennial, pp. 140-142, 1993
- Permutation Tests: A Practical Guide to Resampling Methods for Testing Hypotheses, Good, P., 2nd ed. New York: Springer-Verlag, 2000
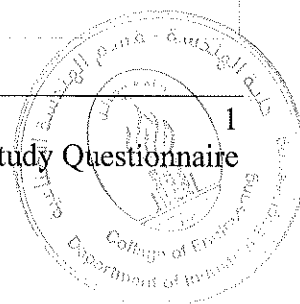
- Testing Hypotheses." Ch. 3 in Introduction to Statistical Theory, Hoel, P. G.; Port, S. C.; and Stone, C. J. ". New York: Houghton Mifflin, pp. 52-110, 1971

Supplemental Materials:

Students use of personal computer (Minitab software)

Course Learning Outcomes:

Upon completion of this course, the students should be able to:
1. Structure engineering decision-making problems as hypothesis tests.
2. Test statistical hypothesis about means, variances and proportions.
3. Use linear regression for building empirical models to engineering and scientific data.
4. Use the regression model to estimate the mean response and to make predictions and to construct confidence intervals and prediction intervals.
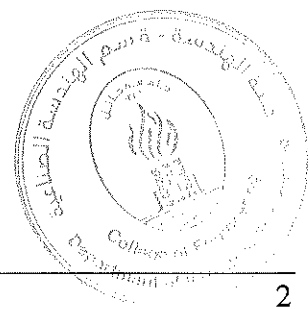5. Design and conduct engineering experiments involving several factors using the factorial design approach.

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

1	2	3	4	5	6	7
✓	✓				✓	

Brief List of Topics to be Covered:

1	Understanding the engineering statistics
2	Test of hypothesis for single and two samples
3	Applications of test of hypothesis in engineering
4	Simple linear regression and their applications
5	Multiple linear regression and their applications
6	Design and analysis of single-factor experiments: analysis of variance
7	Case studies in engineering statistics

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 351 Cooperative Work	9	0	9
	CONTACT HRS: 9		

Pre-requisites	Remaining hours less than or equal to 23 credit hours and Completion of all 1xx and 2xx courses
Co-requisites	NIL

Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

The Cooperative Work Program accounts for nine (9) credit hours, involves either a team based or a single student-based project that is geared toward an integrated application of several pieces of Systems Engineering knowledge learned by the student in his undergraduate education thus far. The co-op project must address technical aspects of the practice of Systems Engineering, including analysis, experimentation and design, by utilizing the problem-solving techniques covered in the various required (core) and elective courses offered at the Systems Engineering Department.
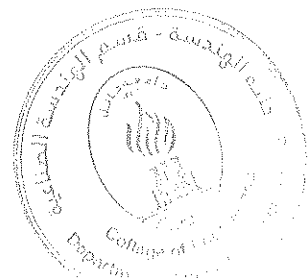
Instructor's Name & Contact Information:

Dr. Mohamed Boujelbene
Room B14-S-043
E-mail: mboujelbene@yahoo.fr

Textbooks:

References:

Supplemental Materials:

Course Learning Outcomes:

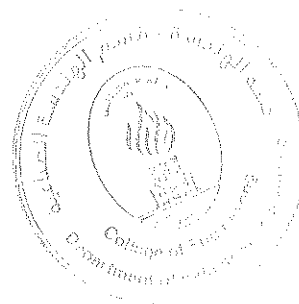By the completion of the course the students should be able to:
1. Exposing the student to real-life experience to familiarize the student with the work environment and ethical behaviours and giving the students a chance to develop the required employability skills.
2. Strengthening the student's understanding of the theoretical background in his field of study by Integrating previous knowledge from mathematics, basic sciences, engineering fundamentals and discipline related courses.
3. Integrate previous knowledge from mathematics, basic sciences, engineering fundamentals and discipline related courses
4. Communicate project details and express thoughts clearly and concisely, both orally and in writing, using necessary supporting material, to achieve desired understanding and impact.
5. Collect and review related data such as technical information, regulations, standards, and operational experiences from credible literature resources.
6. Plan an effective project work plan, using standard project planning techniques, to ensure project completion as per constraints.
7. Demonstrate ability to achieve project objectives while acting as an effective member of a multidisciplinary team.
8. Demonstrating the ability to deal with the society outside the university and prove to be a lifelong learner.
9. Introducing the employers to the qualifications of the future human resources and to give the employer an opportunity to evaluate the students' performance.

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

1	2	3	4	5	6	7
✓		✓	✓	✓		✓

Brief List of Topics to be Covered:

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 421 Operations Research II	3	0	3
	CONTACT HRS: 4		

Pre-requisites	ISE 303	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

Following topics from operations research with an emphasis on modeling and implementation are covered; integer programming, dynamic programming and nonlinear programming. Implementation using modeling software and spreadsheet is demonstrated on examples and case studies

Instructor's Name & Contact Information:

Dr. Imran Ali Chaudhry
Room B14-S-036
E-mail: Imran_chaudhry@yahoo.com; i.chaudhry@uoh.edu.sa

Textbooks:

- Operations Research: An Introduction, *H. Taha*, 10th Edition, Pearson, 2017
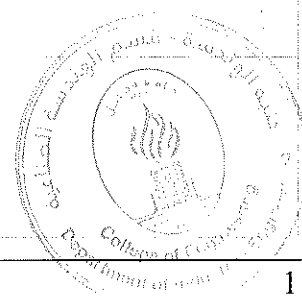
References:

- Introduction to Operations Research, *Hillier and Lieberman*, 10th Edition, 2014
- Operations Research - Applications & Algorithms, Wayne L Winston, 2004

Supplemental Materials:

Course Learning Outcomes:

By the completion of the course the students should be able to:
  1. Formulate and solve problems using integer programming.

2. Develop heuristic methods to solve problems.
3. Develop dynamic programming models for certain set of decision problems and solve them.
4. Build nonlinear programming models for problems.
5. Develop solution procedure for nonlinear programming models.

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

1	2	3	4	5	6	7
✓						✓

Brief List of Topics to be Covered:

1	Review of the Simplex & Dual Simplex Method
2	Integer Programming Models
3	Cutting Plane Algorithm
4	Branch and Bound Algorithm
5	Dynamic Programming
6	Nonlinear Programming

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 422 Facility Layout & Location	3	0	3
	CONTACT HRS: 4		

Pre-requisites	ISE 303	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Required
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

Introduction to facility planning issues. Material handling. Facility location and layout and computer-aided techniques and packages. Storage and warehousing functions, emphasizing quantitative and simulation technique.

Instructor's Name & Contact Information:

Dr. Imran Ali Chaudhry
Room B14-S-036
E-mail: Imran_chaudhry@yahoo.com; i.chaudhry@uoh.edu.sa

***Textbooks*:**

- Facilities Planning, *Tompkins, White, Bozer, Tanchoco,* 4th Edition, Wiley, 2010

***References*:**

- Facilities Planning and design, Alberto Garcia-Diaz, J. MacGregor Smith, Pearson, 2008
- Facility Layout and Location: An Analytical Approach, R. L. Francis, Leon Franklin McGinnis, John A. White, Prentice Hall, 1992

Supplemental Materials:

**Course Learning Outcomes:**

By the completion of the course the students should be able to:
1. Apply the knowledge of product, process and schedule design to facilities planning.
2. Identify product, process and schedule requirements.
3. Ability to develop process requirements for different type of facility layout models.
4. Develop and analyze different type of facility layout models using various techniques.
5. Ability to solve site selection problem models single and multi-facilities
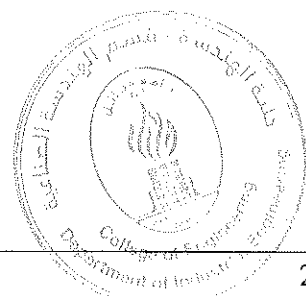6. Ability to design and develop warehouse models.

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

1	2	3	4	5	6	7
✓	✓					

**Brief List of Topics to be Covered:**

1	Fundamental principles of facilities planning and design
2	Product, process, and schedule design
3	Flow systems, activity relationships, and space requirements
4	Layout planning models and design algorithms
5	Location Models in Facility Planning
6	Computerized layout procedures
7	Warehouse operations
8	Material Handling

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DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & TITLE	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 429 Maintenance Planning and Control	3	0	3
	CONTACT HRS: 4		

Pre-requisites	Senior standing		
Co-requisites	NIL		
Course Role in Curriculum	*Required or Elective:*	Elective	
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic	

Catalogue Description:

Maintenance Organization, Maintenance strategy, Forecasting maintenance work, Maintenance capacity planning, Component replacement decision models, Maintenance Measurement and Standards, Scheduling of maintenance, Maintenance material control, Quality of maintenance jobs, Maintenance productivity, Maintenance audit, Maintenance management information systems, Case Studies.

Instructor's Name & Contact Information:

Dr. Yassine Bouazzi
Room B14-S-021
E-mail: y.bouazzi@uoh.edu.sa

Textbooks:

- Planning and Control of Maintenance Systems, Salih, O. Duffuaa and A. Raouf, Springer, Second Edition, 2015

References:

- Maintenance Engineering Handbook edited by L.R. Higgins, McGrawHill Book Company, New York, 1988
- Engineering Maintenance Management by B.W. Niebel, Marcel Dekke, New York, 1994
- Maintenance Fundamentals by R.K. Mobley, Butterworth-Heinemann, Boston, 1999
- Maintenance Strategy by A. Kelly, Butterworth-Heinemann, Oxford, U.K, 1997
- Maintenance Planning and Control by A. Kelly, Butterworth and Co. Ltd., London, 1984

__Supplemental Materials:__

    CMMS: ManWinWin

__Course Learning Outcomes:__

By the completion of the course the students should be able to:
1. Define the basic concepts of the maintenance.
2. Describe the maintenance organization.
3. 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.
4. Forecast the maintenance work.
5. Determine the maintenance capacity planning.
6. Able to control the maintenance material.
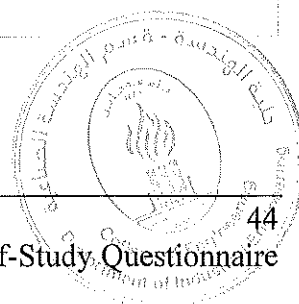7. Evaluate the quality of maintenance jobs.

__Student Outcomes addressed by the course:__ (Put a ✓ sign)

1	2	3	4	5	6	7

__Brief List of Topics to be Covered:__

1	Introduction to Maintenance
2	Maintenance Planning and Scheduling
3	Maintenance Management through PERT/CPM
4	Maintenance Workload Forecasting
5	Maintenance capacity planning
6	Maintenance Work Measurement
7	Failure Analysis and Replacement Decisions
8	Maintenance Material Control
9	Maintenance Quality Control
10	Computerized Maintenance Management System

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 461 Computer Aided Manufacturing & Robotics	3	0	3
	CONTACT HRS: 4		

Pre-requisites	ME 206	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Elective
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

High volume discrete parts production systems. Fundamentals of CAD/CAM. Computers in manufacturing. Computer process monitoring. Systems for manufacturing support. Group technology and integrated manufacturing systems. Case studies for robots in industry. CAD/CAM using computer graphics laboratory.

Instructor's Name & Contact Information:

Dr. Isam A.Q Badawi
Room B14-S-045
E-mail: isam149@gmail.com; i.elbadawi@uoh.edu.sa

***Textbooks*:**

- Principles of CAD/CAM/CAE Systems by Kunwoo Lee, Addison Wesley, 2019, 9th Edition, Pearson, 2019

***References*:**

- CAD/CAM by Ibrahim Zeid, McGraw-Hill, 2005, Introduction to CNC by Valentino and Goldenberg, Prentice Hall, 2016

Supplemental Materials:

Course Learning Outcomes:

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

1. To enable the students to understand the science behind the CAD/CAM.
2. To provide the students a practical knowledge and skill of using the CAD/CAM software.
3. To enable the students to integrate the isolated components.

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

1	2	3	4	5	6	7

Brief List of Topics to be Covered:

1	Introduction
2	Computer graphics: constructing the geometry; wire frame, surface and solid modeling, Geometric transformation: 2D and 3D transformations, Geometric projections
3	CAD/CAM databases: database management, databases of geometric properties
4	Numerical control basic of numerical control, motion control, point to point and continuous motions, programming numerical control machines, mathematics for CNC programming, Words address programming
5	Group technology: part families, parts classification and coding, machine cells, classification system, ER4U system
6	Robotics

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 465 Industrial Safety	3	0	3
	CONTACT HRS: 4		

Pre-requisites	None	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Elective
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

The scope of occupational safety: Human safety, Environmental safety, Setting safety standard: Safety administration, Legal aspect of industrial safety.

Instructor's Name & Contact Information:

Dr. Naim Ben Ali
Room B14-S-043
E-mail: naimgi2@yahoo.fr; na.benali@uoh.edu.sa

Textbooks:

- Industrial Safety and Health Management, C. Ray Asfahl, David W Rieske, Pearson; 6th edition, ISBN-10: 0132368714, 2009

References:

- Safety Professional's Reference and Study Guide, W. David Yates, Second Edition CRC Press; ISBN-10: 1482256657, 2015
- Industrial Safety and Environment, Amit Gupta, Firewall Media, ISBN 8170089387, 2006

Supplemental Materials:
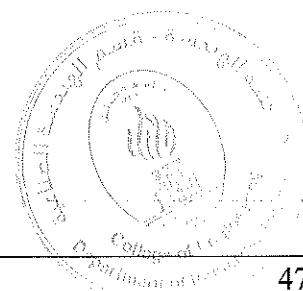
Course Learning Outcomes:

By the completion of the course the students should be able to:
1. Define the basic concepts of industrial safety.
2. Describe the Human safety, Environmental safety.
3. Describe the safety standard: Safety administration, Legal aspect of industrial safety.
4. Write the concept of industrial safety and provide useful practical knowledge for workplace safety.
5. Analyse all industrial hazards and potential hazards to prevent or mitigate harm or damage to people, property, or the environment.
6. Develop safety programs to prevent or mitigate damage or losses to people, property, or the environment.
7. Evaluate the spirit of teamwork by projects and discussion sessions to get all the thoughts from students.
8. Demonstrate effective communication through written reports and presentation notes.
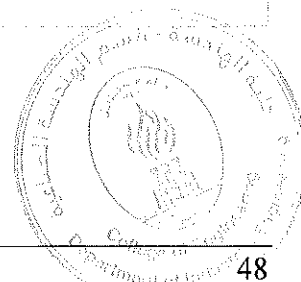9. Use of Environmental, Health & Safety (EHS) management software.

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

1	2	3	4	5	6	7

Brief List of Topics to be Covered:

1	Introduction to Safety in Industry
2	Health and safety signage
3	Personal Protective Equipment
4	Hazardous Chemicals
5	Fire Safety & Prevention
6	Occupational Safety and Health Management System (OSHMS)
7	Environmental & workplace safety
8	Basic First Aid

Date of Last Update: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	LAB	Total
ISE 470 Supply Chain Systems Modeling	3	0	3
	CONTACT HRS: 4		

Pre-requisites	ISE 402 & Senior standing	
Co-requisites	NIL	
Course Role in Curriculum	*Required / Elective*	Elective
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

This course adopts a modeling approach to supply chains that is designed to study trade-offs between system costs and customer service. Topics covered include supply chain design, multi-location inventory-distribution models, bullwhip effect, delayed differentiation, and e-commerce and supply chain. The key insights provided by such system-wide models will be illustrated through the use of software packages, real cases discussion and presentations and term projects. In addition, the course will highlight the role of information technology in supporting supply chain operations.

Instructor's Name & Contact Information:

Dr. Imran Ali Chaudhry
Room B14-S-036
E-mail: Imran_chaudhry@yahoo.com; i.chaudhry@uoh.edu.sa

Textbooks:

- Supply chain management: strategy, planning, and Operation, *Sunil Chopra and Peter Meindl*, 6th Edition, 2014, Pearson

References:

- Designing and Managing the Supply Chain, *Simchi-Levi, Kaminsky and Simchi-Levi*, 2008, McGraw Hill

Supplemental Materials:

Course Learning Outcomes:

By the completion of the course the students should be able to:
1. Understating the fundamental concepts of Supply Chain Management.
2. Design the Supply Chain Network.
3. Model the planning demand and supply in supply chain network.
4. Determine the optimal capacity and product availability.
5. Determine the Sourcing, Transportation, and Pricing.
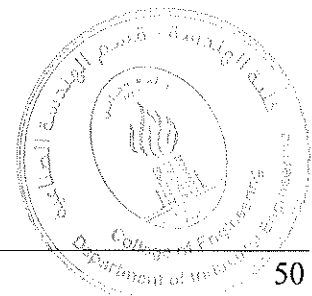6. Identify the competition and coordination in Supply Chains.

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

1	2	3	4	5	6	7

Brief List of Topics to be Covered:

1	Understanding the Supply Chain
2	Supply Chain Performance: Achieving Strategic Fit and Scope
3	Designing Distribution Networks
4	Network Design in the Supply Chain
5	Designing Global Supply Chain Networks
6	Network Design in an Uncertain Environment
7	Aggregate Planning in a Supply Chain
8	Planning Supply & Demand in a Supply chain

Date of Last Review: 01 September 2022

DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE NUMBER & NAME	CREDITS / CONTACTS		
	LEC	**LAB**	**Total**
	3	0	3
ISE 499 Energy Efficiency	CONTACT HRS: 4		

Pre-requisites	PHYS 102 and EE 202	
Co-requisites	NONE	
Course Role in Curriculum	*Required / Elective*	Elective
Categorization of Credits	*Math & Basic Sci / Engg Topic / Other*	Engg Topic

Catalogue Description:

Energy use and importance in development, Energy forms, Conventional energy sources, Renewable energy sources, Sustainability, Environmental and health effects of energy use, Concept of energy efficiency, Economics of implementing energy efficiency, Energy efficiency in different the electric power sector, Energy efficiency in the industrial sector, Energy efficiency in the residential and commercial sectors, Energy efficiency in the transportation sector.

Instructor's Name & Contact Information:

Dr. Attia Boudjemline
College of Engineering, Room 037
E-mail: a.boudjemline@uoh.edu.sa

**Textbooks**:

- Energy Efficiency: Concepts and Calculations, Daniel M. Martinez, Ben W. Ebenhack and Travis P. Wagner, Elsevier, 2019
- Handbook of Energy Efficiency and Renewable Energy, Frank Kreith, & D. Yogi Goswami, CRC Press, 2007

**References**:

- Energy Efficiency Guidebook, Gulf Organization for Industrial consulting, Suleiman Al Balushi, and Jayesh Kumar Vakumdakar, Doha Qatar, 2013

**Supplemental Materials**:

- Saudi Energy Efficiency Center (SEEC): https://seec.gov.sa/en
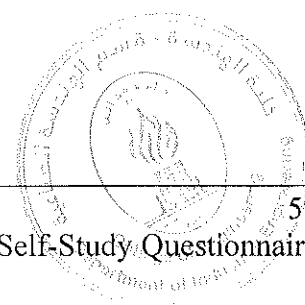
- Environmental and Energy Study Institute (USA): https://www.eesi.org/

Course Learning Outcomes:

By the completion of the course the students should be able to:
1. Understand the importance of energy in modern societies.
2. List the different types of energy.
3. Describe conventional and renewable energy sources.
4. Describe the concept of energy sustainability and its implications.
5. Understand the impact of energy use on the environment, and human health and well-being.
6. Define the basic concepts of energy efficiency.
7. Energy efficiency in different sectors.
8. Economic benefits and challenges in achieving energy efficiency.
9. Define the methods to evaluate energy efficiency, energy generation, and energy demand.
10. Ability to effectively relate critical concepts in energy efficiency and energy management.
11. Ability to carry on a project related to energy and make a presentation.

Student Outcomes satisfied by the course: (Put a ✓ sign)

1		3	4	5	6	7

Brief List of Topics to be Covered:

1	Basic concepts of energy
2	Energy measurement and statistics
3	Energy supply and energy demand
4	Energy economics, lifecycle analysis, and carbon management
5	Conventional energy sources
6	Renewable energy sources and sustainability
7	Quantifying Energy Efficiency for Policy
8	Energy Use and Efficiency in the Electric Power Sector
9	Energy Use and Efficiency in Industrial Sectors
10	Energy Use and Efficiency in Commercial and Residential Sectors
11	Energy Use and Efficiency in Transportation

Date of Last Update: 01 September 2022