DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

IE 202: Introduction to Engineering Design II

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Introduction to Engineering Design II	IE 202	هـ ص ٢٠٢		4		2
Pre-requisites:	IE 201, IE 200					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: Engineering design process. Computer modeling and heuristics for problem solving. Hands-on real life and team–based engineering design project: customer requirements, conceptual design, prototyping, functional testing, preparation of operational manual. Communicating design outcomes.						

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

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

***Course Learning Outcomes*:**

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

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

Topics to be Covered:		***Duration in Weeks***
1.	Course Norms - Working within Multidisciplinary Teams	0.5
2.	Introduction - The Design Process	0.5
3.	Problem Definition	1
4.	Objectives & Constraints	1
5.	Functions & Requirements	1
6.	Alternative Designs	1.5
7.	Evaluation & Selection	1.5
8.	Project Management	1.5
9.	Modeling, Analysis, and Optimization	1.5
10	Prototyping	2
11.	Testing & Design Specifications	1
12.	Communication Skills	1

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

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

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

Instructor or course coordinator: Dr. Ibrahim Olwi
Last updated: May 2015