

**DEPARTMENT OF INDUSTRIAL ENGINEERING  
COURSE SYLLABUS**

<i>COURSE TITLE</i>	<i>ENGLISH CODE/NO</i>	<i>ARABIC CODE/NO.</i>	<i>CREDITS</i>			
			<i>Th.</i>	<i>Pr.</i>	<i>Tr.</i>	<i>Total</i>
<b>SENIOR PROJECT</b>	<b>IE 499</b>		2	4		4
<i>Pre-requisites:</i>	IE 422; IE 432					
<i>Course Role in Curriculum</i>	<i>Required or Elective:</i>		Required Core Course			

***Catalogue Description:***

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

**Textbooks:**

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

**Supplemental Materials:**

As provided/recommended by the project work advisors

**Course Learning Outcomes:**

**By the completion of the course the student should be able to:**

1. Analyze a project statement, brief, or proposal to identify the real problem and the most relevant needs and operational constraints - (c, e).
2. Identify potential costumers, their needs, and their operational constraints - (c).
3. Collect and review related data such as technical information, regulations, standards, and operational experiences from credible literature resources - (e, i, j).
4. Integrate previous knowledge from mathematics, basic sciences, engineering fundamentals and discipline related courses to address the problem - (a).
5. Discuss all applicable realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. (c, j)
6. Define design objectives, design constraints, measures of design viability, and the evaluation criteria of the final project, and reformulate the problem based on collected data. - (c).
7. Generate possible solutions; compare alternatives, and select one alternative based on evaluation criteria and feasibility analysis - (c, e).
8. Plan an effective design strategy and a project work plan, using standard project planning techniques, to ensure project completion on time and within budget - (c).
9. Implement a planned design strategy for an Experimental Design Project, if applicable:
  - Identify experimental variables and parameter with ranges and desired accuracies - (b)
  - Select appropriate experimental tools such as sensors, instruments and software - (b, k)
  - Explain a reliable experimental setup and experimental procedure that solves the problem – (c, e)
  - Explain efficient measures to deal responsibly with safety issues and environmental hazards - (b, h, j)
  - Use appropriate measurement techniques to ethically collect and record data - (b, f)
  - Analyze experimental data using appropriate tools such as data reduction and statistical analysis - (a, b)
  - Perform uncertainty analysis - (a, b)

- Judge, verify, and validate the experimental result by comparing them with theory and/or previous experimental works - (b)
10. Implement a planned design strategy for a Product-Based Design Project, if applicable:
- Identify design parameters as well as assumptions - (c).
  - Carry out initial design calculations using modern engineering tools - (a, c, k).
  - Use modern engineering tools to estimate the performance parameters of the initial design - (a, c, k)
  - Use constraint analysis and trade-off studies of the design parameters to refine the initial design and obtain a final optimized design - (c )
  - Evaluate the project related environmental, social, health and safety issues as well as hazards anticipated by the project - (h, j)
  - Evaluate project success in satisfying customer’s needs, design criteria and operational constraints - (c, i)
11. Demonstrate ability to achieve project objectives while acting as an effective member of a multidisciplinary team - (c, d)
12. Communicate design details and express thoughts clearly and concisely, both orally and in writing, using necessary supporting material, to achieve desired understanding and impact - (g, k)

<u>Topics to be Covered:</u>	<u>Duration in Weeks</u>
Design Methodology, Synthesis, Creativity and Conceptualization	
Project Management Techniques	
Problem Solving Heuristic	
Teamwork Skills	
Communication Skills; Written and Oral	
Use of standards and design codes	
Software Tutorials (e.g. MS Info Path, Mind Manager, MS Project, Arena etc.)	
Cost Analysis	
Engineering profession Ethics	

**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:** ( ) and ( )

***Instructor or course coordinator:***

Dr Shafi Ullah

***Last updated:*** Feb 17, 2015