

<p>Islamic University Faculty of Engineering</p>		<p>الجامعة الإسلامية كلية الهندسة</p>
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ENGR 101 - CREATIVITY IN ENGINEERING DESIGN I

COURSE SYLLABUS

Spring Semester 2013-2014

A. Catalog Data

COURSE TITLE	COURSE CODE	CREDITS		
		Theory	Practice	Credit Hours
Creativity in Engineering Design I	ENGR 101	2	-	2
Pre-requisites, Co-requisites		COMM 101, ELAN 102		
Introduces the student to engineering with a focus on academic success, professional development, creative problem solving techniques, design concepts, team work, brainstorming, project planning, reverse engineering, research for design and development, engineering ethics, economic cost analysis, environmental impact, report writing, presentation skills. Students are expected to define and solve an engineering problem under a variety of constraints in a team spirit and eventually present their design in front of an audience consisting of faculty and students.				

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B. Textbook and References

Textbooks:

- Raymond B. Landis, Studying Engineering: A Road Map to a Rewarding Career, 4th Ed., Discovery Press, 2013.
<http://www.discovery-press.com/discovery-press/studyengr/studyeng4e.asp>
- John R. Karsnitz, Stephen O'Brien and John P. Hutchinson, Engineering Design: An Introduction, 2nd Ed., Delmar, 2012.

References:

- Barry Hyman, Fundamentals of Engineering Design, 2nd Ed., Prentice Hall, 2002.

C. Objectives of the Course

- Explain the campus facilities available to the students and how they should benefit from them.
- Understand how to succeed as an engineering student.
- Understand different engineering career paths and the available opportunities.
- Understand the engineering design process.

- Use a systematic approach for defining and solving engineering problems.
- Learn how to work in a team to complete a project.
- Learn how to perform brainstorming and concept generation.
- Develop project proposal writing skills.
- Understand how record keeping is accomplished.
- Develop scheduling and project planning techniques.
- Understand reverse engineering process.
- Learn how to research for design and development.
- Learn the importance of morals and ethics in engineering.
- Understand economic cost analysis and environmental impact.
- Demonstrate technical report writing techniques and presentation skills.
- Understand different engineering disciplines.

D. Course Learning Outcomes (CLO)

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

1. **Define** the teaching and learning process.
2. **Outline** different engineering career paths.
3. **Describe** the essentials of creativity in engineering design.
4. **Demonstrate** problem definition and solving.
5. **Operate** as a design team.
6. **Practice** brainstorming and concept generation.
7. **Acquire** project proposal writing skills and record keeping.
8. **Practice** scheduling and project planning.
9. **Outline** reverse engineering process.
10. **Examine** research for design and development.
11. **Demonstrate** engineering ethics.
12. **Describe** economic cost analysis and environmental impact.
13. **Acquire** report writing and presentation skills.
14. **Define** different engineering disciplines.

E. Relationship of ABET Student Outcomes to Course Learning Outcomes

ABET Student Outcomes		Low	Medium	High	NA
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		✓		

F. Course Contents (Weekly Lecture Plan)

Week	Dates	Lecture Topics	Reading Materials/ Assignment Due Dates/ Quiz and Exam Dates
1	26/01 – 30/01	Course Overview	Assignment: Obtain the Course Material from the web site: https://sites.google.com/site/kfidan1/
2	02/02 – 06/02	1. Keys to Success in Engineering Study 2. Understanding the Teaching & Learning Process	Read: Chapters 1 & 3 - Landis
3	09/02 – 13/02	3. Making the Most of How You are Taught	Read: Chapter 4 - Landis Quiz 1: Chapters 1 & 3 - Landis
4	16/02 – 20/02	4. Making the Learning Process Work for You	Read: Chapter 5 - Landis Assignment 1: Index of Learning Styles Questionnaire
5	23/02 – 27/02	5. The Engineering Profession	Read: Chapter 2 - Landis Quiz 2: Chapters 4 & 5 - Landis
6	02/03 – 06/03	6. Essentials of Engineering Design	Read: Chapter 2 - Karsnitz
7	09/03 – 13/03	7. Problem Formulation: Problem Definition Statement	Read: Lecture Notes Quiz 3: Chapters 2 Landis & Karsnitz
8	16/03 – 20/03	8. How to Operate as a Design Team: Team Building, Team Work, Assigning Responsibilities	Read: Chapter 3 - Karsnitz, Lecture Notes Midterm Exam 1
9	21/03 – 29/03	Inter-semester Break	
10	30/03 – 03/04	9. Brainstorming, Concept Generation 10. Proposal Writing	Read: Chapter 4 - Karsnitz, Lecture Notes Assignment 2: Problem Definition Statement
11	06/04 – 10/04	11. Record Keeping, Scheduling (Gantt Chart), Project Planning	Read: Chapter 5 - Karsnitz, Lecture Notes Quiz 4: Chapters 3 & 4 - Karsnitz, Lecture Notes Assignment 3: Draft Proposal
12	13/04 – 17/04	12. Reverse Engineering	Read: Chapter 6 - Karsnitz Assignment 4: Gantt Chart
13	20/04 – 24/04	13. Investigation and Research for Design and Development	Read: Chapter 7 - Karsnitz Quiz 5: Chapters 5 & 6 - Karsnitz, Lecture Notes

14	27/04 – 01/05	14. Engineering Ethics 15. Economic Cost Analysis 16. Environmental Impact	Read: Lecture Notes Assignment 5: Proposal
15	04/05 – 08/05	17. Final Report Requirements 18. Presentation Skills	Read: Lecture Notes Midterm Exam 2
16	11/05 – 15/05	19. Orientation to Engineering Education	Read: Chapter 8 - Landis Quiz 6: Chapters 7 - Karsnitz, Lecture Notes Assignment 6: Final Report
17-18	18/05 – 04/06	Final Exam	Final Exam and Project Presentations

G. Planned Learning Activities, Teaching Methods and Mode of Delivery

- **Lectures:** Two hours sessions per week – Face to Face Lectures and Presentations.
- **Design Project:** Students will work independently in a multidisciplinary team under the supervision of a faculty advisor to design and demonstrate an engineering project. The purpose of the project is to emphasize the creativity in engineering design, to solve a problem under a variety of constraints, attempting to meet criteria that are often conflicting, and to do so in association with colleagues who often have slightly different viewpoints. Successful completion of the project involves designing, as well as reporting on the work in oral and written form.

H. Course Contribution to Professional Component

- Engineering Science: 50%
- Engineering Design: 50%

I. Assessments, Methods and Evaluation Criteria

Course Grading Policy

<u>Assessment Method</u>	<u>Quantity</u>	<u>Percentage</u>
Assignment 1: Index of Learning Styles Questionnaire	1	1%
Assignment 2: Problem Definition Statement	1	3%
Assignment 3: Draft Proposal	1	3%
Assignment 4: Gantt Chart	1	3%
Assignment 5: Proposal	1	5%
Assignment 6: Final Report	1	7%
Quizzes	6	18%
Midterm Exam 1	1	15%
Midterm Exam 2	1	15%
Final Presentations	1	10%
Final Exam	1	20%
Total		100%

J. Class Policy

- Class attendance are mandatory. You should come to the classroom before the instructor. Late comers will not be allowed to enter the classroom. Students, who are absent over 25% of the class time will not be allowed to enter the final examination.

- You should turn off your cellular phone before entering the classroom. You should not leave the classroom to make or take cellular phone calls.
- You should bring a notepad and/or a writing instrument to every class and take detailed notes.
- You should pay attention to the instructor and participate in class discussions.
- You should not do other work during class time.

K. Honor Code

Any form of cheating, plagiarism, and/or academic dishonesty will result in an "F" grade in the course.

L. Late Work and Examinations

Late assignments will not be accepted. Students who know that they are going to miss class should make arrangements in advance. Exams will be closed book and in-class. There will not be any make-up for quizzes and midterm exams except the cases of hospitalization or detention.