IE-352
Section 1, CRN: 48700/1/2
Section 2, CRN: 48703/4/5
Section 3, CRN: 48706/7/8
Section 4, CRN: 58626/7/8
Second Semester 1438-39 H (Spring-2018) – 4(4,1,2)
"MANUFACTURING PROCESSES – 2"

Course Description

Course-in-brief

Dimensional and geometric tolerances; Tool materials and geometry; Cutting tools assembly techniques; Cutting mechanisms; Material removal operations; Effects of cutting variables on machining operations; Effects of machining parameters on machine tool elements; Non-traditional machining; Process planning.

Level: 6 (for more details: https://engineering.ksu.edu.sa/en/Bachelor_of_Science_in_IE)

Estimated Category Content:
Engineering science: 3 credit hours
Engineering design: 1 credit hour

Prerequisite:
IE-251 – "Manufacturing Materials"
GE-104 – "Basics of Engineering Drawing"

Co-requisite:
IE-252 – "Manufacturing Processes – 1"

Time and Place

Section 3	Section 4
Lecture (48706): **Sun: 09:00 -09:50 AM** (1A-54) **Mon: 11:00 – 11:50 AM** (1A-47 / CADCAM) **Tue: 09:00 -09:50 AM** (1A-54) **Wed: 10:00 -10:50 AM** (1A-46/3) Dr. El-Sherbeeny	Lecture (58626): **Mon: 08:00 – 09:50 AM** (Civil Dept.: 1A-13) **Wed: 08:00 – 09:50 AM** (Civil Dept.: 1A-13) Dr. El-Sherbeeny
Exercises (48708): **Mon: 10:00 – 10:50 AM** (1A-54) Engr. Ahmed Tawheed	Exercises (58627): **Mon: 02:00 – 02:50 PM** (Civil Dept.: 1A-60) Engr. Ahmed Tawheed
Lab (48707): **Mon: 01:00 – 02:50 PM**; (1A-52) Engr. Umar Al-Shehry	Lab (58628): **Wed: 01:00 – 02:50 PM**; (Civil Dept.: 1A-38) Engr. Umar Al-Shehry

Course Resources

Resources for the course include the instructor; assigned textbook and references; class notes and handouts; your teammates; the library and course website; and the World Wide Web.

Instructor
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Teaching Assistants

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Office Hours
I adopt an open-office policy. You are encouraged to come to my office and ask questions, consult, provide feedback, or give suggestions at any time during the day. Best times to find me in the office this semester are: **Sun, Mon, Tue: 10:00 - 11:00 AM; Sun, Tue, Wed: 11:00 AM – 12:00 noon; or by appointment.**

Textbook: ***Manufacturing Engineering and Technology***. Serope Kalpakjian, Steven R. Schmid. Seventh Edition (SI). Pearson, 2014. ISBN-10: 9810694067; ISBN-13: 978-9810694067

Reference: ***The selection of Manufacturing Engineering Processes***. Saied Darwish, Supported by Research Center, College of Engineering Project No. 50/426, King Saud University, 2006.

Reference: ***Principles of Modern Manufacturing***. Mikell P. Groover. Fourth Edition. Wiley: Asia, 2011. ISBN: 978-0-470-50592-2.

Websites (sample)
http://www.gdandtbasics.com/gdt-symbols/
http://www.engineersedge.com/tolerance__calc_menu.shtml
http://www.engineeringessentials.com/gdt/

Computer Usage
Exercises may be assigned regarding the usage of the statistical package of *Dynoware* software for performing cutting force analysis.

Project Work
You will be asked to perform a literature review related to advances related to advances in machining processes (details will be discussed during the semester).

Course Objectives

The course familiarizes students with metal removal machines and processes; gives them an insight of the mechanics of machining processes and making them capable of performing force, power and tool wear analysis for various machining operations. The course also trains students to operate and carryout experiments on metal removal machines. In addition, the student also get in depth understanding of the advanced manufacturing processes such as laser machining, electric discharge machining, etc. The course also introduces students to the basic techniques required to choose optimal machines, decide on optimal sequences of operations, and to determine optimal cutting parameters.

Intended Learning Outcomes

At the end of this course, students are expected to acquire knowledge regarding the following:

1. Understand the workpiece design for manufacturing (dimensional and geometric tolerances), and the theory of conventional metal cutting and non-conventional machining operations [**a**].
2. Perform metal cutting analysis (i.e. force, power, machining time, and tool wear calculations) in different machining processes [**e**].
3. Enable the students to use various machine tools and conduct experiments [**b**].
4. Determine or improve the machining parameters and develop a process plan for a given workpiece [**c**].

Course Policies

Attendance

Attendance is a must! Attendance will be taken **at the beginning of each class period**. In case you are not present when attendance is taken, you will be counted as absent; no exceptions. Students who absent themselves during a semester **for more than 25%** of the required number of lectures will not be allowed to continue the course, denied from sitting for the final examination, and assigned a course grade of DN which is reported in their transcript.

Class Discussion

Communication is very important in achieving collective goals and objectives. Feel free to voice your opinions and ask questions anytime during a class period. Practice your right and freedom to learn.

Help Sessions

Help sessions will be organized at convenient times as needed upon request from students.

Expected Behavior

Practicing engineers are expected to conduct themselves in an ethical and professional manner. This includes attending all class activities; meeting deadlines; observing common courtesies to fellow students, teachers, and staff; being honest; making a diligent effort to learn; and not engaging in any disruptive, irresponsible manner. Legitimate collaboration is encouraged but academic dishonesty will not be tolerated.

Assessment and Evaluation

Assessment in the following areas will be converted to points, to compute your final grade in the course:

Assessment Item	Comment	Marks*
Class Attendance	Used only to assess denial status (beginning of class!)	0%
Quizzes	Assigned once every 2-3 weeks	5%
Project	One semester project report and presentation	5%
Laboratory	Lab reports (every lab); 2 lab exams	20%
Midterms	Two midterms (see schedule below)	30%
Final Exam	Exams period	40%

* Subject to change

Course Curriculum:

Course topics*:

1. Dimensional and geometric tolerances (2 weeks)
2. Fundamentals of metal cutting (2 weeks)
3. Mechanics of metal cutting (2 weeks)
4. Conventional machining processes (3 weeks)
5. Surface finish and integrity, and machinability (1 week)
6. Non-traditional machining processes (3 weeks)
7. Manual process planning (1 week)

* Subject to change

Laboratory topics*:

1. Metal cutting related measurements
2. Machine tools and machine tools operations
3. Cutting tool geometry
4. Experimental study in metal cutting: chip formation; tool wear and cutting force measurements
5. Non-traditional machining processes
6. Developing routing sheets

* Subject to change

Course Outline*

Week	Date: Greg.	Topic*
1 (1A)		Syllabus, course content Introduction
2 (2A)		1. Dimensional and geometric tolerances
3 (3A)		Cont. Dimensional and geometric tolerances
4 (4A)		2. Fundamental of metal cutting
5 (5A)		Cont. Fundamental of metal cutting
6 (6A)	**Sun. Feb 25, 2018**	**FIRST MIDTERM** 3. Mechanics of metal cutting
7 (7A)		Cont. Mechanics of metal cutting
8 (8A)		4. Tool Wear and Tool Life
9 (9A)		5. Conventional machining processes
10 (10A)		Cont. Conventional machining processes
11 (11A)	**Sat. Mar 31, 2018**	**SECOND MIDTERM** Cont. Conventional machining processes
12 (12A)	**Thurs. Apr. 12, 2018**	6. Finishing operations: grinding; honing; lapping **PROJECT PRESENTATIONS:**

13 (13A)	**7. Non-traditional machining processes***
14 (14A)	**8. Manual process planning**

*** Tentative**