Manufacturing Processes

Course Code:

ME 363

Course Period:

Autumn

Course Type:

Core

Credits:

3

Theoric:

3

Practice:

0

Laboratory Hour:

0

ECTS:

5

Prerequisite Courses:

Material Science for Mechanical Engineers [1]
Course Language:

English

Course Objectives:

1. To give students the information in materials processing such as casting, forming, machining, welding, 2. To introduce the principles of basic materials processes; tools and machines used; application fields of different processes in manufacturing 3. To develop an understanding of environmental and design issues related to the processes in manufacturing

Course Content:

Fundamentals of the mechanical behavior of materials. Metal-casting processes and equipment. Heat treatment. Bulk deformation processes. Sheet-metal forming processes. Material-removal processes: cutting, abrasive, chemical, electrical, and high-energy beams. Processing of polymers: rapid prototyping and rapid tooling. Processing of metal powders, ceramics, glasses, composites, and superconductors. Computer-integrated manufacturing systems. Product design and competitive aspects of manufacturing.

Course Methodology:

1: Lecture, 2: Question-Answer, 3: Lab, 4: Case-study

Course Evaluation Methods:

A: Testing, B: Experiment, C: Homework, D: Project

Course Learning Outcomes	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Adequate knowledge of materials processes used in industry and related material behavior	1,2,4,12,13	1,2,4	A
2) Ability to compare, contrast and choose the right material processes	1,2,4,5	1,2,4	A
3) Ability to identify design issues related to material processing	4,13	1,2,4	A
4) Ability to work as a team and research state of the art in materials processing	7,9,10	1,2	D

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	INTRODUCTION, MATERIALS and PROCESSES	Text Book, Lec Notes
2	METAL ALLOYS, IRON-CARBON	Text Book, Lec Notes
3	FUNDAMENTALS of CASTING	Text Book, Lec Notes
4	SHAPE CASTING PROCESSES	Text Book, Lec Notes
5	INJECTION MOLDING	Text Book, Lec Notes
6	MIDTERM EXAM I	Text Book, Lec Notes
7	ROLLING, FORGING, EXTRUSION, DRAWING	Text Book, Lec Notes

8	SHEET METAL FORMING	Text Book, Lec Notes
9	FUNDAMENTALS of MACHINING, CUTTING TOOLS	Text Book, Lec Notes
10	MACHINING PROCESSES	Text Book, Lec Notes
11	MODERN PROCESSES	Text Book, Lec Notes
12	MIDTERM EXAM II	Text Book, Lec Notes
13	PRESENTATION of TERM PROJECTS	Text Book, Lec Notes
14	WELDING	Text Book, Lec Notes

RECOMMENDED SOURCES	
Textbook	“Introduction to Manufacturing Processes”, By; Mikell P. Groover, Wiley “Principles of Modern Manufacturing”, Mikell P. Groover, Wiley, 5th Ed., “Manufacturing Engineering and Technology”, By; S.Kalpakjian – S.R. Schmid Pearson, 6th Ed., 2010
Additional Resources	Lecture Notes: http://me.yeditepe.edu.tr/courses/me363 [2]

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	2	40
Term Project	1	20
Attendance	1	5
Final	1	35
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		35
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		65
Total		**100**

COURSE'S CONTRIBUTION TO PROGRAM								
No	Program Learning Outcomes		Contribution					
		NA	1	2	3	4	5	
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in complex engineering problems.	**X**						
2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**						
3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.	**X**						
4	Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in engineering practice; ability to employ information technologies effectively.	**X**						
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.	**X**						
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.	**X**						
7	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language; ability to write effective reports and comprehend written reports, prepare design and production reports, make effective presentations, and give and receive clear and intelligible instructions.	**X**						
8	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	**X**						
9	Consciousness to behave according to ethical principles and professional and ethical responsibility; knowledge on standards used in engineering practice.	**X**						

10	Knowledge about business life practices such as project management, risk management, and change management; awareness in entrepreneurship, innovation; knowledge about sustainable development.	**X**						
11	Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions.	**X**						
12	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**						
13	Ability to verify and validate numerical solutions to engineering problems.	**X**						

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding the exam weeks: 12x Total course hours)	12	3	36
Hours for off-the-classroom study (Pre-study, practice)	14	2,5	35
Midterm examination	2	2	4
Homework	0	0	0
Project	1	40	40
Final examination	1	3	3
Total Work Load			118
Total Work Load / 25 (h)			4.7
ECTS Credit of the Course			5