ECTS COURSE INFORMATION FORM

Faculty	**Faculty of Engineering**	
Program	**B.Sc. in Civil Engineering**	**Elective**
	B.Sc. in Computer Engineering	**Elective**
	B.Sc. in Electrical-Electronics Engineering	**Elective**
	B.Sc. in Industrial Engineering	**Elective**
	B.Sc. in Mechanical Engineering	**Required**

Course Code	ME 309			
Course Title in English	Manufacturing Processes			
Course Title in Turkish	İmal Usulleri			
Language of Instruction	English			
Type of Course	Flipped Classroom			
Level of Course	Undergraduate			
Course Category (by % of Content)	Basic Science	Basic Engineering	Engineering Design	General Education
	-	10	90	-
Semester Offered	Fall			
Contact Hours per Week	Lecture: 4 hours	Recitation: -	Lab: -	Other: -
Estimated Student Workload	152 hours			
Number of Credits	6 ECTS			
Grading Mode	Standard Letter Grade			
Pre-requisites	STM 203			
Expected Prior Knowledge	The process of designing a workpiece. The structure, properties, and performance of materials.			
Co-requisites	None			
Registration Restrictions	Only Undergraduate Students			
Overall Educational Objective	The students learn how to design and use machine elements based on the fundamental of mechanical engineering codes and standers.			
Course Description	The course aims at providing the basics of manufacturing process technologies, their characteristics, advantages, limitations, and selection principles. The course covers main process categories such as casting, material removal, forming & assembly, as well as the principles of quality assurance and computer-integrated manufacturing.			
Course Description in Turkish	Bu ders imalat yöntemlerinin, bu yöntemlerin özelliklerinin, avantajlarının, sınırlamalarının ve seçim prensiplerinin öğrenilmesini amaçlamaktadır. Ders, döküm, talaşlı imalat, şekil verme ve montaj gibi temel imalat sınflarının yanısıra kalite güvence sistemi prensipleri ve bilgisayar bütünleşik imalatı konu almaktadır.			
Course Learning Outcomes and Competencies	Upon successful completion of the course, the learner is expected to: 1. understand mechanical and physical properties of materials; 2. recognize fundamental mechanical tests (tensile, torsion, impact, and hardness) to investigate mechanical properties of materials and evaluate test results; 3. know a set of materials and manufacturing processes to choose from for production of an engineering part; 4. select the most appropriate and feasible material and process for a given quantity and requirements; 5. select the appropriate machine(s) for the chosen process by calculating the required force and power; 6. measure the dimensions of a part for quality control; 7. simulate and operate CNC machining (turning and milling) processes.			

Relationship of the Course with the Student Outcomes	Level	Learning Outcome(s)	Assessed by
Student Outcomes	N=None S=Supportive H=High		Exam, Project, HW, Experiment, Presentation, etc.
(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	S	1, 2, 5	Midterm Exams, Quizzes/HWs, Class Practices
(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	H	4	Midterm Exams, Quizzes/HWs, Class Practices
(3) an ability to communicate effectively with a range of audiences			
(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	S	3	Midterm Exams, Quizzes/HWs, Class Practices
(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	S	7	Weekly meetings to check the progress of the project, team works, and meeting the deadlines of the final project
(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions			
(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	H	6	Midterm Exams, Quizzes/HWs, Class Practices, Project

Prepared by and Date	Asst. Prof. Dr. Seyed Ehsan Layegh Khavidaki / September 2019	
Semester	Fall 2019-2020	
Name of Instructor	Asst. Prof. Dr. Seyed Ehsan Layegh Khavidaki	
Course Contents	Week	Topic
	1.	Fundamental of Materials: Their Behavior & Manufacturing
	2.	Properties
	3.	Heat Treatments
	4.	Ferrous Metals and Alloys (Iron and Steel), Nonferrous Metals and Alloys
	5.	Polymers, Ceramics and Composite Materials
	6.	Fundamentals of Metal Casting
	7.	Rolling of Metals, Forging of Metals
	8.	Extrusion and Drawing of Metals, Sheet-Metal Forming
	9.	Powder Metallurgy, Ceramic Processing
	10.	Forming and Shaping of Plastics and Composite Materials, Rapid Prototyping
	11.	Fundamentals of Machining, Cutting-Tool Materials and Cutting Fluids
	12.	Turning, Milling
	13.	CAD, G-code
	14.	Surface Roughness and Measurement
	15.	Final Exam/Project/Presentation Period
	16.	Final Exam/Project/Presentation Period
Required / Recommended Readings	• Manufacturing Engineering and Technology, Serope Kalpakjian and Steven Schmid, Pearson, 7th SI Edition, 2013, ISBN-10: 0133128741, ISBN-13: 978-0133128741. (Required) • Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, Mikell P. Groover, John Wiley, 5th Edition, 2012, ISBN-10: 1118231465, ISBN-13: 978-1118231463.	

	• Materials and Processes in Manufacturing, 8th Ed., E. P. de Garmo, Wiley, 1999. • Process Selection, Second Edition: from design to manufacture, K. G. Swift, J. D. Booker, Butterworth-Heinemann; 2nd Edition, 2003. ISBN-10: 0750654376, ISBN-13: 978-0750654371. • Manufacturing Processes for Design Professionals, Rob Thompson, Thames & Hudson Publishing, 2007, ISBN-10: 0500513759, ISBN-13: 978-0500513750. • Making It: Manufacturing Techniques for Product Design, Chris Lefteri, Laurence King Publishing; 2nd Edition, 2012, ISBN-10: 1856697495, ISBN-13: 978-1856697491.
Teaching Methods	Lectures using "flipped classroom" as an active learning technique.
Homework and Projects	Online quizzes/HWs will be assigned.
Laboratory Work	-
Computer Use	-
Other Activities	-
Assessment Methods	Types of Assessment / Number / Ratio (%) Midterm Exams / 2 / 50 (25+25) Quiz / 2 / 5 After Class Activities (HW) / 10 / 15 Final Project / 1 / 20 Flipped Learning Practice / 5-10 / 10 Total / / 100
Course Administration	Dr. Seyed Ehsan Layegh Khavidaki **Instructor's office and phone number**: A Block-5th Floor-518 **Office hours:** Friday 14:00-16:00 **Email address:** layeghs@mef.edu.tr **Rules for attendance:** Classroom participation contributes to 10% of the final grade. **Missing a quiz/HW:** No make-up will be given. **Missing a midterm**: Provided that proper documents of excuse are presented, make-up will be given. **A reminder of proper classroom behavior, code of student conduct**: YÖK Regulations. **Academic dishonesty and plagiarism**: YÖK Regulations.

ECTS Student Workload Estimation

Activity	No/Weeks	Hours			Calculation	Explanation
	No/Weeks per Semester (A)	Preparing for the Activity (B)	Spent in the Activity Itself (C)	Completing the Activity Requirements (D)		
Lecture/Flipped Classroo	14	1	4	1	84	A*(B+C+D)
Quizzes	2	2	1		6	A*(B+C+D)
Midterm(s)	2	6	2		16	A*(B+C+D)
Homework	10	2.5	1		35	A*(B+C+D)
Final Project	1	10	1		11	A*(B+C+D)
Total Workload					152	
Total Workload/25					6.08	
ECTS					**6**	