Identification	**Subject**	ME 363, Manufacturing technologies, 6 ECTS
	Department	Mechanical Engineering
	Program	Undergraduate
	Term	Spring 2026
	Instructor	Tarlan Farajov
	E-mail:	Tarlan.farajov@khazar.org
	Phone:	
	Classroom/hours	
	Office hours	
Prerequisites	Materials Science	
Language	English	
Compulsory/Elective	Compulsory	
Required textbooks and course materials	1. Kalpakjian, S., & Schmid, S. R. (2019). Manufacturing Engineering and Technology (8th ed.). Pearson. 2. Gupta, H. N., Gupta, R. C., & Mittal, A. (2009). Manufacturing Processes (2nd ed.). New Age International. 3. Groover, M. P. (2010). Fundamentals of Modern Manufacturing: Materials, Processes, and Systems (4th ed.). Wiley.	
Course outline	This course offers students an introductory perspective on the concepts and technologies associated with the principal manufacturing processes employed by industries, all from the standpoint of a designer. The course encompasses a wide range of topics, including the functioning of manufacturing systems and their core principles, as well as discussions on casting, forming, material removal, welding, quality control, and advanced manufacturing techniques. As a mandatory component of the mechanical engineering degree program, Manufacturing Processes delve into the intricate relationship between design and industrial materials and processes. It emphasizes the importance of considering technical and economic feasibility, trade-offs, and automation in the context of design decisions and manufacturing practices.	
Course objectives	Manufacturing is concerned with making products. A manufactured product may itself be used to make other products, such as (a) a large press, to shape flat sheet metal into automobile bodies, (b) a drill, for producing holes, (c) industrial sewing machines, for making clothing at high rates, and (d) numerous pieces of machinery, to produce an endless variety of individual items, ranging from thin wire for guitars and electric motors to crankshafts and connecting rods for automotive engines. The manufacture of items for specific uses began with the production of various household artifacts, which were typically made of either plastics or metal.	
Learning outcomes	Students who successfully complete the course should demonstrate the following outcomes by tests and homework: • Know about the basic physical and mechanical Properties of materials which are used oil and gas, food, energy industry sector.	

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- Recommend cost-effective material options based upon net part shape, expected loading, operating environment, cost constraints, and life expectancy.
- Know the basic operation of various manufacturing processes.
- Learn how various products are made using traditional or non-traditional manufacturing processes.
- Design simple process plans for parts and products.
- Understand how process conditions are set for optimization of production.
- Learn the use of reverse engineering and prototype building.
- Learn the basic concept of metrology, measurement methods, tolerances, and surface finish.

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<tr><td rowspan="7">Teaching methods</td><td colspan="2">Lecture</td><td>x</td></tr>
<tr><td colspan="2">Group discussion</td><td>x</td></tr>
<tr><td colspan="2">Experiential exercise</td><td>-</td></tr>
<tr><td colspan="2">Tutorials once a month on weekends</td><td>-</td></tr>
<tr><td colspan="2">Case analysis and assignments</td><td>x</td></tr>
<tr><td colspan="2">Course paper</td><td>-</td></tr>
<tr><td colspan="2">Others</td><td>-</td></tr>
<tr><td rowspan="7">Evaluation</td><td>Methods</td><td>Date/deadlines</td><td>Percentage (%)</td></tr>
<tr><td>Midterm Exam</td><td></td><td>30</td></tr>
<tr><td>Attendance & Activity</td><td>At each lesson</td><td>5</td></tr>
<tr><td>Quiz (4 quizzes)</td><td>During the semester</td><td>15</td></tr>
<tr><td>Assignment</td><td>During the semester</td><td>10</td></tr>
<tr><td>Final Exam</td><td></td><td>40</td></tr>
<tr><td>Total</td><td></td><td>100</td></tr>
<tr><td>Policy</td><td colspan="3">

- **Ethics**
  Copy of other students' work is highly discouraged. All assignments must be handled by the student himself. This is a university policy, and violators will be reprimanded accordingly.
- **Preparation for class**
  The structure of this course demands your individual effort outside the classroom for extra practice of many problems within the textbook. After each session, every student needs to put sufficient time to practice and finish the assignments by the predetermined date.
- **Withdrawal (pass/fail)**
  This course strictly follows grading policy of the School of Engineering. Thus, a student is expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year.
- **Cheating/plagiarism**
  Cheating or other plagiarism in handling the assignments, Mid-term and Final Examinations will lead to course failure. In this case, the student will automatically get zero (0), without any considerations.

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	▪ **Professional behavior guidelines** The students shall behave in the way to create favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly discouraged. ▪ **Quiz** Quizzes constitute 15 marks out of the total 100 marks for this course. Four quizzes will be conducted throughout the semester: two quizzes before the midterm examination and two quizzes before the end of the semester. Quiz questions will primarily focus on manufacturing concepts, process analysis, and basic problem-solving related to manufacturing operations. Full credit will be awarded only for clearly explained answers, appropriate use of technical terminology, and correctly justified final results. ▪ **Assignment** Assignments constitute 10 marks out of the total 100 marks for this course. Students are required to submit assigned homework tasks by the specified deadlines. Assignments may include analytical questions, short case studies, or process-related problems in manufacturing technology. Full credit will be awarded only for complete, well-structured responses with clear explanations and technically sound conclusions. ▪ **Exam** The midterm and final examinations will assess the manufacturing technology topics covered during the course as outlined in the syllabus, with a focus on students understanding of manufacturing processes, materials, and production principles, as well as their ability to analyze and solve related engineering problems.

Tentative Schedule

Week	Date/Day (tentative)	Topics	Textbook/Assignments
1		General Introduction The structure of Metals	Chap 1 (Textbook 1)
2		Mechanical behavior, Testing and manufacturing properties of materials	Chap 2, Ref-1
3		Physical Properties of Materials	Chap 3, Ref-1
4		Metal alloys: their structure and strengthening by heat treatment	Chap 4, Ref-1
5		Ferrous and nonferrous metals and alloys: production, general properties, and applications,	Chap 5, 6, Ref-1
6		Polymers: structure, general properties, and applications	Chap 7, Ref-1
7		Ceramics, graphite, diamond, and Nanomaterials: structure, general properties, and applications Composite materials: structure, general properties, and applications	Chap 8, 9, Ref-1

8		Fundamentals of metal casting Metal-casting processes and equipment. **Midterm exam**	Chap 10, 11, 12, Ref-1
9		Metal-rolling processes and equipment Metal-forging processes and equipment	Chap 13, 14, Ref-1
10		Metal extrusion and drawing processes and equipment Sheet-metal forming processes and equipment	Chap 15, 16, Ref-1
11		Powder-metal processing and equipment Plastics and composite materials: forming and shaping,	Chap 17, 19, Ref-1
12		Plastics and composite materials: forming and shaping (Continues) Fundamentals of machining	Chap 19, 21, Ref-1
13		Cutting-tool materials and cutting fluids Turning and hole making Milling, broaching, sawing, Filing, and gear Manufacturing	Chap 22, 23, 24, Ref-1
14		Machining centers, machine-tool structures, and machining economics Abrasive machining and finishing operations	Chap 24, 25, 26, 27, Ref-1
15		Fusion-welding processes Solid-state welding processes Brazing, soldering, adhesive-bonding, and mechanical- fastening processes	Chap 30, 31, 32, Ref-1
16		**Final Exam**	

This syllabus is a guide for the course and any modifications to it will be announced in advance.