Identification	**Subject**	ME 351 Materials Science, 6 ECTS	
	Department	Mechanical Engineering	
	Program	Undergraduate	
	Term	Fall 2025	
	Instructor	Tarlan Farajov	
	E-mail:	Tarlan.farajov@khazar.org	
	Phone:		
	Classroom/hours		
	Office hours		
Prerequisites	General Chemistry		
Language	English		
Compulsory/Elective	Compulsory		
Required textbooks and course materials	Materials Science and Engineering, An Introduction (10th edition), W. D. Callister and D. G. Rethwisch Introduction to Physical Metallurgy, Avner, Sidney H.-McGraw-Hill		
Course outline	Materials science studies the relations between the structures and mechanical and physical properties of materials. The duty of a materials scientist is to progress or synthesize materials and new alloys, whereas a materials engineer is obligated to develop new systems using present materials. Graduates of this course are trained to be materials scientists and materials engineers.		
Course objectives	This course is designed to provide students with a fundamental understanding of Physical Metallurgy, as well as an understanding of and acquaintance with the basics of Physical Metallurgy, including Crystallization, Annealing, Heat treatments, Equilibrium Diagram, etc.		
Learning outcomes	On successful completion of this course, students will be able to: 1. Classify different materials. 2. Understand the basic properties that characterize the behavior of materials. 3. Understand the type of loadings/environment that materials should withstand. 4. Select an appropriate type of material for a specific application. 5. Offer different approaches to modify structure/microstructure to get the desired properties. 6. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, safety, manufacturability, and sustainability.		
Teaching methods	**Lecture**		x
	Group discussion		x
	Experiential exercise		--
	Tutorials once a month on weekends		--
	Case analysis and assignments		--
	Course paper		--
	Others		--
Evaluation	**Methods**	**Date/deadlines**	**Percentage (%)**
	Midterm Exam		30
	Class Participation		5
	Classroom activity		5
	Assignment		5
	Quiz		15
	Final Exam		40
	Total		100
Policy	▪ **Ethics**		

Copying 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 normally 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.

- **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.

- **Attendance**
  Students who attend the sessions will get 5 marks. For three absence student loses 1 mark.

- **Assignment**
  There will be a homework assignment for every chapter composed of problems.

- **Quiz**
  There will be quizzes during the semester. The questions will be relevant to the previous weeks' topics. If you read your assignments weekly and you actively listen to the lectures and participate in the discussions, you will be successful in answering the quiz questions.

- **Final exam**
  The final exam in this course includes solving problems, definitions, and basic concepts of the course.

Tentative Schedule

Week	Date/Day (tentative)	Topics	Textbook/Assignments
1		Syllabus. Introduction to materials science and engineering.	Chap 1
2		Metals Structure and Crystallization.	Chap 2
3		Plastic Deformation.	Chap 3
4		Annealing and Hot Working.	Chap 4
5		Constitution of Alloys.	Chap 5
6		Phase Diagrams.	Chap 6

7		The Iron-Iron Carbide Equilibrium Diagram.	Chap 7
8		Review. **Midterm exam**	
9		The Heat Treatment of Steel	Chap 8
10		Cast Iron	Chap 11
11		Powder Metallurgy and Structures and properties of ceramics.	Chap 12
12		Corrosion of Metals.	Chap 14
13		Polymer structures.	Chap 15
14		Characteristics, Applications, and Processing of Polymers.	Chap 16
15		Failure Analysis	Chap 17
16		**Final Exam**	