COURSE INFORMATION

Course Code	AAM 557	Course Name	Contemporary Topics in Materials Technology					
Type of Course	**Level of Course**	**Semester**	**Language**	**Theory**	**Application (Practice)**	**Laboratory**	**Local Credits**	**ECTS**
Elective	Graduate	-	English	3	0	0	3	6

Department	: Aerospace Engineering
Prerequisites/Requirements for Admission	: Materials Science I (ME 203), Materials Science II (ME 440) (or equivalent)
Mode of Delivery	: Face to Face (with 15% online)
Course Coordinator	: Assoc. Prof. Mecit Yaman
Course Lecturer(s)	: Assoc. Prof. Mecit Yaman
Course Assistant(s)	
Course Description/Aim	: This course reviews four material types (metals, ceramics, polymers, composites) in the light of processing/ structure/ properties/ performance approach. Building on this central idea, the aim is to survey recent/current materials technology literature. The course covers functional as well as structural materials.
Course Contents	: An overview of ceramics, polymers, composites, as well as more advanced nano, bio- and smart materials. Overview of corrosive, electrical, optical, thermal, and magnetic properties of material. Environmental and societal issues regarding materials. Selected relevant topics from current literature and scientific popular media including original research articles from Nature, Nature Materials and The Economist.
Recommended Optional Program Components	
Compulsory Attendance	: 70%

Course Learning Outcomes

#	Learning outcome	Teaching Methods/Techniques	Assessment method(s)
At the end of this course; students will be able to:			
1	Classify materials as metals, ceramics, polymers, and composites and describe their properties with respect to their microstructure, select suitable materials for a given task/application.	Theoretical Lecture, Reading from literature	Seminar/ Exam
2	Apply the central dogma of materials science (processing, structure, properties, and performance) to current materials technology examples from the literature.	Theoretical Lecture, Reading from literature	Seminar/ Exam
3	Discuss the contemporary economic, environmental, and societal issues around materials.	Theoretical Lecture, Reading from literature	Seminar/ Exam

COURSE INFORMATION

Weekly Detailed Course Content

Week	Content	Recommended Resource(s)	Time (Hours)
1	Metals and their applications	Textbook/ Course website	3
2	Literature study: Metals technology	Textbook/ Course website	3
3	Ceramics and their applications	Textbook/ Course website	3
4	Literature study: Ceramics technology	Textbook/ Course website	3
5	Polymers and their applications	Textbook/ Course website	3
6	Literature study: Polymers technology	Textbook/ Course website	3
7	Composites and their applications	Textbook/ Course website	3
8	Literature study: Composites technology / Midterm Exam / Seminar	Textbook/ Course website	3
9	Electrical/magnetic/optical properties of materials	Textbook/ Course website	3
10	Literature study: electromagnetic properties	Textbook/ Course website	3
11	Thermal properties of materials	Textbook/ Course website	3
12	Literature study: thermal properties	Textbook/ Course website	3
13	Nano, bio, smart materials	Textbook/ Course website	3
14	Environmental and societal issues reg. materials	Textbook/ Course website	3
15	Final Exam		
16	Final Exam		

Sources

Course Notes / Textbooks	• William D. Callister Materials Science and Engineering An Introduction-Wiley 10th edition (2018). • William Smith, Javed Hashemi - Foundations of Materials Science and Engineering-McGraw-Hill Education (2019). • Adrian P. Mouritz - Introduction to Aerospace Materials (2012).
Supplemental Readings	• Mark Miodownik - Stuff Matters: Exploring the Marvelous Materials That Shape Our Man-Made World-Houghton Mifflin Harcourt (2014). • Nature, Nature Materials, The Economist. • https://sites.google.com/site/topicsinengineering/topics.

Evaluation System

Work Placement	Number	Percentage of Grade (%)
Attendance	14	25
Quizzes		
Homework		
Presentation		
Laboratory/Practice		
Report(s)		
Graduate Thesis/Project		
Seminar	1	25
Projects		
Midterm exam(s)		
Others		
Final exam	1	50
	Total	100
	Percentage of semester work	50
	Percentage of final exam	50
	Total	100

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Workload Calculation

Course Hours	14	3	42
Midterm exam/ Seminar	1	15	15
Individual study	14	8	112
Final exam	1	15	15
Homework			
Presentation			
Quiz			
Total			184
		ECTS Credit *(Total/30)*	6

Contribution of Learning Outcomes to Program Outcomes

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
LO1	5	3	5	3	5	3	3	3	5
LO2	5	5	5	5	5	5	3	5	5
LO3	5	5	5	5	5	5	5	5	5

Contribution Level : 1: “Very low”, 2: “Low”, 3: “Medium”, 4: “High”, 5: “Very High”
LO: Learning Outcome of the Course
PO: Program Outcome