Course Name						
Composite Materials						
Code	**Semester**	**Local Credits**	**ECTS Credits**	**Course Implementation, Hours/Week**		
				Theoretical	**Tutorial**	**Laboratory**
MET 414	8	3	5	3	0	0

Department/Program	Metallurgical and Materials Engineering		
Course Type	Elective	**Course Language**	Turkish
Course Prerequisites	(None)		

Course Category by Content, %	**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
		40	60	

Course Description	Micro-and macromechanical behavior of composite materials, design criteria for composites, metal matrix composites, polymer matrix composites, ceramic matrix composites, fabrication and properties of composite materials.
Course Objectives	1. To provide the concepts of reinforcement of metals, ceramics and polymers by using fiber and/or particulate materials 2. To gain ability to design new materials with desired properties 3. To provide a better knowledge about the structure-property relationships in materials
Course Learning Outcomes	Students who pass the course will be able to: 1. learn the aim and fundamentals of composite design, 2. use the knowledge of materials science and technology, 3. learn special manufacturing techniques in addition to the classical techniques, 4. learn mechanical behavior of anisotropic materials, 5. learn the structure, properties, and importance of fiber and whisker materials
Homework & Projects	
Laboratory Work	
Computer Use	
Other Activities	

Assessment Criteria	**Activities**	**Quantity**	**Effects on Grading, %**
	Midterm Exams	2	40
	Quizzes	-	-
	Homework	-	-
	Projects	-	-
	Term Paper/Project	-	-
	Laboratory Work	-	-
	Other Activities	-	-
	Final Exam	1	60

COURSE PLAN

Weeks	Topics	Course Outcomes
1	Definition, classification, and characteristics of composites	I-II
2	Fiber composites. Type, form and properties of fibers	II-V
3	Particulate composites. Dispersion hardened alloys	I-II
4	Design criteria for composites	I-II
5	Metal matrix composites	II-III
6	Metal matrix composites	II-III
7	Polymer matrix composites	II-III
8	Polymer matrix composites	II-III
9	Ceramic matrix composites	II-III
10	Micromechanical behavior of a lamina	I-IV
11	Macromechanical behavior of a lamina	I-IV
12	Macromechanical behavior of a lamina	I-IV
13	Macromechanical behavior of a laminate	I-IV
14	Macromechanical behavior of a laminate	I-IV

Relationship between the Course and METALLURGICAL AND MATERIALS ENGINEERING **Curriculum**

	Program Outcomes	Level of Contribution		
		1	**2**	**3**
1	Ability to apply the knowledge of mathematics, science and engineering principles to solve problems in metallurgical and materials engineering (ABET:a)			X
2	Ability to characterize materials using standard and/or self designed experimental methods and to evaluate the results (ABET:b)			
3	Ability to design a system or a process, taking into consideration of the desired specifications, quality, ethics and environment. (ABET:c)	X		
4	Ability to communicate both orally and in the written form and to take part in, and provide leadership of the teams in the elucidation of engineering problems; (ABET:d, g)			
5	Ability to define, formulate and solve engineering problems in the development, production, processing, protection and usage of engineering materials. (ABET:e)			X
6	An understanding of professional and ethical responsibilities(ABET:f)			
7	An understanding of current/contemporary issues and impact of engineering solutions in broad cultural, national and global levels;. (ABET:h, j)			
8	A comprehension of the nature of engineering progress closely linked with the development of new materials and production processes. An ability to engage in life-long learning and a recognition of its necessity (ABET:i)			X
9	Ability to use essential tools and techniques of modern engineering in the development, production, processing, protecting and surface treatment of the existing and new engineering materials. (ABET:k)			X

1: Little, 2. Partial, 3. Full

Course relationships with major elements of the field and material classes

		Level of Contribution		
		1	**2**	**3**
MAJOR ELEMENT OF THE FIELDS	STRUCTURE			X
	PROPERTIES			**X**
	DESIGN EXPERIMENT/ANALYSE DATA	X		
	PROCESSING			X
	COST/PERFORMANCE	X		
	QUALITY/ENVIRONMENT			
	DESIGN PROCESS OR PRODUCT			X
MATERIAL CLASSES	METAL		X	
	CERAMICS		X	
	POLYMERS		X	
	COMPOSITES			X

1: Little, 2. Partial, 3. Full

Prepared by Prof.Dr. Erdem Demirkesen	Date 01.07.2009	**Signature**