Course Name						
Problem Solving Techniques and Design						
Code	**Semester**	**Local Credits**	**ECTS Credits**	**Course Implementation, Hours/Week**		
				Theoretical	**Tutorial**	**Laboratory**
MET 481	VII	2	3	2	-	-

Department/Program	Metallurgical and Materials Engineering		
Course Type	Required	**Course Language**	Turkish
Course Prerequisites	None		

Course Category by Content, %	**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
	-	20	60	20

Course Description	This course will offer an introduction to the concept of alloy and alloying. The course will include the definition of engineering problems, classification of problems open ended and closed ended problems, engineering designs; conceptual design, embodiment design, detailed design, concurrent engineering, team work, human as a social entity in team works, project management, project proposal writing, an innovative problem solving technique:TRIZ (Therory of Inventive Problem Solving)
Course Objectives	Problem Solving Techniques and Design course is an important engineering course for engineers in order to differentiate, understand and solve engineering problems. This course will emphasize on; 1. Understanding of engineering problems, 2. Finding engineering solutions to the problems and design product/process in light of the solutions 3. Selection materials and proceeses 4. Team work 5. Project proposal writing and managing projects according to the proposals 6. On development of innovative thinking of the students 7. On improvement of written and oral communication
Course Learning Outcomes	Students who pass the course will be able to: I) Differentiate open and closed enden problems II) To make a design with solutions via using problem solving techniques (TRIZ, Quality Tools and Techniques and, etc) III) How to express their inventive ideas in project proposal and preparing a project proposal IV) How to manage a project with a team V) To make a project report VI) To improve their communicating skills (written and oral) via presenting a project proposal and project results

Textbook	Handouts on Problem Solving Techniques and Design
Other References	
Homework & Projects	In the course several open ended problems will be given. Students as teams will choose one of the problems and close them and propose solutions with using problem solving techniques and make a project proposal. Then the temas will work on their solutions and make a project report showing their designs including their solutions. In term papers the same approach will be used. The same teams will be working on problems given at the end of the semester and a project proposal and a project report will be asked from each team.
Laboratory Work	**-**
	-
Computer Use	- **MICROSOFT PROJECT**
Other Activities	**-**
	-

Assessment Criteria)	**Activities**	**Quantity**	**Effects on Grading, %**
	Midterm Exams	**-**	**-**
	Quizzes	**-**	**-**
	Homework		
	Projects	**1**	**40**
	Term Paper/Project	**1**	**45**
	Laboratory Work	**-**	
	Other Activities	**1**	**15**
	Final Exam	**-**	**-**

COURSE PLAN

Weeks	Topics	Course Outcomes
1	Definition of engineering problems.	I
2	Classification of problems open ended and closed ended problems.	I
3	Engineering designs; conceptual design, embodiment design, detailed design	II
4	Design techniques	II
5	Concurrent engineering	I,II
6	Team work, human as a social entity in team works	III,IV
7	Materials and Process Selection, the definition of quality charcateristics	III
8	Ideas through innovative project ideas	II
9	Project management: Constructing a project proposal	I,II
10	Managing a project	III,IV,V
11	Project proposal writing	VI
12	An innovative problem solving technique:TRIZ (Therory of Inventive Problem Solving) Writing and presenting design projects	II
13	Presentations	VI
14	Presentations	VI

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)	X		
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)			**X**
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)	**X**		
7	An understanding of current/contemporary issues and impact of engineering solutions in broad cultural, national and global levels;. (ABET:h, j)			**X**
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		**X**	
	DESIGN PROCESS OR PRODUCT			**X**
MATERIAL CLASSES	**METAL**		**X**	
	CERAMICS		**X**	
	POLYMERS		**X**	
	COMPOSITES		**X**	

1: Little, 2. Partial, 3. Full

Prepared by	Date	**Signature**
Prof. Dr. Yılmaz Taptık Assist. Prof. Dr. Özgül Keleş	20.7.2009	