

SELF STUDY REPORT APPENDIX A COURSE SYLLABUS

| Course Name | | | | | | |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------|-----------------------------------|----------|------------|
| Welding Technology | | | | | | |
| Code | Semester | Local Credits | ECTS Credits | Course Implementation, Hours/Week | | |
| | | | | Theoretical | Tutorial | Laboratory |
| MET424 | 8 | 3 | 4.5 | 3 | - | - |
| Department/Program | Metallurgical and Materials Engineering Department | | | | | |
| Course Type | Elective | | Course Language | Turkish | | |
| Course Prerequisites | None | | | | | |
| Course Category by Content, % | Basic Sciences | Engineering Science | Engineering Design | General Education | | |
| | - | % 20 | % 80 | - | | |
| Course Description | Definition and importance of welding, Classification of welding processes, Fusion welding processes, Solid state welding processes, Heat affected zone, Weldability, Welding defects, Distorsion of welded materials, Fundamentals of manufacturing by welding. | | | | | |
| Course Objectives | 9. To teach the basic principles of welding, 10. To teach the general principles of welding methods, 11. To define electrode types, 12. To teach the microstructural variations occurred during welding, 13. To explain weld failures, their causes and preventions. | | | | | |
| Course Learning Outcomes | Students who pass the course will be able to: VI. Understand the basic principles of welding as a manufacturing method, VII. Understand the application principles of the welding methods, VIII. Interpret the microstructural variations occurred during welding, IX. Weldability concept, X. Understand the weld failure and their prevention methods. | | | | | |
| Textbook | W. Galvery, F. Marlow, Welding Essentials: Questions and Answers, 2nd.Ed. Industrial Press, Inc. USA, 2007. | | | | | |
| Other References | 1.K. Weman, Welding process handbook, CRC Pres, Cambridge, 2003. 2.ASM Handbook, Welding, Brazing and Soldering, Vol 6. ASM International, USA, 2003. 3.S. Kalpakjian, Manufacturing processes for engineering materials, Prentice Hall, N.J., 2003. | | | | | |
| Homework & Projects | Students will be given a subject and this will be presented in the class. Presentation subjects may be used as a source for exams. | | | | | |
| 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 | 1 | 20 | | | |
| Final Exam | 1 | 40 | | | | |

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COURSE PLAN

| Weeks | Topics | Course Outcomes |
|-------|----------------------------------------------------------------------------|-----------------|
| 1 | Introduction to welding technology | I |
| 2 | Pressure welding methods (forge welding, stir welding, resistance welding) | I-II |
| 3 | Pressure welding methods (resistance welding) | I-II |
| 4 | Melt welding methods (gas flame welding) | I-II |
| 5 | Arc welding, | II |
| 6 | Electron beam welding, plasma welding) | II |
| 7 | Welding electrodes, | II |
| 8 | Shielded gas welding methods, | II |
| 9 | Introduction to welding metallurgy | III |
| 10 | Weldability | III |
| 11 | Solidification of the weld metal | III |
| 12 | Heat affected zone (HAZ) | III-IV |
| 13 | Weld failures | V |
| 14 | Principles of welded constructions | V |

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) | | | |
| 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, i) | 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 | | | |
| | POLYMERS | | | |
| | COMPOSITES | | | |

1: Little, 2. Partial, 3. Full

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| Prepared by PROF. DR. HÜSEYİN ÇİMENOĞLU YARD. DOÇ. DR.MURAT BAYDOĞAN | Date 04.015.2010 | Signature |
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