

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**



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| **DEPARTMENT** | **ELECTROCHEMISTRY AND ELECTROCHEMICAL TECHNOLOGIES (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** |  | **TITLE** | ELECTROCHEMICAL BASICS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | | 0 | 0 | | | 3 | 7,5 | COMPULSORY  ( X ) | | ELECTIVE  (   ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
| 0 | |  | | | |  | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 1 | | 50 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (………) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | No | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Electrochemical terms and concepts, ionic conductivity of the electrolyte balance, ionic equilibrium and Donnan equilibrium, thermodynamics of electrolytic solution to the electrochemical cell and the Nernst equation, electrode types, electrochemical battery types, Thermodynamics of electrochemical cells, electrolysis, corrosion basics | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The aim of the course; students can learn basic concepts and equations of electrochemistry | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Understand the fundamentals of electrochemical processes and gain the ability to follow and evaluate industrial applications and current studies. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1) Electrochemical terms and the relationship between them.  2) Explain the conductivity, resistance and current properties of electrolyte solutions.  3) Explain the equilibrium and thermodynamics of the electrolyte solutions.  4) Electrolytic, galvanic cells and electrodes used in these cells is known.  5) Describes electrochemical battery types and thermodynamics.  6) Understands electrolysis and corrosion events. | | | | | | | |
| **TEXTBOOK** | | | | | 1) B.E. Conway, J.O’M. Bockris, R.E. White, Modern Aspects of Electrochemistry No:32, Kluwer Academic Publishers, New York, Boston, Dordrecht, London, Moscow, ISBN 0-306-46916-2 (2002). 2) P.H. Riger, Electrochemistry, This edition published by Chapman & Hall One Penn Plaza New York, NY 10119, ISBN 0-412-04391-2 (1994) | | | | | | | |
| **OTHER REFERENCES** | | | | | 1) A. R. Berkem, "Elektrokimya", İstanbul Ünivesitesi Yayınları, 1993 | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Electrochemical terms and concepts |
| 2 | Ionic conductivity, ionic equilibrium and Donnan equilibrium |
| 3 | Electrolyte balances |
| 4 | Thermodynamics of electrolytic solutions |
| 5 | Electrochemical cells and Nerst equation |
| 6 | Midterm Examination 1 |
| 7 | Electrode types |
| 8 | Electrochemical battery types |
| 9 | Thermodynamics of electrochemical batteries |
| 10 | Thermodynamics of electrochemical batteries |
| 11 | Midterm Examination 2 |
| 12 | Electrolysis and electrolysis laws |
| 13 | Electrolysis |
| 14 | Corrosion basics |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE ELECTROCHEMISTRY AND ELECTROCHEMICAL TECHNOLOGIES MSc PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES (MSc)** | **3**  High | **2**  Mid | **1**  Low |
| **LO 1** | Learning to use knowledges which have been gained by undergraduate education in the postgraduate areas. |  |  |  |
| **LO 2** | To have a research qualificaiton with professional responsibility. |  |  |  |
| **LO 3** | Self-developing by following and being aware of the importance of innovation and Electrochemistry in the development of science and technology. |  |  |  |
| **LO 4** | By using individual working abilities, to be capable of sharing studies and opinions in various communication media such as seminars, symposiums, congress or workshops. |  |  |  |
| **LO 5** | To be capable of preparing scientific publications by using their acquired knowledge and experience in undergraduate and graduate study. |  |  |  |
| **LO 6** | To follow closely the developments of Electrochemistry in both national and international levels. |  |  |  |
| **LO 7** | To design and apply theoretical, experimental and modelling studies and to examine and solving complex problems encountered in these processes. |  |  |  |
| **LO 8** | To be capable of making disciplinary and inter-disciplinary studies. |  |  |  |
| **LO 9** | Ability to make literature survey, presentation, designing and performing experiments and interpretation of relevant results. |  |  |  |
| **LO 10** | Using the ability to take initiative by acting independently. |  |  |  |
| **LO 11** | To have a scientific and personal ethics and defend this approach in any medium. |  |  |  |

**Prepared by:** Prof.Dr.Evrim HÜR **Date:**      

**Signature**: