



COURSE INFORMATION FORM

| Course Name | Course Code |
|-------------|-------------|
| CHEMISTRY | 151911188 |

| Semester | Number of Course Hours per Week | | ECTS |
|----------|---------------------------------|----------|------|
| | Theory | Practice | |
| 1 | 3 | 0 | 3 |

| Course Category (Credit) | | | | |
|--------------------------|----------------------|--------|-------------------|--------|
| Basic Sciences | Engineering Sciences | Design | General Education | Social |
| √ | | | | |

| Course Language | Course Level | Course Type |
|-----------------|---------------|-------------|
| Turkish | Undergraduate | Compulsory |

| | |
|---------------------------------|---|
| Prerequisite(s) if any | |
| Objectives of the Course | To introduce the main subjects of chemistry, to give the fundamentals of chemistry to the engineering students. |
| Short Course Content | The properties of material and measurements, atoms and atomic theory, periodic table chemical compounds, chemical reactions stoichiometry, gases and gas mixtures, chemical thermodynamics. |

| Learning Outcomes of the Course | Contributed PO(s) | Teaching Methods * | Measuring Methods ** |
|--|-------------------|--------------------|----------------------|
| 1 Define, classify and explain the properties of materials, | 1 | 1, 5, 10 | A |
| 2 Explain the concepts of atoms and atomic theory, | 1 | 1, 5, 10 | A |
| 3 Explain and use the mole concepts and the Avogadro's law, | 1 | 1, 5, 10 | A |
| 4 Explain and classify the chemical compounds, | 1 | 1, 5, 10 | A |
| 5 Define, explain and use the relationship of the gaseous state, the properties of gases and gas laws, | 1 | 1, 5, 10 | A |
| 6 Define the basic concepts of thermodynamics, explain the law of thermodynamics and use them in solving the thermochemistry problems. | 1 | 1, 5, 10 | A |
| 7 | | | |
| 8 | | | |

*Teaching Methods 1:Expression, 2:Discussion, 3:Experiment, 4:Simulation, 5:Question-Answer, 6:Tutorial, 7:Observation, 8:Case Study, 9:Technical Visit, 10:Trouble/Problem Solving, 11:Individual Work, 12:Team/Group Work, 13:Brain Storm, 14:Project Design / Management, 15:Report Preparation and/or Presentation

**Measuring Methods A:Exam, B:Quiz, C:Oral Exam, D:Homework, E:Report, F:Article Examination, G:Presentation, I:Experimental Skill, J:Project Observation, K:Class Attendance; L:Jury Exam

| | |
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| Main Textbook | Petrucchi, H., Harwood, W. S., Herring, F. G., 2002 “Genel Kimya: İlkeler ve Modern Uygulamalar” (I. Cilt), Çeviri Editörleri: Uyar. T., Aksoy, S., Palme Yayıncılık, Ankara. |
| Supporting References | 1. Mortimer, C. E. , 1988, Modern Üniversite Kimyası , I. ve II. Cilt, Çağlayan Kitabevi, İstanbul 2. Sienko, M. J., Plane, R. A., 1983, Temel Kimya , Savaş Yayınları, Ankara. 3. Erdik, E., Sarıkaya, Y., 1987, Temel Üniversite Kimyası , Hacettepe Taş Kitapçılık, Ankara. |
| Necessary Course Material | Board, projector |

| Course Schedule | |
|------------------------|--|
| 1 | Matter-Its properties and measurement. The scope of chemistry, the scientific method, properties and classification of matter, measurements of matter, uncertainties in scientific measurements. |
| 2 | Atoms and the atomic theory, early chemical discoveries and the atomic theory, electrons and other discoveries in atomic physics, atomic masses, chemical elements. |
| 3 | Introduction to the periodic table, the concept of the mole, the Avogadro constant, using the mole concept in calculation. |
| 4 | Chemical compounds, types of chemical compounds and their formulas, the mole concept and chemical compounds, composition of chemical compounds. |
| 5 | Chemical compounds; oxidation states; A useful toll in describing chemical compounds, naming organic and inorganic compounds. |
| 6 | Chemical reactions and chemical equation, the chemical equation and stoichiometry, chemical reaction in solution. |
| 7 | Chemical reactions and chemical equation, Determining the limiting reactant, other practical matters. |
| 8 | Mid-Term Exam |
| 9 | Gases and Gases Mixers |
| 10 | Gases: Properties of gases; gas pressure, the simple gas laws |
| 11 | Gases: Application of the ideal gas equation. |
| 12 | Gases in chemical reaction, mixtures of gases, kinetic-molecular theory of gases, non-ideal gases. |
| 13 | Thermochemistry, getting started; some terminology, work, heat, and calorimetry. |
| 14 | Thermochemistry: The first law of thermodynamics, heats of reaction. |
| 15 | Thermochemistry: Hess’s law, standard enthalpies of formation, |
| 16,17 | Final Exam |

| Calculation of Course Workload | | | |
|---|---------------|--------------------|------------------------------|
| Activities | Number | Time (Hour) | Total Workload (Hour) |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,...) | | | |
| Homework | | | |
| Quiz Exam | | | |
| Studying for Quiz Exam | | | |
| Oral exam | | | |
| Studying for Oral Exam | | | |
| Report (Preparation and presentation time included) | | | |
| Project (Preparation and presentation time included) | | | |
| Presentation (Preparation time included) | | | |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 15 | 15 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 20 | 20 |
| Total workload | | | 81 |
| Total workload / 30 | | | 2.7 |
| Course ECTS Credit | | | 3 |

| Evaluation | |
|---------------|------------|
| Activity Type | % |
| Mid-term | 40 |
| Final Exam | 60 |
| Total | 100 |

| RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO) (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low) | | |
|---|--|--------------|
| NO | PROGRAM OUTCOME | Contribution |
| 1 | To possess sufficient knowledge in mathematics, science, and engineering subjects related to Metallurgical and Materials Engineering; the ability to apply theoretical and practical knowledge in these areas to model and solve engineering problems. | 5 |
| 2 | The ability to identify, define, formulate, and solve complex engineering problems by selecting and applying appropriate analysis and modeling methods. | 2 |
| 3 | The ability to design a complex system, process, device, or product under realistic constraints and conditions to meet specific requirements by applying modern design methods. | 2 |
| 4 | The ability to develop, select, and use modern techniques and tools necessary for engineering applications encountered as a Metallurgical and Materials Engineer; the ability to effectively use information technology. | 3 |
| 5 | The ability to design experiments, conduct experiments, collect data, analyze results, and interpret findings for the investigation of engineering problems. | 2 |
| 6 | The ability to work effectively individually, as well as within disciplinary and interdisciplinary teams. | 2 |
| 7 | The ability to communicate effectively in Turkish, both verbally and in writing; knowledge of at least one foreign language. | 2 |
| 8 | The awareness of the necessity for lifelong learning; the ability to access information, follow developments in science and technology, and continuously renew oneself. | 2 |
| 9 | Awareness of professional and ethical responsibility. | 2 |
| 10 | Knowledge about business practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development. | 2 |
| 11 | Knowledge about the universal and societal impacts of engineering applications on health, environment, and safety; awareness of the legal consequences of engineering solutions. | 3 |
| 12 | Awareness of quality consciousness and sustainability in material selection, product development, and production processes in engineering applications; awareness of quality control. | 3 |
| 13 | The ability to confidently approach problems encountered in engineering applications. | 2 |

| LECTUTER(S) | | | |
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| Prepared by | Doç. Dr. M. ARICI | Doç. Dr. S. ÇELİK | |
| Signature(s) | | | |

Date:18.07.2024