# AYDIN ADNAN MENDERES UNIVERSITY
# COURSE INFORMATION FORM

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|---|---|---|---|---|---|---|---|---|---|
| Course Title | Chemistry II | | | | | | | | |
| Course Code | KMY142 | | Couse Level | First Cycle (Bachelor's Degree) | | | | | |
| ECTS Credit | 6 | Workload | 148 *(Hours)* | Theory | 4 | Practice | 0 | Laboratory | 0 |
| Objectives of the Course | At the end of this course learner gains knowledge about chemical kinetics, equilibrium, properties of acids and bases, buffer solutions, neutralization reactions, acid-base titration and realted topics. The learner comprehends chemical data and related concepts and applies them to problem solving, and uses this knowledge during the following years. | | | | | | | | |
| Course Content | In this course acids, bases as well as reactions in aqueous solutions are discussed. Principles of chemical equilibrium and principles of thermodynamics are also tought. Electronic conformation of atoms and type of bonds are revealed. The course ends with the basic principles of electrochemistry. | | | | | | | | |
| Work Placement | N/A | | | | | | | | |
| Planned Learning Activities and Teaching Methods | Explanation (Presentation), Discussion, Problem Solving | | | | | | | | |
| Name of Lecturer(s) | Assoc. Prof. Semiha KUNDAKCI | | | | | | | | |

| **Assessment Methods and Criteria** | | |
|---|---|---|
| Method | Quantity | Percentage (%) |
| Midterm Examination | 1 | 40 |
| Final Examination | 1 | 70 |

| **Recommended or Required Reading** | |
|---|---|
| 1 | Genel Kimya-İlkeler ve Modern Uygulamalar,, 8.Baskı; Petrucci, Harwood, Herring (Çeviri Editörleri: Tahsin Uyar, Serpil Aksoy), Palme Yayıncılık (2010-Ankara). |
| 2 | Genel Kimya-Temel Kavramlar, 4. baskı, Raymond Chang (Çeviri Editörleri: Tahsin Uyar, Serpil Aksoy, Recai İnam), Palme Yayıncılık (2009-Ankara). |
| 3 | Modern Üniversite Kimyası, C.E. Mortimer, (Çeviri Editörleri: T. Altınata, H. Akçay, H. Anıl, H. Avcıbaşı, D. Balköse, S. Çelebi, E. Henden, G. Nişli, M. Toprak, D. Toscalı, B. Yenigün), Çağlayan Kitabevi (1993-İstanbul). |

| Week | Weekly Detailed Course Contents | |
|---|---|---|
| 1 | Theoretical | Chemical kinetics. Reaction rates. Half life of the reaction. Concentration and reaction rates. Reaction mechanisms. |
| 2 | Theoretical | Rate equation and temperature. Catalysts. |
| 3 | Theoretical | Reversible reactions and chemical equilibrium. Equlibrium constants: Kc and Kp. |
| 4 | Theoretical | Factors affecting the equilibrium. |
| 5 | Theoretical | Acids and bases. (Arrhenius, Bronsted-Lowry, Lewis acids and bases). |
| 6 | Theoretical | Hydrolysis. Acid strength and molecular structure. Weak and strong electrolytes. pH and calculation of pH. |
| 7 | Theoretical | Buffer solution and polyprotic acids. |
| 8 | Theoretical | Precipitation and solubility constant. Factors affecting the solubility. |
| 9 | Theoretical | Introduction to organic chemistry. |
| 10 | Theoretical | Midterm Exam |
| 11 | Theoretical | First law of thermodynamics. Internal energy. Enthalpy. |
| 12 | Theoretical | Second law of thermodynamics. Entropy and Gibbs free energy. |
| 13 | Theoretical | Third law of thermodynamics. Absolute entropy. Free energy and equilibrium. |
| 14 | Theoretical | Basic electrochemistry. Electrochemical cells. Standart electrode potential. Nernst equation. Effect of concentration on cell EMF. |
| 15 | Theoretical | Types of cells. Dry cells. Solid-state lithium cells. Fuel cells. Electrolysis. Corrosion. Faraday laws. |
| 16 | Theoretical | Final exam |

| **Workload Calculation** | | | | |
|---|---|---|---|---|
| Activity | Quantity | Preparation | Duration | Total Workload |
| Lecture - Theory | 14 | 4 | 0 | 56 |

| | | | | |
|---|---|---|---|---|
| Midterm Examination | 1 | 44 | 2 | 46 |
| Final Examination | 1 | 44 | 2 | 46 |
| | | | Total Workload (Hours) | 148 |
| | | | [Total Workload (Hours) / 25*] = **ECTS** | 6 |
| **25 hour workload is accepted as 1 ECTS* | | | | |

| **Learning Outcomes** | |
|---|---|
| 1 | To be able to comprehend the rates of chemical reactions and the factors effecting the chemical equilibrium. |
| 2 | To be able to apply the acid base concept to chemical compounds, and calculate pH and pOH. |
| 3 | To be able to recognise the thermodynamic rules which are suitable for a chemical reaction to occur in fovour of products. |
| 4 | To be able to define organic chemistry, and recognise functional groups. |
| 5 | To be able to acquire the interconvention of electricity and chemical reactions and comprehend the daily applications of electrochemistry. |
| 6 | To be able to use the knowledge of chemistry during the following years. |

| **Programme Outcomes** *(Physics)* | |
|---|---|
| 1 | To understand the importance of physics by understanding the general concepts of physics, matter and energy |
| 2 | To be able to define the movements of matter and to distinguish the characteristics of movements under different force (potential) |
| 3 | Be able to say the meaning of Lagrange and Hamiltonian formulations of the movement and apply them to simple problems, |
| 4 | To be able to express the fundamental concepts such as time, space, force, momentum and energy in the movements of matter close to the speed of light and be able to solve and interpret the simple problems related to |
| 5 | To be able to establish the relationship between electric and magnetic forces and to be able to illustrate their applications to technology and solve problems related to the movement of particles in electric and magnetic fields |
| 6 | Be able to say the basic laws of electromagnetics and apply them to problems, illustrate their applications to simple technology |
| 7 | To be able to tell the reasons of the differences between the classical cases and the quantum scale and explain the reasons |
| 8 | Explain the concepts of discontinuity, uncertainty, matter-antimatter, indecisiveness of quantum physics with examples and explain simple problems related to the subject. |
| 9 | To be able to solve the problems of micro-particles under different simple potentials and be able to say their meanings |
| 10 | To be able to establish the relationship between the movements and properties of multi-particle systems and the laws of probability and solve simple problems |
| 11 | To be able to illustrate the laws, meanings and applications of thermodynamics and use them |
| 12 | Be able to use their knowledge about quantum physics and mechanics in explaining some properties of atoms and nuclei |
| 13 | To be able to show the meanings of some theoretical concepts by experimenting, and develop a strong relationship between thought and the real world, develop analytical thinking |
| 14 | To be able to apply the meanings of the basic laws of physics, their comprehension of universality and the relations between them and the unity of the laws of nature. |
| 15 | Use computer to solve physics problems |
| 16 | To be able to understand the problems by using their analytical knowledge skills and to propose solutions by dealing with the laws of physics |
| 17 | Be able to use the knowledge of physics to understand new technologies |
| 18 | To be able to tell the relations between symmetry and conservation laws in laws of physics |

**Contribution of Learning Outcomes to Programme Outcomes** *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

| | L1 | L2 | L3 | L4 | L5 | L6 |
|---|---|---|---|---|---|---|
| P1 | 5 | 5 | 5 | 5 | 5 | 5 |
| P2 | 3 | 4 | 5 | 5 | 5 | 4 |
| P3 | 3 | 4 | 4 | 4 | 5 | 4 |
| P5 | 3 | 4 | 4 | 4 | 5 | 4 |
| P7 | | | | | 4 | 2 |
| P8 | | 2 | 4 | 2 | 2 | 2 |
| P9 | | | | 2 | 5 | 5 |
| P10 | 5 | 5 | 5 | 5 | 4 | 3 |
| P11 | 4 | 4 | 5 | 3 | 3 | 2 |
| P12 | 2 | 2 | 3 | 3 | 4 | 4 |
| P13 | 4 | 4 | 4 | 4 | | |
| P15 | 2 | 3 | 3 | 3 | 3 | 3 |

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|---|---|---|---|---|---|---|
| P16 | 4 | 3 | 3 | 3 | 4 | 3 |
| P17 | 4 | 3 | 4 | 4 | 3 | 3 |