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| https://admin.antalya.edu.tr/files/139/abu-logo-en.jpg | **ECTS Course Description Form** |
| **PART I ( Senate Approval)** |
| **Offering School**  | **Antalya Bilim University** |
| **Offering Department** | **Industrial Engineering** |
| **Program(s) Offered to** | **All engineering** | **Core** |
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| **Course Code**  | **CHEM-101** |
| **Course Name** | **General Chemistry** |
| **Language of Instruction** | **English** |
| **Type of Course** | *Lecture* |
| **Level of Course** | **Undergraduate** |
| **Hours per Week** | **Lecture: 3** | **Laboratory:-** | **Recitation:** 1 | **Practical: -** | **Studio:** *-* | **Other:** *-* |
| **ECTS Credit** | **6** |
| **Grading Mode** | **-** |
| **Pre-requisites** | **-** |
| **Co-requisites** | **-** |
| **Registration Restriction** | *-* |
| **Educational Objective** | * To acquire knowledge and understanding about fundamental concepts related to chemistry and their application to personal, social, technological and environmental situations.
* To develop their chemical content knowledge, critical thinking abilities, and problem solving skills by working through example cases and practice problems.
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| **Course Description** | The CHEM-101 covers the fundamental aspects of general chemistry. Matter ant its properties, Uncertainty and Significant figures, Dimentional analysis, Atom and atomic theory, Mass relationships in chemical reactions, Reactions in aqueous solutions, Gases, Thermochemistry, Electronic structure of atoms, Periodic table, Chemical binding, Liquids and solids, Physical properties of solutions, Thermodynamics and Electrochemistry are the sub-titles of this course. |
| **Learning Outcomes**  | At the end of the class, the students will be able to describe:**LO1-**The scientific method, Classification of matter, Physical and chemical properties of matter, Measurement, Significant numbers **LO2-** The atomic theory, The structure of an atom, The periodic table, Molecules and ions, Chemical formulas and naming of compounds **LO3-** Atomic mass, Avogadro’s number and molar mass of an element, The mass spectrometer, Percent composition of compounds, Determination of empirical formulas, **LO4-**Chemical reactions and chemical equations, Amount of reactant and product, Limiting reagents, Reagent yield, **LO5-**General properties of aqueous solutions, precipitation reaction, acid-base reactions, oxidation-reduction reactions **LO6-** Substances that exist as gases, Pressure of a gas, The gas laws, The ideal gas equation, Dalton’s law of partial pressures, Kinetic molecular theory of gases **LO7-** The nature of energy and types of energy, Enthalpy of chemical reactions, Hess Law, Calorimetry, Standard enthalpy of formation and reaction **LO8-** Photoelectric effect, Bohr’s theory of hydrogen atom, quantum numbers, atomic orbitals, electron configurations, Periodic relationship between the elements, **LO9-**Periodic variation in physical properties, Ionization energy and electron affinity, Variation in chemical properties of the representative elements **LO10-**Lewis dot symbols, The Ionic bond, Lattice energy of ionic compounds, The covalent bond, Electronegativity, Writing lewis structures, Formal charge and lewis structures, The concept of resonance, bond energies **LO11-** The kinetic molecular theory of liquids and solids, Intermolecular forces, Properties of liquids, Crystal structure, Types of crystals, Amorphous solids, Phase changes, Phase diagrams **LO12-** Types of solutions, a molecular view of solution process, Concentration units, The effect of temperature on solubility, The effect of pressure on the solubility of gases, Colligative properties, **LO13-** The three laws of thermodynamics, Spontaneous processes and entropy, Entropy, Gibbs free energy, Thermodynamics in living systems **LO14-** Redox reactions, galvanic cells, Standard reduction potentials, Batteries, Corrosion, Semiconductors  |
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| **PART II ( Faculty Board Approval)** |
| **Basic Outcomes (University-wide)** | **No.** | **Program Outcomes** | **LO1-LO2-LO3-LO4-LO5-LO6-LO7-LO8-LO9-LO10-LO11-LO12-LO13** |
| **PO1** | **Ability** to communicate effectively and write in English.  | 🗸🗸 🗸 🗸 🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸 🗸 🗸 🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸 🗸 🗸 🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸 🗸 🗸 🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸 🗸 🗸 🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸 🗸 🗸 🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸 🗸 🗸 🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸 🗸 🗸 🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸 🗸 🗸 🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸 |
| **PO2** | **Ability** to work individually, and in intra-disciplinary and multi-disciplinary teams. |
| **PO3** | **Recognition** of the need for life-long learning and **ability** to access information, follow developments in science and technology, and continually reinvent oneself. |
| **PO4** | **Knowledge** of chemistry, and trendy applications of chemistry on engineering |
| **PO5** | **Learning** of industry areas which are working in the field of chemistry  |
| **PO6** | **Understanding** of professional and ethical responsibility and **demonstrating** ethical behavior. |
| **Faculty Specific Outcomes** | **PO7** | **Gaining** knowledge about chemistry principles and modern applications on engineering  |
| **PO8** | **Awareness** of the environmental, health, and energy issues and information about the problems of our age  |
| **PO9** | **Gaining** the ability of problem solving in chemistry. |
| **PART III ( Department Board Approval)** |
| **Course Subjects, Contribution of Course Subjects to Learning Outcomes, and Methods for Assessing Learning of Course Subjects** | **Subjects** | **Week** |  | **LO1-2-3-4-5-6-7-8-9-10-11-12-13**For all LOs and for all subjects (S1-S11) are in **A1-A2.** |
| **S1** | 1 | **THE MATTER** **(**The scientific method, classification of matter, physical and chemical properties of matter, measurement, significant numbers) |
| **S2** | 2 | **THE ATOM, MOLECULES AND IONS**(The atomic theory, the structure of atom, the periodic table, molecules and ions, chemical formulas and naming of compounds) |
| **S3** | 3-4 | **MASS RELATIONSHIPS IN CHEMICAL REACTIONS AND RXNS IN AQUEOUS SOLUTIONS**Atomic mass, avagadro’s number and molar mass of an element, the mass spectrometer, percent composition of compounds, determination of emprical formulas, chemical reactions and chemical equations, amount of reactant and product, limiting reagents, reagent yield, general prop. of aq. Solutions, precipitation rxns, ox-red. rxns.  |
| **S4** | 5 | **GASES**(Substance exist as gases, pressure of a gas, the gas laws, the ideal gas equations, dalton’s law of partial pressures) |
| **S5** | 6-7 | **THERMOCHEMISTRY**(The nature of energy and types of energy, enthalpy of chemical rxs, hess law, calorimetry, standart enthalpy of formation and rxn) |
| **S6** | 8-9 | **ELECTRONIC STRUCTURE OF ATOMS AND PERIODIC RELATIONSHIPS BETWEEN THE ELEMENTS**(Photoelectric effect, Bohr’s theory of hydrogen atom, quantum numbers, atomic orbitals, electron conf., periodic relationship between elements, periodic variation in physical properties, ionization energy and electron affinity, variation in chemical properties of the representative elements. |
| **S7** | 10 | **CHEMICAL BINDING**(Lewis dot symbols, the ionic bond, lattice energy of ionic compounds, the covalent bond, electronegativity) |
|  | **S8** | 11 | **LIQUIDS AND SOLIDS**(The kinetic molecular theory of liq. And solids, intermolecular forces, properties of liq., crystal structure, types of crystals, phase changes, phase diagrams) |
|  | **S9** | 12 | **PHYSICAL PROPERTIES OF SOLUTIONS**(Types of solutions, a molecular view of solution process, concentreation units, the effect of temperature on solubility, colligative properties) |
|  | **S10** | 13 | **THERMODYNAMICS**(The three laws of thermodynamics, spontaneous process and entropy, entropy, gibbs free energy, thermodynamics in living systems) |
|  | **S11** | 14 | **ELECTROCHEMISTRY**(Redox reactions, galvanic cells, standart reduction potentials, batteries, corrosion, semiconductors) |
| **Assessment Methods, Weight in Course Grade, Implementation and Make-Up Rules**  | **No.** | **Type** | **Weight** | **Implementation Rule** | **Make-Up Rule** |
| **A1** | **Exam** | 70 % | No electronic devices are allowed in the examinations except for calculators. | If a student misses an exam and provides an acceptable legitimate document, a make-up exam should be provided for at least one midterm. |
| **A2** | **Homework** | 30 % | The duration is one week. Assignments are announced to the students at least one week in advance. |  |
| **A3** | **Quiz** |  |  |  |
| **A4** | **Project** |  |  |  |
| **A5** | **Report** |  | - | - |
| **A6** | **Presentation** |  | - | - |
| **A7** | **Attendance/ Interaction** |  | - | - |
| **A8** | **Class/Lab./****Field Work** |  | - | - |
| **A9** | **Other** |  |  |  |
| **TOTAL** | **100%** |
| **Evidence of Achievement of Learning Outcomes** | Every topic is tested with at least one exam question. In order to pass, a student needs to accumulate certain percentage of points and this percentage is determined by the class mean. |
| **Method for Determining Letter Grade** | The method on which the letter grade is based on will be announced at the beginning of the semester, and this method may be subjected to change depending on the performance of the students.

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| Assessment | Midterm 1 | Final | Homework | TOTAL |
| Points | 30 | 40 | 30 | 100 |

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| Total points | 100 - 95 | 94-90 | 89-85 | 84-80 | 79-75 | 74-70 | 69-65 | 64-60 | 59-55 | 54-45 |
| Letter Grade | A | A- | B+ | B | B- | C+ | C | C- | D+ | D |

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| **Teaching Methods, Student Work Load** | **No** | **Method** | **Explanation** | **Hours** |
| ***Time applied by instructor*** |
| **1** | **Lecture** |  | 3x14=42 |
| **2** | **Interactive Lecture** |  |  |
| **3** | **Recitation** |  | 1x14=14 |
| **4** | **Laboratory** |  |  |
| **5** | **Practical** |  |  |
| **6** | **Field Work** |  |  |
| ***Time expected to be allocated by student*** |
| **7** | **Project** |  |  |
| **8** | **Homework** |  | 20 |
| **9** | **Pre-class Learning of Course Material**  |  | 40 |
| **10** | **Review of Course Material** |  | 50 |
| **11** | **Studio** |  |  |
| **12** | **Office Hour** |  | 2x14=28 |
| **TOTAL** | 194 |
| **IV. PART** |
| **Instructor** | **Name** | Assist. Prof. Seda Demirel Topel |
| **E-mail** | seda.demireltopel@antalya.edu.tr |
| **Phone Number** | 5346193811 |
| **Office Number** | A1-62 |
| **Office Hours** | It will be announced during the term |
| **Course Materials** | **Mandatory** | General Chemistry *: The essential concept* (11th Edition) (ISBN:9781259060427): Autohor:Raymond Chang, Publisher: McGrow Hill |
| **Recommended** | *General Chemistry: Principles and modern applications* (11th Edition)(ISBN: 9780134097329) Authour: Ralph H. Petrucchi, Publisher: Pearson |
| **Other** | **Scholastic Honesty** | Any breach of academic honesty is a serious academic offense and will result in a university's disciplinary rules. |
| **Students with Disabilities** | Appropriate conditions are provided for students with disabilities related to the course and evaluation of learning. |
| **Safety Issues**  | The course does not require a special safety. |
| **Flexibility** | The course can be changed by the instructor by informing students. |