Course Plan for Bachelor Program - Study Plan Development and Updating Procedures/ Pharmacy Department	QF02/0408-4.0E

Study Plan No.	**2021/2022**		**University Specialization**		**Bachelor of Engineering**	
Course No.	**0201143**		**Course Name**		**General Chemistry for Engineering**	
Credit Hours	**3**		**Prerequisite *Co-requisite**		**-**	
Course Type	☐ Mandatory University Requirement	☐ University Elective Requirement	☐ Faculty Mandatory Requirement	☑ **Supporting course family requirements**	☐ Mandatory Requirement	☐ Elective Requirement
Teaching Style	☐ Full Online Learning		☐ Blended Learning		☑ **Traditional Learning**	
Teaching Model	☐ 1 Synchronous: 1 Asynchronous		☐ 1 Face to Face: 1 Asynchronous		☑ **2 Traditional**	

Faculty Member and Study Divisions Information *(to be filled in each semester by the subject instructor)*

Name	Academic rank	Office No.	Phone No.	E-mail	
Office Hours (Days/Time)	**Sunday, Tuesday, Thursday ()**		**Monday, Wednesday ()**		
Division number	**Time**	**Place**	**Number of Students**	**Teaching Style**	**Approved Model**
				Traditional Learning	**2 Traditional**

Brief Description

This course is designed to introduce students to basic chemistry concepts. These concepts include matter, measurements, stoichiometry, solutions, thermochemistry, atomic and electronic structures, and chemical bonding.

Learning Resources

Course Book Information (Title, author, date of issue, publisher ... etc)	Chemistry, The Central Science, Brown, Lemay, Bursten and Murphy, Prentice Hall, 14th edition (2017).			
Supportive Learning Resources (Books, databases, periodicals, software, applications, others)	1. Chemistry: The Molecular Nature of Matter, James E. Brady, Neil D. Jespersen, Alison Hyslop, 7th edition International Student Version, 2015. 2. Chemical Principles, The Quest for Insight, Peter Atkins (Oxford University), Loretta Jones (University of Northern Colorado), Leroy Laverman (University of California, Santa Barbara), 7th edition, 2016. 3. Chemistry, by Raymond Chang Kenneth Goldsby, 12th edition, AP student edition, 2016.			
Supporting Websites	-			
The Physical Environment for Teaching	☑ **Class room**	☐ Labs	☑ **Virtual Educational Platform**	☐ Others

Necessary Equipment and Software	Moodle
Supporting People with Special Needs	-
For Technical Support	E-Learning & Open Educational Resources Center. Email: elearning@zuj.edu.jo; Phone: +962 6 429 1511 ext. 425/362.

Course learning outcomes *(K= Knowledge, S= Skills, C= Competencies)*

No.	Course Learning Outcomes	The Associated Program Learning Output Code
Knowledge **The student should be able to:**		
K1	Recognize fundamental principles and applications in chemistry.	
K2	Outline the periodicity of elements.	
K3	Identify some types of chemical reactions.	
K4	Recognize units of measurements in different calculations.	
K5	Define electronic structure and chemical bonding.	
K6	Derive the relation between electronic structure, chemical bonding and properties of a molecule.	
Skills **The student should be able to:**		
S1	Apply fundamental stoichiometric calculations.	
Competencies **The student should be able to:**		
C1	Develop his/her professional and personal performance by continuously following-up lectures and submitting tasks on time.	

Mechanisms for Direct Evaluation of Learning Outcomes

Type of Assessment / Learning Style	Fully Electronic Learning	Blended Learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
Midterm Exam	30%	30%	**30%**	0%
Participation / Practical Applications	0%	0%	**20%**	50%
Asynchronous Interactive Activities	20%	20%	**0%**	0%
Final Exam	50%	50%	**50%**	50%

Note 1: *Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, and work within student groups ... etc, which the student carries out on his own, through the virtual platform without a direct encounter with the subject teacher.*

Note 2: *According to the Regulations of granting Master's degree at Al-Zaytoonah University of Jordan, 40% of final evaluation goes for the final exam, and 60% for the semester work (examinations, reports, research or any scientific activity assigned to the student).*

Schedule of Simultaneous / Face-to-Face Encounters and their Topics

Week	Subject	Learning Style*	Reference **
1	- Introduction - The study of chemistry. - Classifications and Properties of Matter.	Lecture	2 -16
2	- Units of measurement. - Uncertainty in measurement. - Dimensional analysis.	Lecture	17-43
3	-The atomic theory of matter. -The discovery of atomic structure. -The modern view of atomic structure and Atomic Weights.	Lecture	44-54
4	- The Periodic Table. -Molecules and molecular compounds. -Ions & Ionic compounds. -Naming Inorganic Compounds.	Lecture	55-70
5	-Chemical equations and patterns of chemical reactivity. -Formula weights. -Avogadro's number and the mole. -Empirical formulas from analyses.	Lecture	83-101
6	-Quantitative information from balanced equations. -Limiting reactants. Solution composition and general properties of aqueous solutions.	Lecture	102-125
7	-Precipitation reactions. -Acids, bases and neutralization reactions. -Oxidation reduction reactions.	Lecture	126-143
8	-Concentration of solutions -Solution Stoichiometry and chemical analysis. -Thermochemistry: The nature of chemical energy and the first law of thermodynamics..	Lecture	144-161 164-171
9	-Enthalpy and enthalpies of reaction - Calorimetry. - Hess's law. **Midterm Exam**	Lecture	172-185

10	-Enthalpies of formation. -Bond enthalpies. -The wave nature of light, quantified energy and photons.	**Lecture**	**186-193** **214-218**
11	-Line spectra and the Bohr model. -The wave behavior of matter, Quantum mechanics and atomic orbitals. -Representation of orbitals and many electron atoms.	**Lecture**	**219-235**
12	-Electron configuration. -Electron configuration and the periodic table -Development of the periodic table, effective nuclear charge.	**Lecture**	**236-255** **256- 261**
13	-Sizes of atoms and ions and ionization energy. -Electron affinity. -Lewis symbols and the octet rule.	**Lecture**	**262-273** **298-300**
14	-Ionic bonding. -Covalent bonding, bond polarity and electronegativity. -Drawing Lewis structures and resonance structures	**Lecture**	**301-321**
15	-Exceptions to the octet rule, strengths and lengths of covalent bonds. - Molecular Shapes, the VSEPR theory, polarity of molecules, and covalent bonding and orbital overlap - Hybrid orbitals, multiple bonds, and molecular orbitals.	**Lecture**	**322-337** **338-367**
16	**Final Exam**		

** Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.*
*** Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.*

Schedule of Asynchronous Interactive Activities *(in the case of e-learning and blended learning)*

Week	Task / Activity	Reference	Expected Results
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