Faculty: Faculty of Science	
Department: Service Courses Unit	**Program: Bachelor in Dentistry**
Semester:	**Academic year:**

Course Plan

First: Course Information

Course No.: 0300180	***Course Title: General and Organic Chemistry***	***Credit Hours: 4 (3+1)***
Prerequisite:	***Section No.:***	***Lecture Time:***
Type Of Course:	■ ***Obligatory Faculty Requirement*** ☐ ***Elective University Requirement*** ☐ ***Obligatory University Requirement*** ☐ ***Faculty Requirement*** ☐ ***Course Elective Specialty Requirement*** ☐ ***Obligatory Specialization requirement***	
Type of Learning:	■ ***Face-to-Face Learning*** ☐ ***Blended Learning (2 Face-to-Face + 1Asynchronous)*** ☐ ***Online Learning (2 Synchronous+1 Asynchronous)***	

Second: Instructor's Information

Name:	***Academic Rank:***	
Office Number:	***Phone Number:***	***Email:***
Office Hours:		

Third: Short Description of the Course

This course includes a practical part and a theoretical part, this course provides the students with the basic introduction of general chemistry needed to understand the chemical and physical properties of the main classes of organic compounds. Accordingly, the course firstly introduces the students to the atomic structure and chemical bonds between atoms. Identification of the acid and bases, and their definitions will be covered. The main classes of organic compounds will be covered and their physical properties, based on their intermolecular interactions, will be explained. Besides that, the chemical reaction of the main classes of organic compounds will be introduced to obtain the final products will be explained. The correct nomenclature of the basic organic compounds will be introduced using the IUPAC. In order to add high level of critical thinking, since the organic chemistry is based on reparation of final products from a starting material, the steps need for the synthesis of some organic compounds will be explained, based on the full understanding of the chemical reactions of each class of organic compounds.

Fourth: Learning Source

Designated Book 1 – (General Chemistry)	General Chemistry – **The essential Concepts** - 6th Edition	
Authors: Raymond Chang Jason Overby	Mc Graw Hill 2011 IBSN: 978-007-131368-1	***Year: 2011***
Designated Book 2 – (General Chemistry)	Organic Chemistry – A SHORT COURSE - **Hart** - 13th Edition	
Authors: David J. Hart Susan Christopher M. Hadad Leslie E. Craine Harold Hart	Brooks Cole 20 Davis Drive- Belmont, CA 94002-3098 - USA	***Year: 2012***
Additional Sources:	Chemistry – **Zumdahl** - 9th Edition, Brooks Cole 20 Davis Drive- Belmont, CA 94002-3098 - USA Organic Chemistry, J. Mc-Murry – 8th Edition, 2008	
Teaching Type:	***Classroom*** ■ ***Laboratory*** □ ***Workshop*** □ **MS Teams** □ **Moodle** ■	

Fifth: Learning Outcomes

Number	*Course learning output*	*Associated Program Outcome Code*
Knowledge		
K1	**K1**: 1. The differences between atoms, compounds and mixtures. 2. Introduction to the different types of chemical reactions – Basic types. 3. Electrolytes and non-electrolytes. 4. Acids and bases – Definitions and Properties. 5. The main classes of functional groups in organic chemistry. 6. General properties of aromatic compounds and benzene.	**P.K1
K2	**K2**: 1. Understanding the differences between ionic and covalent bonds.	P.K2

	2. The electronegativity and polarity of molecules 3. Lewis acids and bases. 4. The orbital model of bonds and benzene.	
K3	**K3**: 1. The definition of mole concepts and its application in solution stoichiometry. 2. Common ion effect on acidic and basic solutions. 3. Homogenous and Heterogenous solutions, buffer solutions, acid base titration and acid base indicator 4. The physical properties of different classes of organic compound.	P.K3
Skills		
S1	**S1**: 1. Volumetric analysis – Titration problems. 2. Calculation the pH of strong and weak acids 3. Buffer solution and its capacity. 4. Nomenclature of different types of organic compounds using IUPAC rules. 5. The most common chemical reactions of different classes of organic compounds.	**P.S1
S2	**S2**: 1. Drawing Lewis structure for organic compounds. 2. Resonance structures of different organic compounds. 3. pH curves. 4. Electrophilic aromatic substitution. 5. Nucleophilic addition reactions to carbonyl groups	P.S2
S3	**S3**: 1. Students could work in groups to solve some challenge questions about the preparation of different organic compounds from a starting material. 2. Introduce different organic compounds and the students could work in groups to assign the types of bonds and the main functional groups. 3. Students could work together to determine the structure and molecular shapes of different organic compounds using the VSEPR theory.	P.S3
Competences		
C1	**C1**: 1. The effect of intermolecular forces on the physical properties of different classes of organic compounds.	**P.C1

C2	**C2**: 1. Conformations of alkanes and cycloalkanes 2. Cis-trans isomerism 3. E-Z conversion for Cis-trans isomers.	P.C2
C3	**C3**: 1. The ability of students to complete the chemical reaction of different types of organic compounds 2. Preparation of final products from given starting materials	P.C3

***K: knowledge, S: skills, C: competencies.**
**** P.K: Program Learning Outcome Knowledge, P.S: Program Learning Outcome Skill, P.C: Program Learning Outcome Competence.**

Sixth: Course Structure

Lecture Date	Teaching Outcome	Topics	Teaching Procedures*	Teaching Methods***	References*** **Textbook1** – General Chemistry – **The essential Concepts** - 6th Edition
	-------	**Introduction to the course / course outline**	**Direct (Face-to-Face)**	**Lectures Moodle**	**----------**
	K1 K2	**The study of general chemistry, scientific methods, classification of metals, physical and chemical properties, measurements,**	**Direct (Face-to-Face)**	**Lectures Moodle**	**Ch.1 – Pages (2-18)**
	K1 K2	**Atomic mass, Avogadro's number and molar mass of element, molecular mass, percent composition of compound**	**Direct (Face-to-Face)**	**Lectures Moodle**	**Ch.3 – Page (60-72)**
	K1 K2 K3 S1	**Determination of molecular formula, chemical reactions and chemical equations, amount of reactant and product, limiting reagent**	**Direct (Face-to-Face)**	**Lectures Moodle**	**Ch.3 – Pages (72-86)**

	K1 K2 K3 S1	General properties of aqueous solution, acid-base reaction, concentration of solution, solution stoichiometry	Direct (Face-to-Face)	Lectures Moodle	Ch.4 – Pages (97-100) Ch.4 – Pages (105-109) Ch.4 – Pages (118-128)
	K1 K2 S1	Types of solution, concentration unit, effect of temperature on solubility, effect of pressure on the solubility of gases	Direct (Face-to-Face)	Lectures Moodle	Ch.13 – Pages (436-447)
	K1 K2	Bronsted acids and bases, acid-base properties of water, pH measurements, strength of acids and bases	Direct (Face-to-Face)	Lectures Moodle	Ch.16 – Pages (544-555)
	K1 K2 K3	Weak acid and acid ionization constant, weak base and base ionization constant, Lewis acids and bases	Direct (Face-to-Face)	Lectures Moodle	Ch.16 – Pages (555-572) Ch.16 – Pages (579-583)
	K1 S2	Homogenous and Heterogenous solutions, buffer solutions, acid base titration and acid base indicator	Direct (Face-to-Face)	Lectures Moodle	Ch.17 – Pages (590-606)
	K1 S1	Types of bonds and types of bond cleavage Writing structure formula Abbreviated structure formula Functional group, electronegativity, inductive effect, types of rection	Direct (Face-to-Face)	Lectures , Moodle	Ch. 1- pages 13-14 Ch. 1- pages 14-15 Ch. 1- pages 16-18 Ch. 1- pages 30-31

	K1, S1	The structures of Alkanes Nomenclature of organic compounds IUPAC for naming alkanes	Direct (Face-to-Face)	Lectures , Moodle	Ch.2 – Pages (37-38) Ch.2 – Pages (38-39) Ch.2 – Pages (39-44)
	K1 K2 S1 C1 C2	Cycloalkanes Nomenclature & Conformation Preparation of alkanes Reaction of alkanes	Direct (Face-to-Face)	Lectures Moodle	Ch.2 – Pages (47-49) Ch.2 – Pages (49-54) Ch.2 – Pages (54-61)
	K1 K2 K3 S1	Definition and classification of alkenes and alkynes Nomenclature of alkenes and alkynes	Direct (Face-to-Face)	Lectures Moodle	Ch.3 – Pages (69-70) Ch.3 – Pages (70-73) Ch.3 – Pages (73-76)
	K1 S1 C1 C2	Cis-Trans Isomerism in alkenes Polar addition reactions Addition of unsymmetric reagents – Markovnilove rule	Direct (Face-to-Face)	Lectures Moodle	Ch.3 – Pages (76-78) Ch.3 – Pages (79-80) Ch.3 – Pages (80-85)
	K1 K2 K3 S1 S3	Addition of Halogens Oxidation of alkenes Addition reactions of alkynes Acidity of alkynes	Direct (Face-to-Face)	Lectures Moodle	Ch.3 – Pages (91-92) Ch.3 – Pages (96-100) Ch.3 – Pages (101-104) Ch.3 – Pages (104-105)
	K1 K2 S1 C2	Some facts about benzene Resonance model of benzene - Kekulé's Orbital model of benzene Nomenclature of aromatic compounds	Direct (Face-to-Face)	Lectures Moodle	Ch.4 – Pages (115-116) Ch.4 – Page (117) Ch.4 – Pages (117-118) Ch.4 – Pages (118-121)
	K1 S1 S3	Electrophilic aromatic substitution	Direct (Face-to-Face)	Lectures Moodle	Ch.4 – Pages (122-134)

	C1				
	K1 K3 S1 C1	Nomenclature and classification of Alcohols Nomenclature of phenols Hydrogen Bonding in Alcohols and Phenols Acidity and Basicity of alcohols and phenols	Direct (Face-to-Face)	Lectures Moodle	Ch.7 – Pages (207-209) Ch.7 – Page (209) Ch.7 – Page (210) Ch.7 – Pages (211-216)
	K1 S1 S3 C1	Dehydration of Alcohols to Alkenes Reaction of Alcohols with Hydrogen Halides Oxidation of Alcohols to Ketones, ,Aldehydes and Carboxylic Acids Aromatic Substitution in Phenols Thiols	Direct (Face-to-Face)	Lectures Moodle	Ch.7 – Pages (216-217) Ch.7 – Pages (218-219) Ch.7 – Pages (220-223) Ch.7 – Pages (224-225) Ch.7 – Pages (227-228)
	K1 K3 S1 S3 C1	Nomenclature and physical properties of Ethers Preparation of Ethers Cleavage of Ethers	Direct (Face-to-Face)	Lectures Moodle	Ch.8 – Pages (235-238) Ch.8 – Pages (240-242) Ch.8 – Pages (242-244)
	K1 S1 S3	Nomenclature of aldehydes and ketones Synthesis of aldehydes and ketones The carbonyl group Nucleophilic Addition to Carbonyl Groups: An Overview	Direct (Face-to-Face)	Lectures Moodle	Ch.9 – Pages (253-255) Ch.9 – Pages (257-258) Ch.9 – Pages (259-260) Ch.9 – Pages (260-261)
	K1 S1 S3 C1	Addition of Alcohols Addition of water Addition of hydrogen cyanide Addition of Nitrogen Nucleophiles Reduction of carbonyl	Direct (Face-to-Face)	Lectures Moodle	Ch.9 – Pages (262-264) Ch.9 – Page (264) Ch.9 – Page (268) Ch.9 – Pages (269-270) Ch.9 – Pages

		compounds **Oxidation of carbonyl compounds**			**(270-271)** **Ch.9 – Pages (271-272)**
	K1 **K3** **S1**	**Nomenclature and physical properties of acids** **Acidity and acidity constants**	**Direct (Face-to-Face)**	**Lectures** **Moodle**	**Ch.10 – Pages (288-292)** **Ch.10 – Pages (292-293)**
	K1 **K3** **S1** **S3**	**Carboxylic acids derivatives, reactions and identification – Briefly**	**Direct (Face-to-Face)**	**Lectures** **Moodle**	**Ch.10 – Pages (300-318) – Follow the lecture topics**
	K1 **S1** **S3** **C1**	**Classification, structure and Nomenclature of amines** **Preparation of amines and** **reduction of nitrogen compounds**	**Direct (Face-to-Face)**	**Lectures** **Moodle**	**Ch.11 – Pages (328-330)** **Ch.11 – Pages (331-333)** **Ch.11 – Pages (334-335)**
	K1 **S1**	**The basicity of amines** **Reaction of amines with strong acids** **Acylation of Amines with Acid Derivatives**	**Direct (Face-to-Face)**	**Lectures** **Moodle**	**Ch.11 – Pages (335-338)** **Ch.11 – Pages (340-342)** **Ch.11 – Pages (343-344)**

Education procedures: (Direct, synchronous, asynchronous). * * Teaching methods: Lecture, video…..). * * Reference: .(Pages of the book, recorded lecture, video….)

Seventh: Assessment methods

Methods	Fully Electronic Education	Integrated Teaching	Direct Teaching	Material Output to be measured
Mid-term Exam **(03/12/2023)**	-----	-----	30	**K1, K2, K3 S1, S2, C1, C2, C3**
Practical Exam	-----	-----	20	**K1, K2, K3 S1, S2, C1, C2, C3**
Final Exam **(21/1/2024)**	-----	-----	50	**K1, K2, K3 S1, S2, C1, C2, C3**

Eighth: Course Polices

- Meeting the deadline for the lecture.
- Commitment to interaction and participation.
- Interactive lectures will be given through a platform (MS Teams).
- Duties and tests will be given through a platform (Moodle).
- Commitment to the right appearance in front of the camera with the proper background.
- University regulations for attendance and absence from lectures and examinations are in force.
- Academic Integrity: Fraud or moral impersonation are unacceptable and are punishable according to university regulations and instructions

Approval	Name	Date	Signature
Head of Department			
Faculty Dean			