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**Department:**  Chemistry Dept.

**College:** Education

**University:**  Salahadin University-Erbil

**Subject:**  Organic Hydrocarbons

**Course Book:**  *Stage* 1

**Lecturer's name:** Lana Hadi Chawishli

**Academic Year: 2022/2023**

**Course Book**

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| **1. Course name** | Organic Chemistry | |
| **2. Lecturer in charge** | Mohammed Kareem Samad | |
| **3. Department/ College** | chemistry/ Education | |
| **4. Contact** | e-mail: mohammed.samad@su.edu.krd | |
| **5. Time (in hours) per week** | Theory: 4 | |
| **6. Office hours** |  | |
| **7. Course code** |  | |
| **8. Teacher's academic profile** | I graduated from the College of Education, Department of Chemistry in 2006 and got a bachelor's degree BSc in chemistry. After that, I accessed to work at the University of Salahaddin as Assistant Chemist till 2007-2009 in Education College /Chemistry Dept. The work was teaching practical Chemistry (such as Biochemistry and Organic chemistry) in the laboratories. I then started to study MSc/Organic Chemistry In 2009, at Salahaddin University.      After finishing my MSc study, I worked in my department, as an assistant lecturer. The teaching experience is both theoretical and practical in the Organic Chemistry. My PhD study started in Organic Chemistry in the same University in 2015-present. My academic and research program interest focus on Organic synthesis and spectroscopic characterization of newly heterocyclic compounds; I have more than 9 published articles. | |
| **9. Keywords** | **Organic chemistry, Nomenclature, preparation, reaction** | |
| **10. Course overview:**  Organic chemistry is a study of compounds that contain carbon atom. To discuss organic compounds, you must be able to name them and visualize their structures when you read or hear their names. We study organic chemistry because just about all of the molecules that make life possible—proteins, enzymes, vitamins, lipids, carbohydrates, and nucleic acids—contain carbon, so the chemical reactions that take place in living systems, including our own bodies, are organic reactions. Most of the compounds found in nature—those we rely on for food, medicine, clothing (cotton, wool, silk), and energy (natural gas, petroleum)—are organic as well. Important organic compounds are not, however, limited to the ones we find in nature. Chemists have learned to synthesize millions of organic compounds never found in nature, including synthetic fabrics, plastics, synthetic rubber, medicines, and even things like photographic film and Super glue. Many of these synthetic compounds prevent shortages of naturally occurring products. When we study organic chemistry, we study how organic compounds react. When an organic compound reacts, some old bonds break and some new bonds form. Bonds  form when two atoms share electrons, and bonds break when two atoms no longer  share electrons. How readily a bond forms and how easily it breaks depend on the particular electrons that are shared, which, in turn, depend on the atoms to which the electrons belong. So if we are going to start our study of organic chemistry at the beginning, we must start with an understanding of the structure of an atom what  electrons an atom has and where they are located | | |
| **11. Course objective:**  The aim of this course is to observe the fundamental concepts of organic chemistry and illustrate how chemistry explains many aspects of everyday life. The interesting applications for all basic chemical concepts, along with theoretical representations and presenting the subjects favorable and likely by students through extensive illustrations, and step-by-step problem solving.  A key feature is the use teaching Aids like molecular arts to illustrate and explain common phenomena we encounter every day. Students are given enough detail to understand basic concepts. Different problems and more practices problems lead students to easily problem solving and allow students to apply what they have just learned. | | |
| **12. Student's obligation**  The student attendance in class two hours a week, preparation of the home works examinations and participate in the discussion in the classroom. | | |
| **13. Forms of teaching**  Different forms of teaching will be used to reach the objectives of the course: Direct questions, Quizzes, Discussion and conclusions. Power point presentations | | |
| **14. Assessment scheme**  At least two exam for course (200pts) during the **Course** (100pts). Participation in class and answering the questions and an extra degree to attend the lecture (\*).  ‌ | | |
| **15. Student learning outcome:**  Upon completion of these topics, the student will learn how to:  1: Recognize the characteristic features of organic compounds and their derivatives.  2. Recognize the polarity of bonds and molecules affect the structure on polarity. Polar and non-polar solvents.  3: Predict the shape, bond angles and hybridization around atoms in organic molecules  4: Use shorthand methods to draw organic molecules using different representations and types of bonds like ionic, covalent, hydrogen bond and other inter molecular bonds.  5: Recognize the common functional groups and understand their importance, nomenclature, physical and chemical properties, preparation, reactions and mechanisms.  6: Recognize the common reaction types and mechanisms, addition, elimination, and substitutions reactions.  7: After the student's knowledge of this information will be eligible to work as a successful teacher in chemistry | | |
| **16. Course Reading List and References‌:**   1. Organic chemistry Morrison and Boyed 2. Organic Chemistry 4th edition - Paula Bruice 3. General, organic, and biological chemistry. Janice Gorzynski Smith.   Organic Chemistry, David Clein, 2012 John Wiley & Sons, Inc | | |
| **17. The Topics:** | | **Lecturer's name** |
| Week 1:  Introduction to Organic Compounds, The Chemical Bond, Electronegativity,Bonding in Carbon Compounds, Classification of Organic Compounds  Week 2:  Alkanes, Alkyl Groups ,Naming of Alkanes, , sources, Physical Properties of Alkanes, Reactions of Alkanes  week:3:  preparation of Alkanes ,cycloalkanesproperties , Naming cycloalkanes,reaction of cycloalkanes, stability of cycloalkanes  Week 4:  Alkenes, introduction , nomenclature, structure , properties, Alkenes preparation and reactions  Week5:  Alkynes, introduction , nomenclature, structure , properties  Alkynes preparation and reactions  Week6:  Dienes Clssification , nomenclature, properties and reactions Benzene, Benzene Preparation  Week7:  Stability of Benzene, Physical Properties of Benzene, Chemical Properties of Benzene  Week8:  Nomenclature of Mono-Substituted Benzenes, Nomenclature of Disubstituted Benzenes, Nomenclature of Benzenes with Three or more Substituents, electrophilic aromatic substitution reaction of substituted benzene.  ---------------------------------------------------------------------------------------  **18. Practical Topics:**  The details exist in the practical course teacher. | | Dr. mohammed kareem samad  (4 hrs)  11/11/2023 |
| **19. Examinations:**  **Q1-A/Define and give example for the following**  **1- Hydrogen bonds 2- Geometric isomers**  **B/ Fill the blank by choosing one correct answer from below:**  **1.The O-H bond in alcohols classified as ----------bond**  **a-polar covalent b-covalent c-ionic**  **2.P orbitals overlap ----------form bond known as a pi () bond.**  **a-side-to-side b-head-to-head c-side-to-head**  **3.----------alcohol mean that it has an alcohol functional group (-OH) bonded to a carbon atom that is itself bonded to three other carbons.**  **a-Primary b-Secondary c- Tertiary**  **4.Combustion is a rapid oxidation takes place at high temperatures, converting alkanes to ---------and water**  **a-carbon monoxide b-carbon dioxide c-carbon**  **5.Homolytic cleavage is bond breaking in which the bonding electron pair is split evenly between the products and produces ---------.**  **a-anion b-cation c-radicals**  **Q2/**  **A-Draw and named two conformation isomers of butane resulted from rotation about the C2-C3 single bond and identify the stable one.**  **B-Three different alkyl halides are obtained from the monochlorination of pentane, explain.**  **C-Writ the mechanism of propene hydration.**  **Q3/Complete the following equation:** | | |
| **20. Extra notes:**  Here are some hints I give to my students at the beginning of the course:  1. Read the material in the subject and previous one before the lecture ). Knowing what to expect and what is in the book, you can take fewer notes and spend more time listening and understanding the lecture.  2. After the lecture, review your notes, and try to solve problems. Also, read the material for the next lecture.  3. If you are confused about something, visit your instructor during office hours  immediately, before you fall behind. Bring your attempted solutions to problems  with you to show the instructor where you are having trouble.  4. To study for an exam, begin by reviewing each chapter and your notes, then concentrate on the end-of-chapter problems. Also use old exams for practice, if  available. Many students find that working in a study group and posing problems  for each other is particularly helpful. | | |
| **21. Peer review** | | |