



PRINCIPLES OF ORGANIC CHEMISTRY I

FOR CHEMISTRY STUDENTS MAJOR

CHEM 240

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Topics to be Covered

- **Introduction**

(Carbon Compounds, Chemical Bonds (ionic and Covalent), Atomic and Molecular orbitals, Hybridization, Polarity and Inductive effect).

- **Alkanes and Cycloalkanes**

(Alkyl groups, IUPAC nomenclature, Physical properties, Sources off, Synthesis. Reactions (Combustion, Halogenation, Ring opening). Configuration, cyclohexanes.

- **Alkenes, Alkynes and Conjugated Dienes**

(IUPAC nomenclature, Physical properties, Synthesis (Dehydrohalogenation, from vicinal dihalides, Dehydration of alcohols). Reactions (Acidity of terminal alkynes, Addition reactions (Reduction, Halogenation, Addition of HX – Markovnikov rule, Carbonium ions and their stability, Reaction mechanism), Addition in the presence of peroxides, Hydration, Halohydrin formation), Oxidation of Alkenes (KMnO₄, Peroxides and Ozonolysis). (Allyl radical and stability, Allyl cation, 1,3-Butadiene - electron delocalization, Resonance and the Stability of conjugated dienes, 1,4-Addition and 1,4-Cycloaddition reactions of diene).

Topics to be Covered

- **Aromatic Compound**

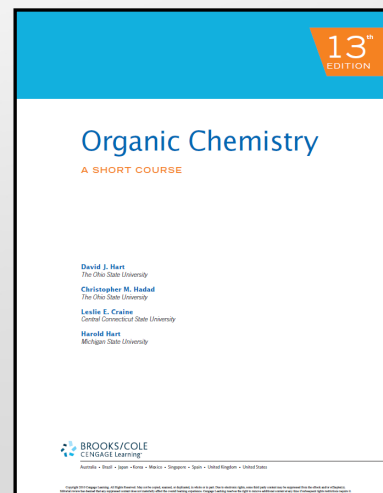
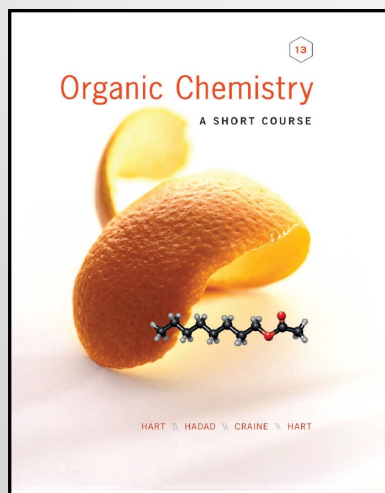
(Aromatic character, Hukel rule, Nomenclature, Electrophilic substitution reactions (Alkylation, Acylation, Halogenation, Sulphonation, Nitration; reaction mechanism), Side chain halogenation and oxidation, Reactivity and Orientation in substituted benzene, Polynuclear aromatics).

- **Alkyl halides**

(nomenclature, synthesis and reactions, optical isomerism (SN1, SN2, E1 and E2 reactions)).

References

- Organic chemistry: A short course by I Harold Hart, David J. Hart and Leslie E. Craine, Houghton Mifflin Company, USA.
- Elements of Organic Chemistry (second edition) is written by Isaak Zimmerman and Henry Zimmerman and published by Macmillan Publishing Co., Inc. New York in 1983.
- أسس الكيمياء العضوية - أ.د./ سالم بن سليم الذياب - الناشر: مؤسسة نافثة



Schedule of Assessment Tasks During the Semester

| No. | Assessment Task | Points |
|-----|---------------------|------------|
| 1 | Frist Midterm Exam | 20 |
| 2 | Second Midterm Exam | 20 |
| 3 | Quizzes | 10 |
| 4 | Assignments | 10 |
| 5 | Final Exam | 40 |
| | Total | 100 |

Course Objectives

- Name organic compounds using IUPAC naming system, their occurrence in nature, physical properties.
- Identify, classify and understand physical and chemical properties of the major functional groups.
- Understand the basic organic reaction for preparation of common functional groups.
- Understand the reaction of functional groups and families of organic compounds.
- The practical uses of organic compounds as drugs, food additives, pesticides, plastics, and other products, as well as their occurrence in nature.

Course Learning Outcomes

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| 1 | Knowledge |
| 1.1 | To recognize structures of organic compounds. |
| 1.2 | To memorize naming, constitutional isomer, physical properties and reactions. |
| 2 | Skills |
| 2.1 | To differentiate between ionic and covalent bonds in chemical compounds. |
| 2.2 | To recognize the IUPAC nomenclature of organic chemical compounds. |
| 2.3 | To differentiate between aromatic and non-aromatic compounds according to Hukel's rule. |
| 2.4 | To predict the type of nucleophilic or electrophilic substitutions in organic reactions. |

Course Learning Outcomes

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| 3 | Values |
| 3.1 | Work independently and as a part of a team during class session. |
| 3.2 | Utilizing university electronic resources of learning. |