

Organic Chemistry  
**CHEM 145**

2 Credit hrs

*Chemistry Department*

*College of Science*

*King Saud University*

**By**

**Prof. Mohamed El-Newehy**

**Syllabus**

**(145 Chem.)**

**Health Science**

**2Credit hrs (2+0)**

*King Saud University*

*College of Science,*

*Chemistry Department*

➔ **Introduction;**

Chemical Bonds (Ionic, Covalent), Atomic and Molecular Orbital, Hybridization, Polarity and Inductive Effect.

(2Lect.)

➔ **Alkanes, Cycloalkanes;**

Alkyl groups, IUPAC nomenclature, Physical properties, Sources, Synthesis, Reactions (Combustion, Halogenations, and Ring opening).

(3Lect.)

➔ **Alkenes and Alkynes;**

IUPAC nomenclature, Physical properties, Synthesis (Dehydrohalogenation from vicinal dihalides, Dehydration), Isomerism (Geometrical Isomerism of Alkenes and Cycloalkenes).

(2Lect.)

➔ **Reactions of Alkenes and Alkynes;**

Acidity of terminal alkynes, Addition reactions (Reduction, Halogenations, Addition of HCN, HX– Markovnikov's rule, Carbonium ions and their stability), Hydration, Halohydrin formation), Oxidation of Alkenes (KMnO<sub>4</sub>, Peroxides and Ozonolysis).

(2Lect.)

➔ **Aromatic Compound;**

Aromatic character, Hukel rule, Nomenclature, Electrophilic aromatic substitution reactions (Alkylation, Acylation, Halogenation, Sulphonation, Nitration), Side chain halogenations and oxidation. Orientation in monosubstituted benzenes derivatives.

(3Lect.)

**1<sup>st</sup> mid Exam; Thursday: 21/5/1436 H (12/3/2015 G)**  
**[Time: 7:00–8:30 p.m.]**

➔ **Week 7**

**Alkyl halides;**

IUPAC nomenclature, classification, Physical properties, Synthesis (alcohols with PX<sub>3</sub>, PX<sub>5</sub>, SOCl<sub>2</sub>), Grignard reagents, Nucleophilic substitution (CN<sup>-</sup>, HO<sup>-</sup>, NH<sub>3</sub>, .....).

(2Lect.)

➔ **Amines;**

Nomenclature, classification, Physical properties. Synthesis: (Reduction of amide and nitro compounds). Reactions: Basicity Formation of diazonium salts. (1Lect.)

➔ **Alcohols;**

IUPAC nomenclature, classification, Physical properties, hydrogen bonding. Synthesis (from Aldehydes and Ketones, reaction of Grignard reagent with Aldehydes and Ketones). Reactions: Acidity, Formation of esters, ethers, Water elimination.

**Ethers and Epoxides;**

Nomenclature, Physical properties. Williamson Synthesis, Epoxides from alkenes and halohydrins). Reactions: HI, Epoxides with acids, bases and Grignard reagents.

*(4Lect.)*

➔ **Phenols;**

hydrogen bonding, Acidity. Synthesis (from Sulphone salts and Diazonium salts). Formation of esters, Oxidation.

*(1Lect.)*

➔ **Aldehydes and Ketones;**

Nomenclature, Physical properties. Synthesis (Oxidation of alcohols, 1°, 2°, Rosenmund's reductions) Reactions: Nucleophilic addition (Addition of Grignard reagent, HCN, H<sub>2</sub>O), Acetals and Ketals, Hydrazones and oximes.

*(2Lect.)*

**2<sup>nd</sup> mid Exam; Thursday: 11/7/1436 H (30/4/2015 G)**

**[Time: 7:00–8:30 p.m.]**

➔ **Carboxylic acids;**

Nomenclature, Physical properties. Synthesis (Alkyl and aryl Nitrile hydrolysis, reaction with CO<sub>2</sub>). Reactions (acidity, Formation of salts, acid halides and esters, Haloform, Reduction).

*(2Lect.)*

➔ **Carboxylic acid derivatives;**

Nomenclature, synthesis and hydrolysis.

**Final revision.**

**Final Exam: Sunday: 13/8/1436 H (31/5/2015 G)**

**[Time: 9:00–11:00 a.m.]**

## References

➔ **Text book:**

Elements of Organic Chemistry by Isaaq Zimmarman and Henry Zimmarman, 2<sup>nd</sup> Edition, Macmillan Publisher Co., Inc. New York Collier Macmillan Publisher, London (i.e. the Latest Edition)

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