

# Organic Chemistry II

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## Syllabus

### I. Alkynes

- A. Nomenclature
- B. Bonding and structure
- C. Physical properties
- D. Sources and preparation
- E. Electrophilic addition reactions
- F. Redox reactions
- G. Acidity
- H. Organic synthesis

### II. Conjugated Dienes, Resonance, and Aromaticity

- A. Structure and stability
- B. Ultraviolet-visible (UV-Vis) spectroscopy
- C. Diels-Alder reaction
- D. Addition of HX to conjugated dienes
- E. Diene polymers
- F. Resonance
- G. Aromatic compounds

### III. Benzene and its Derivatives

- A. Nomenclature
- B. Physical properties
- C. Spectroscopy
- D. Electrophilic aromatic substitution
- E. Catalytic hydrogenation
- F. Sources and industrial uses

#### IV. Reactivity of Allylic and Benzylic Carbons

- A. Carbocations
- B. Radicals
- C. Carbanions
- D. S<sub>N</sub>2 reactions
- E. Oxidation reactions

#### V. Vinylic Halides, Aryl Halides, Phenols, and Metal Catalysis

- A. Vinylic and aryl halides
- B. Nucleophilic aromatic substitution
- C. Metal-catalyzed reactions
- D. Phenols
- E. Reactivity of the aryl-oxygen bond
- F. Industrial preparation and uses of phenols

#### VI. Aldehydes and Ketones

- A. Nomenclature
- B. Physical properties
- C. Spectroscopy
- D. Sources and preparation
- E. Reactions
- F. Basicity
- G. Reversible nucleophilic additions to the carbonyl group
- H. Reduction-oxidation of the carbonyl group
- I. Wittig reaction
- J. Sources and uses

## VII. Carboxylic Acids

- A. Nomenclature
- B. Structure and physical properties
- C. Spectroscopy
- D. Acid-Base properties
- E. Sources and preparation
- F. Reactions
- G. Fatty acids, soaps, and detergents

## VIII. Carboxylic Acid Derivatives

- A. Nomenclature and classification
- B. Structures and physical properties
- C. Spectroscopy
- D. Basicity
- E. Sources and preparation
- F. Reactions

## IX. Enols, Enolates, and $\alpha,\beta$ -Unsaturated Carbonyls

- A. Acidity of carbonyl compounds
- B.  $\alpha$ -Halogenation
- C. Aldol addition and condensation reactions
- D. Claisen condensation
- E. Alkylation of ester enolates
- F. Conjugate addition reactions
- G. Reduction reactions

## X. Amines

- A. Nomenclature
- B. Structure and physical properties
- C. Sources and preparation
- D. Spectroscopy
- E. Acid-base properties
- F. Quaternary ammonium and phosphonium salts
- G. Alkylation and acylation reactions
- H. Hofmann elimination
- I. Aromatic substitution reactions of aniline derivatives
- J. Reactions of diazonium salts