Course Description of
Organic Chemistry VIII (Molecular Orbitals)

The program that presents the course from its beginning (Chemistry program).
It is the course that represents the program.
The program is responsible for the program (multiple).
The program is responsible for the program (methods of linear combination of atomic orbitals).
The academic year of the course (the fourth semester, year two, chemistry, second term).
The academic year of the program (August / /)

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Basic Data

(1) Course Title
Organic Chemistry VIII (Molecular Orbitals)

(2) Course Code No.
Ch 424

(3) Credit Hours:
2 credit hours

Lectures:
Lec 2 hrs

Total hours:
2 credit hours

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Course Description: Molecular orbital theory, wave equation, dual property of electron, wave functions, amplitudes of wave orbitals, in phase, out of phase, nodal plane, the method of linear combination atomic orbitals (LCAO), stability of atomic orbitals, bonding and nonbonding orbitals, electronic configuration of some organic molecules, stability of benzene, aromatic character, the Hückel 4n + 2 rule, orbital symmetry and the chemical reactions S

Professional Data

(1) General goals of the course

- The course is designed to help student-teachers achieve the following goals:
  - Explain the molecular orbital theory.
  - Define the methods of linear combination of atomic orbitals (LCAO).
  - Assign the electronic configuration of some organic molecular orbitals in the ground and excited states.
  - Explain the stability of benzene aromatic character, the Hückel 4n +2 rule.
  - Comprehend the orbital symmetry to the chemical reaction.

(2) Operational learning objectives of the course
By the end of this course, student teachers are expected to achieve the following objectives:

A) Knowledge and Comprehension:
- Explain the molecular orbital theory.
- Define the methods of linear combination of atomic orbitals (LCAO).
- Assign the electronic configuration of some organic molecular orbitals in the ground and excited states.
- Explain the stability of benzene aromatic character, the Huckel 4n +2 rule.
- Comprehend the orbital symmetry to the chemical reaction.
- Describe wave equations, phase, in phase and out of phase.
- Explain the molecular orbital theory.
- Define the methods of linear combination of atomic orbitals (LCAO).
- Assign the electronic configuration of some organic molecular orbitals in the ground and excited states.
- Explain the stability of benzene aromatic character, the Huckel 4n +2 rule.
- Comprehend the orbital symmetry to the chemical reaction.
- Apply the method of linear combination of atomic orbitals (LCAO).
- Define the bonding, antibonding, and nonbonding orbitals.
- Describe electronic configuration of some organic molecular orbitals in the ground and excited states.
- Apply the molecular symmetry to some organic molecules.
- Recognize stability of benzene, aromatic character, the Huckel 4n + 2 rule.
- Apply the orbital symmetry to the chemical reaction.
- Explain the molecular orbital theory.
- Describe wave equations, phase, in phase and out of phase.
- Explain the method of linear combination of atomic orbitals (LCAO).
- Define the bonding, antibonding, and nonbonding orbitals.
- Describe electronic configuration of some organic molecular orbitals in the ground and excited states.
- Apply the molecular symmetry to some organic molecules.
- Recognize stability of benzene, aromatic character, the Huckel 4n + 2 rule.
- Apply the orbital symmetry to the chemical reaction.

B) Cognitive Skills:
- Apply mathematics, including calculus and statistics, to investigations in chemistry and the analysis of data.
- Relate the concepts of chemistry to contemporary, historical, technological, and societal issues; in particular, relate concepts of chemistry to current controversies, such as those around energy uses and medical research, as well as other issues.

C) Practical Skills:
- Locate resources, design and conduct inquiry-based open-ended investigations in chemistry, interpret findings, communicate results, and make judgments based on evidence.
• Construct new knowledge for themselves through research, reading and discussion, and reflect in an informed way on the role of science in human affairs.
• Understand and promote the maintenance of a safe science classroom, including the appropriate use and storage of scientific equipment, and the safe storage, use, and disposal of chemicals.

D) Enabling Skills:
• Demonstrate competence in the practice of teaching as defined within the Entry-Level Standards.
• Create and maintain an educational environment in which conceptual understanding will occur for all science students.
• Demonstrate competence in the practice of teaching through investigative experiences and by demonstrating the application of the scientific process and assessing student learning through multiple processes.
• Develop an understanding and appreciation for the nature of scientific inquiry.
• Understand chemistry as the study of the composition, structure, properties, reactions of matter, and the dynamic interrelations of matter.

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Activities, tasks and assignments:

- Solve and discuss problem sets.
- Submission and class presentation of term papers.
- Computer aided and web based assignments and assessment.
- Computational modeling, and simulation assignments, groups discussions, interpenetration of data, and reports on pertinent materials included in the course.

**Summative Evaluation table**

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1. Final written exam %58.33
2. Practical exam %16.66
3. Assignments %25
4. Total %100

**References:**

**كتّب الطالب:**

كتب المحاضر:

1- Schaum's Outline of Physical Chemistry (2nd Edi... by Clyde Metz
2- Cracking the GRE Chemistry Test, 3rd Edition... by Princeton Review
3- GRE Chemistry (REA) - The Best Test P by Staff of Research
4- Instant Notes in Physical Chemistry by Gavin Whittaker

مجلات علمية ومواقع الإنترنت

- WWW Virtual Library - Chemistry
- ChemDex-Sheffield List of Chemistry internet Sites
- www.carolina.com/product/physical+science/chemistry/che..
- www.ecampus.com/book/067352342X.
- Chemical Information Sources from Indiana University
- Internet Resources: Chemistry

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الإمكانات المطلوبة للتعليم والتعلم
Educational sources:

- Textbooks
- Handouts and problem sets.
- Electronic, web, and multimedia based resources.

Course coordinator: 

Head of the Department: 

Date: 12/10/2009