Course Description of
Inorganic Chemistry III – Coordination Chemistry

مواصفات مقرر

المبادئ التي يقدم المقرر من خلاله (برنامج الكيمياء).

1. يمثل المقرر عنصرًا (رئيسيًا) بالنسبة للبرنامج.
2. القسم العلمي المسئول عن البرنامج (متبعد).
3. القسم العلمي المسئول عن تدريس المقرر (المناهج وطرق التدريس).
4. السنة الدراسية/ المستوى (الفرقة الرابعة عام، شعبة الكيمياء، الترم الثاني).
5. تاريخ اعتماد توصيف البرنامج (   /   /   )

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Basic Data

<table>
<thead>
<tr>
<th>(1) Course Title</th>
<th>Inorganic Chemistry III -</th>
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<tbody>
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<td>(1)</td>
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<tr>
<td>(2) Course Code No.</td>
<td>Ch412</td>
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<tr>
<td>(3) Credit Hours:</td>
<td>six credit hours</td>
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<tr>
<td>Lectures:</td>
<td>Lec 2 hrs</td>
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<td>Total hours:</td>
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1. Course Description: This course deals with the nomenclature and structure of coordinating compounds, isomerism, metal complexes, and magnetic properties in Meta complexes. Different theories in complex formation (VBT, LTF, CFT, and MOT). Electronic Spectra and energy level diagrams.

Professional Data

<table>
<thead>
<tr>
<th>(1) General goals of the course</th>
<th>الهدف العام للمقرر</th>
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<tbody>
<tr>
<td>The course is designed to help student-teachers achieve the following goals:</td>
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<tr>
<td>• Explain rules of naming coordinating compounds.</td>
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<td>• Explain the models of interaction between metal ions and ligands.</td>
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<td>• Explain the color and magnetic properties of complexes using crystal field theory (CFT).</td>
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<td>• Apply molecular orbital theory (MOT) to octahedral complexes.</td>
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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:
- Describes structure of coordinating compounds.
- Define nomenclature of coordinating compounds.
- Discuss isomerism and metal complexes.
- Explain magnetic properties and bonding in metal complexes.
- Discuss crystal and ligand field theories.
- Explain electronic spectra.
- Understands thermodynamic stability of coordinating compounds.
- Perform experiments related to the course topics.
- Explain the function and structure of some biologically important complexes.
- Synthesize and characterize coordination compounds.
- Describe structure of coordination compounds.
- Define nomenclature of coordination compounds.
- Discuss isomerism and metal complexes.
- Explain magnetic properties and bonding in metal complexes.
- Discuss crystal and ligand field theories.
- Explain electronic spectra.
- Explain thermodynamics stability of coordination compounds.
- Perform experiments related to the course topics.
- Explain the function and structure of some biologically important complexes.
- Acquire experience in the synthesis and characterization of inorganic compounds.

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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<th>Contents</th>
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<td><strong>Week</strong></td>
<td><strong>Topic</strong></td>
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<td>First</td>
<td>Coordinating Chemistry</td>
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<tr>
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<td>Introduction.</td>
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<td>Second</td>
<td>Nomenclature</td>
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<td>Third</td>
<td>structural of coordinating compounds</td>
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<td>Fourth</td>
<td>Isomerism</td>
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<td>Fifth</td>
<td>metal complexes</td>
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<td>Sixth</td>
<td>Magnetic properties</td>
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<td>Seventh</td>
<td>Bonding in metal complexes</td>
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<tr>
<td>Eighth</td>
<td>Crystal and ligand field theories</td>
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Activities, tasks and assignments:

- Solves and discusses problem sets.
- Submission and class presentation of term papers.
- Computer aided and web based assignments and assessment.
- Molecular modeling to elucidate chemical bonding, molecular and crystal structure.
- Laboratory work, group discussions, and reports on: synthesis and characterization of coordination compounds.

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<tr>
<th></th>
<th>Score</th>
<th>Weight</th>
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<tbody>
<tr>
<td>2. Final written exam</td>
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<td>3. Practical exam</td>
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<td>4. Assignments</td>
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<td>Total</td>
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<td></td>
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</tbody>
</table>

References:
كتب 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 و مواقع إنتترنت

- 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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Educational sources:

- Chemistry library
- Textbooks
- Handouts and problem sets.
- Electronic, web, and multimedia based resources.
- Lab work.

Course coordinator: د. محمد عبد اللطيف

Head of the Department: أ.د. منحت شاكر

Date: 12/10/2009 م