The course is designed to help student-teachers achieve the following goals:

- Explain principles underlying chemical equilibrium.
- Identify factors affecting chemical equilibrium.
- Explain different theories of acids and bases.
- Explain principles of ionic equilibrium in aqueous solutions.
- Distinguish the difference between natural and artificial radioactivity.
- Comprehend basic principles of electrolytic behavior, and measurements.
- Distinguish between properties and reactions of aliphatic and aromatic hydrocarbons.
By the end of this course, student teachers are expected to achieve the following objectives:

A-1. Understand and performs calculations on equilibrium constants.
A-2 Describe ionic equilibrium of weak electrolytes.
A-3 Identify the process of electrolytic conductivity.
A-4 Define the concept of nuclear chemistry.
A-5 Differentiate between electrophilic and nucleophilic substitution and addition reactions in aliphatic and aromatic hydrocarbons.
A-6 Distinguish strong and weak acids and bases.
A-7 Identify the process of electrolytic conductivity.
A-8 Distinguishes natural and artificial radio activities.
A-9 Emphasize the systematic method of describing organic structures.
A-10 Explain how the structure and bonding of carbon lead to the diversity and number of organic compounds.
A-11 Identify the concept of aromaticity and structure of benzene.
A-12 Write chemical equations for synthesis and reactions of organic compounds.

B-1 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.
B-2 Demonstrate competence in the practice of teaching as defined within the Entry-Level Standards.
B-3. Deduce chemical and structural formulas of organic compounds.
B-4. Apply Le chatelier Principle to show the shift of equilibrium.

C-1 performe calculations on equilibrium constants.
C-2 Acquire hands- on practical skills.
C-3 Acquire basic lab skills; identify inorganic anions and cations, titrations and chemical calculations.
C-4 Perform chemical calculations using chemical formulas and equations.
C-5 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.
D-1 Apply scientific skills in his life.
D-2 Construct new knowledge for themselves through research, reading and discussion, and reflect in an informed way on the role of science in human affairs.
D-3 Create and maintain an educational environment in which conceptual understanding will occur for all science students.

المحتويات:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Lectures</th>
<th>Laboratory</th>
<th>Total</th>
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<tbody>
<tr>
<td>First</td>
<td>Chemical Equilibria: The law of mass action, heterogeneous systems, Le Chatelier principle.</td>
<td>3</td>
<td>2</td>
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<td>Second</td>
<td>* Acids and bases: strong.</td>
<td>3</td>
<td>2</td>
<td>5</td>
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<tr>
<td>Third</td>
<td>* Acids and bases, weak acids and bases, Equilibrium constants, theories of weak acids and bases.</td>
<td>3</td>
<td>2</td>
<td>5</td>
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<td>Fourth</td>
<td>Ionic Equilibria: pH, ion effect, buffer, solubility product</td>
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<td>Fifth</td>
<td>Nuclear Chemistry: natural radioactivity, radioactive series,.</td>
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<tr>
<td>Sixth</td>
<td>Nuclear Chemistry: the nucleus, binding energy, artificial radioactivity,</td>
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<td>Seventh</td>
<td>Nuclear Chemistry: fission and fusion reactions, hazards, applications.</td>
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<td>Eighth</td>
<td>Fundamentals of organic Chemistry: empirical, molecular, and structural formulas</td>
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<td>Fundamentals of organic Chemistry: features of 3D</td>
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<td>Hydrocarbons: chemistry of carbon, hybrization. Aliphatic saturated hydrocarbons: nomenclature, structure, isomerism</td>
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<td>Eleventh</td>
<td>Hydrocarbons: preparation, reactions, and stereochemistry. Aliphatic Unsaturated</td>
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<td>Twelfth</td>
<td>Hydrocarbons: nomenclature, structure, preparation, and reactions of alkenes and alkynes. Aromatic Hydrocarbons</td>
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<td>Thirteenth</td>
<td>Hydrocarbons: aromaticity, structure, preparation and reactions of benzene. Petrochemical industries: chemical from refineries, petrochemicals</td>
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</table>

- **Laboratory:** Crystallization, determination of melting points, purification, chromatography, qualitative elemental analysis of organic compounds, preparation of simple organic compounds (esters, acids, aromatic substitution, etc.)

******************************************************************************************
Activities, tasks and assignments:

- Solve and discusses problem sets.
- Submission and class presentation of term papers.
- Visit to pertinent chemical plants and sites.
- Computer aided and web based assignment.
- Molecular modeling to elucidate chemical bonding, atomic, molecular, and crystal structure.

Assessment and Evaluation tools:

- Final exam
- Hourly and midterm exams.
- Oral assessment.
- Assessment of term paper, reports and group discussions.
- Quizzes
- Evaluation of performance in the lab, group projects and reports.

Summative Evaluation table

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<th>Assessment</th>
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<td>1. امتحان نهاية الفصل الدراسي</td>
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<td>3. Final oral exam</td>
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<td>2. الامتحان العملي</td>
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<td>4. assignments</td>
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<td>3. أعمال فصلية</td>
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<td>المجموع</td>
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</table>
References

Students’ Textbooks


Periodicals and websites

Journal of Chemical Information and Modeling
Journal of Chemical Education (JCE)
Chemical reviews.
Condensed matter, materials, surfaces, interfaces & biophysical.

Resources

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

Course coordinator:

Head of the Department:

Date
رؤية الكلية: انطلاقاً من رؤية جامعة الإسكندرية تسعى كلية التربية لدمج النظرة والتحقيق الجودة والحصول على الاعتماد الأكاديمي لتحسن مكانة متميزة بين كليات التربية على المستوى القومي والعالي (مجلس الكلية، 8 مارس 2009).

رسالة الكلية: إعداد المعلمين والكوادر المؤهلة القادرة على تطوير النظم التعليمية والإدارية بالتعليم العام وال الفني، والباحثين القادرين على تطوير