Course specification

University/Academy: Damanhour University
Faculty/Institute: Science
Department: Chemistry

1. course Data:

<table>
<thead>
<tr>
<th>Course code:</th>
<th>Course title:</th>
<th>Academic year/level:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem. 404</td>
<td>Physical Chemistry 7</td>
<td>2010-2011</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fourth year /2nd term</td>
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</table>

Specialization: Special Chemistry

<table>
<thead>
<tr>
<th>No. of instructional units:</th>
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<tbody>
<tr>
<td>lecture 3hrs/week practical 1 hrs/week</td>
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</table>

2. course Aim

This course is designed to give advanced ideas on colloid chemistry, catalysis and surface chemistry and electrochemistry that may be required by chemists in the course of their careers.

3. Intended learning outcome

a) Knowledge and understanding

At the end of this course the students should know and understand the following.

a1- define Colloid chemistry
a2- mention Catalysis and surface chemistry
a3- define Electrochemistry

b) Intellectual skills

At the end of this course the student will be able to:

b1- evaluate knowledge and understanding of essential facts, concepts, principles and theories relating to course content

b) Professional skills

At the end of this course students will have the ability to:

c1- use skills that enable a harmonic working group.

c) General skills

At the end of this course students will have the ability to:

d1- communicator both written and oral date
d2- Interact with other people and to engage in team-working

4. course content

Colloid Chemistry
- Introduction
- The colloidal state.
- Classification.
- Structural characteristics.
- Preparation and Purification of colloidal systems.
- Kinetic properties (Brownian motion and translational diffusion).
- Sedimentation velocity and sedimentation equilibrium.
- Osmotic pressure and the Donnan membrane equilibrium.
- Optical properties.
- The electrical properties of colloidal systems.
- Electro kinetic phenomena and electro kinetic theory.
- Colloid stability (flocculation concentration, Schulze-Hardy rule, the DLVO theory).
- Systems containing lyophiles.

Catalysis and Surface Chemistry

- Introduction.
- Homogeneous, heterogeneous and enzyme catalysis).
- Catalyst poisons.
- Requirements for industrially useful chemical reactions.
- Some applications. Liquid-gas.
- Surface and interfacial tension.
- Adsorption at interface.
- Orientation at interface.
- Thermodynamics of adsorption.
- Solid-gas interface.
- Solid-gas interface (Physical and chemical adsorption. Adsorption isotherms).

The solid-liquid interface. (Contact angle and wetting. Applications).

Electrochemistry (3)

- Introduction.
- Fick's law.
- Limiting, charging.
- Mechanism of corrosion.
- Migration currents.
- Types, theories.
- Passivity.
- Pitting.

Thermodynamics of corrosion.
- Measurement of corrosion rate.
- Corrosion prevention.
- Inhibitors.

5. Teaching and learning methods

4.1. Lecture
4.2. Contact hours
5.3. Problem-Based Learning
4.4. Encourage students to use online and library resources
6. teaching and learning methods for students with special needs

7. Student Assessment

<table>
<thead>
<tr>
<th>Procedures used:</th>
<th>Final-Term Examination to assess the student skill in presenting facts, applications, theories and calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedule:</td>
<td>Assessment 1 Final-Term Examination Week 16</td>
</tr>
<tr>
<td>Weighing of Assessment:</td>
<td></td>
</tr>
<tr>
<td>Mid-Term Examination:</td>
<td>-</td>
</tr>
<tr>
<td>Final-Term Examination:</td>
<td>150</td>
</tr>
<tr>
<td>Oral Examination:</td>
<td>-</td>
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<tr>
<td>Practical Examination:</td>
<td>-</td>
</tr>
<tr>
<td>Semester Work:</td>
<td>-</td>
</tr>
</tbody>
</table>

Total: 150

8. List of Textbooks and References:

|---------------------------|-------------------------------------------------------------------------------------------------------------|

<table>
<thead>
<tr>
<th>a) Course Notes</th>
<th>Lecture notes of physical chemistry for 4th year students - faculty of science – Damanhour - Alexandria University.</th>
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</thead>
<tbody>
<tr>
<td>b) Required Books (Textbooks):</td>
<td>------</td>
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<tr>
<td>c) Recommended Books</td>
<td>H. R. Kruyt, Colloid Science Elsevier publishing Co</td>
</tr>
<tr>
<td>d) Periodicals, web sites, etc</td>
<td>------</td>
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Course Instructor: Dr. Medhat A. Shaker

Head of Department: Dr. Medhat A. Shaker

Date: ----/--/-