



## Course Specifications

<b>Course Title:</b>	<b>Electrochemistry</b>
<b>Course Code:</b>	<b>2043102-3</b>
<b>Program:</b>	<b>Bachelor in Chemistry</b>
<b>Department:</b>	<b>Department of Chemistry</b>
<b>College:</b>	<b>College of Sciences</b>
<b>Institution:</b>	<b>Taif University</b>

## Table of Contents

<b>A. Course Identification</b> .....	<b>3</b>
6. Mode of Instruction (mark all that apply) .....	3
<b>B. Course Objectives and Learning Outcomes</b> .....	<b>3</b>
1. Course Description .....	3
2. Course Main Objective.....	3
3. Course Learning Outcomes .....	3
<b>C. Course Content</b> .....	<b>4</b>
<b>D. Teaching and Assessment</b> .....	<b>4</b>
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods .....	4
2. Assessment Tasks for Students .....	5
<b>E. Student Academic Counseling and Support</b> .....	<b>5</b>
<b>F. Learning Resources and Facilities</b> .....	<b>5</b>
1. Learning Resources .....	5
2. Facilities Required.....	6
<b>G. Course Quality Evaluation</b> .....	<b>6</b>
<b>H. Specification Approval Data</b> .....	<b>6</b>

## A. Course Identification

<b>1. Credit hours:</b> 3 (2 Theoretical, 1 Lab)
<b>2. Course type</b>
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> 9 <sup>th</sup> Level, 3 <sup>rd</sup> Year
<b>4. Pre-requisites for this course (if any):</b> General Chemistry 2 (2042103-3)
<b>5. Co-requisites for this course (if any):</b> NA

### 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3 Theoretical and 2 Practical hours/ Week	100%
2	Blended	---	---
3	E-learning	---	---
4	Distance learning	---	---
5	Other	---	---

### 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	20
3	Tutorial	---
4	Others (specify)	---
	<b>Total</b>	<b>50</b>

## B. Course Objectives and Learning Outcomes

### 1. Course Description

This course is designed to gain students essential knowledge about all kinds of redox reactions and concepts of electrochemistry.

### 2. Course Main Objective

This course aimed to give students the principles and advanced ideas on Electrochemistry, Galvanic cells, Batteries, Electrolytic cells and Electrolysis along with practical training.

### 3. Course Learning Outcomes

	CLOs	Aligned PLOs
<b>1</b>	<b>Knowledge and Understanding:</b>	
1.1	List the electrochemical cell in electrochemistry and redox reaction	K1
1.2	Determine the role of electrochemistry in industrial applications	K3
<b>2</b>	<b>Skills :</b>	

CLOs		Aligned PLOs
2.1	Apply Nernst equation for solving electrochemistry problems	S1
<b>3</b>	<b>Values:</b>	
3.1	Illustrate the concept of personal responsibility for achieving duties by teamwork	V1

### C. Course Content

No	List of Topics	Contact Hours
1	Oxidation- Reduction Reactions and Reduction Processes	3
2	Galvanic Cells	3
3	Standard Reduction Potential	3
4	Cell Potential, Electrical Work, and Free Energy	3
5	Concentration Cells	3
6	Batteries	3
7	Lead Storage Battery	3
8	Fuel Cells - Electrolysis of Water	3
9	Electrolytic cells - Application of Electrolysis	3
10	Faraday laws - Electro refining of Metals	3
<b>Total</b>		<b>30</b>

### Lab Contents

No	List of Topics	Contact Hours
1	Introduction to course and lab safety	2
1	Determine the cell potential for Daniell cell	2
2	Build up three Daniell cells	2
3	Study the effect of concentration on the cell potential	2
4	Fruit battery experiment (the lemon battery)	2
5	Determine the conductivity of water in electrochemistry	2
6	Measuring potentials of reduction	2
7	Study the effect of temperature on the cell potential	2
8	Types of selective electrodes (pH-electrode, NH-Electrode, Calomel electrode)	2
9	Galvanic deposition	2
10	Study the factors influenced the galvanic deposition	2
<b>Total</b>		<b>20</b>

### D. Teaching and Assessment

#### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	List the electrochemical cell in electrochemistry and redox reaction	Lecture	Written exam
1.2	Determine the role of electrochemistry in industrial applications	Lecture	Written exam

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.0	<b>Skills</b>		
2.1	Apply Nernst equation for solving electrochemistry problems	Problem-Solving	Practical tasks and Exam
3.0	<b>Values</b>		
3.1	Illustrate the concept of personal responsibility for achieving duties by teamwork	Collaborative Learning	Individual presentations

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Individual presentations	Throughout Semester	10%
2	Mid Term Exam	6	20%
3	Practical tasks	Throughout Semester	25%
4	Final practical Exam	10/11	5%
5	Final exam	11/12	40%

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

### Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

Commitment to the rules of the Academic Advising Department at the university in accordance with the academic guidance manual approved by the university and the attached forms, there are different arrangements made by teaching staff to support student consultations including;

- Office hours: 8 hours per a week for each academic member.
- Academic guidance: an academic member has a number of students to guide them throughout degree journey.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	<ul style="list-style-type: none"> <li>Essentials of Physical Chemistry, B. S. Bahl, G. D. Tuli and Arun Bahl, 2014. S. Chand Publishing (India), Latest Edition. ISBN: 9788121929783. <a href="https://tinyurl.com/5ebyks9m">https://tinyurl.com/5ebyks9m</a></li> </ul>
<b>Essential References Materials</b>	<ul style="list-style-type: none"> <li>Chemistry, John E. McMurry, Robert C. Fay and Jill K. Robinson (2016). Pearson Education Ltd., England, ISBN: 978-0-321-94317-0, Latest Edition. <a href="https://tinyurl.com/bbvz7xxf">https://tinyurl.com/bbvz7xxf</a></li> </ul>
<b>Electronic Materials</b>	<ul style="list-style-type: none"> <li>Saudi Digital Library (SDL) <a href="https://apps.tu.edu.sa/sdl/default.aspx">https://apps.tu.edu.sa/sdl/default.aspx</a></li> </ul>
<b>Other Learning Materials</b>	<ul style="list-style-type: none"> <li>Learning Management System (Blackboard) <a href="https://lms.tu.edu.sa/">https://lms.tu.edu.sa/</a></li> <li>Computer programs for graphing organic compounds and chemical reactions (Chem draw , Chem sketch)</li> </ul>

## 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"><li>Lecture hall with 100 seats.</li><li>Equipped Lab with essential instrumentations.</li></ul>
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	<ul style="list-style-type: none"><li>Computer and data show with Wi-Fi access.</li></ul>
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	<ul style="list-style-type: none"><li>Conductivity meter – Saturated Calomel Electrode – pH meter - Avometer</li></ul>

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and assessment	Students	Survey (indirect method)
Extent of achievement of course learning outcomes	Program leader	Reports (Direct method)
Quality of learning resources	Peer referees Students	Reports (Direct method) Survey (indirect method)

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

<b>Council / Committee</b>	<b>Department Council/ Quality assurance committee</b>
<b>Reference No.</b>	2-5-1444
<b>Date</b>	01/11/2022