هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Corrosion Chemistry
Course Code:	ICHM355-3
Program:	Bachelor of Science in Industrial Chemistry
Department:	Department of Physical Sciences
College:	College of Science
Institution:	Jazan University
Version:	TP-153 (2024)
Last Revision Date:	14 February 2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3hrs)

2. Course type

A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		

3. Level/year at which this course is offered: (3rd Year – 6th Level)

4. Course General Description:

Course title	Course code	Contact Hours			Credit Hours	Year	Level	Prerequisite	Corequisite
		Lec	Tut	Lab					
Corrosion Chemistry	ICHM 355-3	2	0	1	3	3rd	6th	ICHM 351-3	---

This course aims to cover the fundamentals and types of corrosion via the understanding of thermodynamics and kinetics of electrochemical processes as well as methods of protecting metals and alloys from corrosion.

5. Pre-requirements for this course (if any)**:**

ICHM 351-3

6. Co-requisites for this course (if any)**:**

none

7. Course Main Objective(s):

1. Recognizing the fundamental principles of corrosion.
2. Knowing the fundamentals of different types of corrosion and corrosion inhibitors.
3. Developing the passivity of metals
4. Describing the factors affecting the corrosion of metals and alloys in aqueous solutions
5. Selecting suitable inhibitors to overcome the corrosion.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	$2 \times 15 = 30$
2.	**Laboratory/Studio**	$2 \times 15 = 30$
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding;** *Upon completion of the course, students are able to:*			
1.1	***Recognize the key ideas, concepts, and terminology used in both theoretical and experimental/applied corrosion chemistry. (P)***	**K1**	***Lecture Demonstration PPT presentation***	***Exams Assignments***
1.2	***Describe and explain chemical phenomena, practical procedures, instruments, and strategies associated with corrosion chemistry. (P)***	**K2**	***Lecture Demonstration PPT presentation***	***Exams Assignments***
2.0	***Skills; Upon completion of the course, students are able to:***			
2.1	***Identify and solve problems using appropriate principles, methodologies, and tools, related to corrosion chemistry. (P)***	**S1**	***Interactive Lecture Solving exercises PPT presentation***	***Exams Assignments***
2.2	***Carry out chemical experiments, analyze data and report results correctly. (P)***	**S2**	***Practical work***	***Lab exam assignments***
2.3	***Employ chemical safety skills in laboratory, industry and other work environment (P)***	**S4**	***Practical work lecture***	***exam***
3.0	**Values, autonomy, and responsibility;** *Upon completion of the course, students are able to:*			
3.1	***Collaborate in groups or teams with others. (P)***	***V1***	***Group work***	***Group work rubric***

C. Course Content

1- Theoretical Part

No	List of Topics	Contact Hours
1.	*Introduction to corrosion science and electrode potential.-*	2
2.	*Thermodynamics of corrosion-.*	2
3.	*Nernst Equation*	2
4.	*Pourbaix Diagrams of Water and Metals-*	4
5.	*Different forms of corrosion*	4
6.	*Pitting corrosion: theories and measurements*	3
7.	*Passivity, theories, the kinetics of passivity, and its control -*	3
8.	*Kinetics of corrosion - Factors affecting the rate of corrosion - Measurements of corrosion rate using chemical and electrochemical methods-*	4
9.	*Potential Diagrams and Exchange Current, Activation Controlled Reactions, Butler Volmer and Tafel Law, Cathodic Reactions Under Diffusion Control, and Passivity*	4
10	*Corrosion Protection and Inhibition*	2
	Total	30

2- Lab work

No	List of Topics	Contact Hours
3.	*Safety in Lab*	4
4.	*Determination of the corrosion inhibition efficiency of some inhibitors using Tafel plots.*	6
3.	*Determination of corrosion rates using the weight loss method*	6
4.	*Determination of the corrosion inhibition efficiency of some inhibitors using the weight loss method*	6
5.	*Determination of corrosion rates using thermometric method.*	6
6.	*Final exam*	2
	Total	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	*Periodic Exams*	*6-8*	*15%*
2.	*Assignments & Classroom activities*	*During semester*	*5%*
3.	*Lab work*	*During semester*	*30%*
4.	*Final Exam*	*16-17*	*50%*
		Total	*100%*

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	1. *Electrochemistry for Corrosion Fundamentals, Toshiaki Ohtsuka, Atsushi Nishikata, Masatoshi Sakairi, Koji Fushimi. (2018), Springer Singapore, 1st addition.* 2. *Electrochemistry and Corrosion Science, Nestor Perez, (2016), Springer International Publishing Switzerland, 2nd addition.*
Supportive References	1. *R.I. Masel, "Chemical Kinetics and Catalysis", 1st . Edition, Wiley-Interscience, 2001.Corrosion.* 2. *Corrosion, Kazem abbas Moswi, ELG co, 2000* 3. *R. W. Revie & H. H. Uhlig, Corrosion and Corrosion Control: An Introduction to Corrosion Science and Engineering, 4th Edition, Wiley & Sons Inc.,2008.*
Electronic Materials	*Some course contents and materials are posted on Blackboard sites*
Other Learning Materials	*https://chem.libretexts.org/Special:Search?qid=&fpid=230&fpth=&query=corrosion+&type=wiki*

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	*1 Lecture room(s) for groups of 50 students* *1 lab with suitable electrochemical sets*
Technology equipment (projector, smart board, software)	*Smartboard, Data show, Blackboard, Internet*
Other equipment (depending on the nature of the specialty)	*none*

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Likert-type Survey CES) Indirect
Effectiveness of Students' assessment	Instructor & Course Coordinator	Classroom evaluation (direct & indirect
Quality of learning resources	Program Coordinator	Indirect
The extent to which CLOs have been achieved	Assessment committee	Indirect
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Physical Sciences Department Council
REFERENCE NO.	Meeting (3)
DATE	12/03/2024 -02/09/1445