Kingdom of Saudi Arabia

The National Commission for

Academic Accreditation & Assessment

Course Specifications

Advanced Electrochemistry

(402447)

Institution: **Umm Al-qura University**	Date of Report: **2015**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Advanced Electrochemistry (402447)**	
2. Credit hours: **2** h	
3. Program(s) in which the course is offered. **Chemistry program**	
4. Name of faculty member responsible for the course: Dr. Badriah Al-Jahdali	
5. Level/year at which this course is offered: **7rd level/4st year**	
6. Pre-requisites for this course (if any): **Electrochemistry**	
7. Co-requisites for this course (if any): --	
8. Location if not on main campus: **both on El-Abedyah, El-azyziah and El-Zaher**	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom ☐	What percentage? ☐
b. **Blended (traditional and online)** ■	What percentage? **100%**
c. e-learning ☐	What percentage? ☐
d. Correspondence ☐	What percentage? ☐
f. Other ☐	What percentage? ☐
Comments:	

B Objectives

1. What is the main purpose for this course?

By the end of this course student will be familiar the basic concepts of electro chemistry and minerals corrosion explained to discourage these different physical concepts of corrosion and its relevance and its applications in different domains

1**. describe the fundamental principles of corrosion.**
2. State the fundamental of different types of inhibitors
3. Develop the measurements of corrosion rates
4. known the pitting corrosion and its inhibition
5-Stydy the basic concepts of passivity

2. Briefly describe any plans for developing and improving the course that are being implemented.

(e.g. increased use of IT or web based reference material
l, changes in content as a result of new research in the field)
1-The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course
2- encourage students to make reports in the recent trends in the field of corrosion of metals and its inhibition either from the library or by using the Internet.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
1- Introduction to corrosion study.	**1**	**2**
2- Relation between corrosion and surface chemistry and chemical bonds.	**1**	**2**
3- Mechanism of electrochemical corrosion.	**1**	**2**
4- Electrochemical cells used in corrosion.	**1**	**2**
5- Types of metallic corrosion.	**1**	**2**
6- pH –potential diagrams (Pourbaix Diagrams).	**1**	**2**
7- Electrochemical kinetics of corrosion (E-I diagrams).	**1**	**2**
8- Effect of polarization on corrosion rate and corrosion rate calculation.	**1**	**2**
9- Mid term exam.	**1**	**2**
10- Passivetion, definition, and its reasons.	**1**	**2**
11- Pitting corrosion and their theories and methods of measurement and inhibition.	**1**	**2**
12- methods and ways of the corrosion protection of metals from corrosion.	**1**	**2**
13- General revision and exams.	**1**	**2**

II-General scheme for identification of organic aliphatic unknown

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total

Contact Hours	24	-				24
Credit	2	-				2

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	**List the historical development (thinking back) and to acquire student skill training to choose a methods of corrosion measurements**	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	**describe the student predicating skill of different types of inhibitors**		
1.3	**Illustrate the values inhibition efficiency from different techniques**		
1.4	**Mention appropriate methods of determination of corrosion rate.**		
1.5	**Define different ways to determine pitting corrosion**		
1.6	**Explain different ideas for student innovates the studying the protection against corrosion**		
1.7	**Describe the student plans of research program in the field of advanced electrochemistry according to organized steps.**		
2.0	**Cognitive Skills**		
2.1	**Generate dialogue and debate within the classroom.**	• Lectures • Scientific	• Exams • web-based

2.2	**Examples given in the lecture and exercise under the supervision of teaching workshops.**	discussion • Library visits • Web-based study	student performance systems • portfolios • posters • demonstrations
2.3	**Give some practical issues and assigning students to create a strategic plan for the solution.**		
2.4	**Encourage the transmission of learning using analysis tools in various applications and through discussion of potential applications in other areas.**		
2.5	**Commissioned student functions duties include open tasks designed to apply the predicating skills, analysis and problem solving.**		
3.0	**Interpersonal Skills & Responsibility**		
3.1	**Division of students to collective teams to conduct some joint reports.**	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	**Development of student opinion of fellow accepts its participation to do effective presentation of the topic was linked to course, and evaluate results to discover the responsiveness of students to collective cooperation.**		
4.0	**Communication, Information Technology, Numerical**		
4.1	**Use the computer in the compilation of research that helps in writing reports on topics relevant to the course.**	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	**Use the computer and the Internet to identify sources of recent research relevant to the course.**		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Exam	5,14	30%

2	Assignments		10
3	Final Exam	16	60%

D. Student Academic Counselting and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic Advising for students.**

E. Learning Resources

1. List Required Textbooks

1- Fundamentals of electrochemical corrosion, E.E. Stansbury and R.A. Buchanan, ASM International,2000.

2- Corrosion Mechanisms in Theory and Practice" 2nd ed., Philippe Marcus, Marcel Dekker, Inc. (2002).

2. List Essential References Materials (Journal s, Reports, etc.)

Lecture Hand outs available on the coordinator website

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

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4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)

- **http://en.wikipedia.org/wiki/Petroleum1- http://www.chemhelper.com/**
- **http://www.chemweb.com/**
- **http://www.science.uwaterloo.ca/~cchieh/cact/**
- **http://www.sciencedirect.com/**

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Independent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **The application of e-learning.** • **Exchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ▪ **Check marking of a sample of exam papers, or student work.** ▪ **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • **Periodic Review of the contents of the syllabus and modify the negatives.**

- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

2016

Faculty or Teaching Staff: **Dr. Badriah Al-Jahdali**

Signature: **Date Report Completed: 2016**

Received by: Dr Hatem Altass **Department Head**

Signature: _____ Date: _____