



Course Syllabus

1	Course title	Electroanalytical Chemistry	
2	Course number	0333312	
3	Credit hours	3	
	Contact hours (theory, practical)	(3 Theory, 0 Practical)	
4	Prerequisites/corequisites	0343311	
5	Program title	B.Sc. in Chemistry	
6	Program code	33	
7	Awarding institution	The Department of Chemistry	
8	School	School of Science	
9	Department	Department of Chemistry	
10	Course level	Bachelor/Undergraduate	
11	Year of study and semester (s)	Third and fourth year students/ First and Second Semesters	
12	Other department (s) involved in teaching the course	None	
13	Main teaching language	English	
14	Delivery method	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online	
15	Online platforms(s)	<input type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	Issuing/Revision Date		

17 Course Coordinator:

Name: Prof. Dr. Mohammed Khair Hourani	Contact hours: 11:30 - 12:30 p.m Work days
Office number: 11 Chemistry Annex	Phone number: 22240
Email: mhourani@ju.edu.jo	

**18 Other instructors:**

Name: none

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19 Course Description:

Oxidation-reduction reactions, galvanic cells, standard electrode potentials, oxidation reduction titrations, applications of redox titrations, potentiometric methods, electrogravimetry, coulometry, voltammetric methods, polarography, electrode kinetics, thermodynamics of electrochemical reactions.

20 Course aims and outcomes:

CLO 1-Defines and explains all the terms and aspects of redox reactions and redox reactions terminology.

CLO-2. Defines and explains all the terms and processes involved in the electrochemical cells and manages the calculations relating the redox reactions to thermodynamic functions.

CLO-3. Defines the terms and explains the theory and design of potentiometric devices and manages related calculations and expected errors and error sources.

CLO-4. Defines the terms and explains the theory of polarography and some voltammetric techniques

CLO-5. Explains the practical aspects of potentiometry, polarography and some voltammetric techniques.

21. Topic Outline and Schedule:

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	Introduction to electrochemistry	CLO-1	Face-to-face				
	1.2	Applications of electrochemistry	CLO-1	Face-to-face				
	1.3	Electroanalysis	CLO-1, CLO-2	Face-to-face				
2	2.1	Oxidation-reduction reactions	CLO-1, CLO-2	Face-to-face				
	2.2	Electrochemical cells	CLO-1 CLO-2	Face-to-face				

Week	Lecture	Topic	Student Learning Outcome	Face-to-face	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
	2.3	Electrode reactions		Face-to-face				
3	3.1	Quantitative Aspects of electrolysis	CLO-2	Face-to-face				
	3.2	Calculation of cell potentials	CLO-2	Face-to-face				
	3.3	Equilibrium	CLO-1, CLO-2	Face-to-face				
4	4.1	Calculation of equilibrium constants	CLO-1, CLO-2	Face-to-face				
	4.2	Redox titrations: basics	CLO-1, CLO-2	Face-to-face				
	4.3	Redox titrations: derivation of the titration curve	CLO-1, CLO-2	Face-to-face				
5	5.1	Redox titrations: indicators	CLO-1, CLO-2	Face-to-face				
	5.2	Applications of redox titrations: auxiliary reagents	CLO-1, CLO-2	Face-to-face				
	5.3	Applications of reductants	CLO-1, CLO-2	Face-to-face				
6	6.1	Applications of reductants: examples	CLO-1, CLO-2	Face-to-face				

	6.2	Applications of oxidants: Examples	CLO-1, CLO-2	Face-to-face				
	6.3	Redox titrations: General calculations		Face-to-face				
7	7.1	Classification s of electroanalytic al techniques		Face-to-face				
	7.2	Potentiometric methods		Face-to-face				
	7.3	Reference electrodes		Face-to-face				
8	8.1	Metallic indicator electrodes		Face-to-face				
	8.2	Membrane electrodes		Face-to-face				
	8.3	Gas-molecular and biocatalytic sensors		Face-to-face				
9	9.1	Potentiometric Instrumentations		Face-to-face				
	9.2	Potentiometric applications		Face-to-face				
		Bulk electrolysis: Basics		Face-to-face				
		Electrogravimetry		Face-to-face				

		Coulometry		Face-to-face				
	10.3	Applications of bulk electrolysis		Face-to-face				
Week	Lecture	Topic	Student Learning Outcome	Face-to-face	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
10	9.3	Mass transfer and kinetics of electrode processes		Face-to-face				
	10.1	Polarography		Face-to-face				
	10.2	Polarography: Theory		Face-to-face				
12	12.1	Classical polarography		Face-to-face				
	12.2	Tast polarography		Face-to-face				
	12.3	Normal pulse polarography		Face-to-face				
13	13.1	Differential pulse polarography		Face-to-face				
	13.2	Applications		Face-to-face				
	13.3	Voltammetry At stationary electrodes		Face-to-face				
14	14.1	Theory of voltammetry		Face-to-face				
	14.2	Linear sweep voltammetry		Face-to-face				
	14.3	Instrumentations		Face-to-face				
15	15.1	Applications		Face-to-face				

	15.2	Applications		Face-to-face				
	15.3	Applications		Face-to-face				

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Midterm exam	30	Redox reactions Electrochemical cells, applications of standard electrode potentials, redox titrations, applications of redox titrations	SLO-1 SLO-2	4 weeks	
Quizzes	Bonus/10 %	At the end of each unit	SLO-1, SLO-2 SLO-3, SLO-4 SLO-5	Every 3 weeks	
Second exam	20	Potentiometry Electrogravimetry, coulometry	SLO-3, SLO-4 SLO-5	After 14 weeks	
Final	50	All material		At the end of the semester	



23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform...etc):

1. Laptop for Power Point Presentation and Videos.
2. Data Show for Power Point Presentation.
3. Internet connection
4. Screen
5. Some laboratory equipment for demonstration

24 Course Policies:

A- Attendance policies:

Attending the course is mandatory. Failure to sit an exam will result in a mark of zero, unless a valid reason (with supporting documentation) for the absence is presented.

B- Absences from exams and handing in assignments on time:

Proof of illness requires a signed medical certificate. Notify me as soon as possible if you are going to miss an exam. If any course component is missed for a valid reason, that portion of the exam grade will/may be shifted to the final examination.

C- Health and safety procedures:

Special Needs Students: Feel free to inform your instructor of your special needs in order for you to have a productive learning experience.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

When writing a report or paper on a given topic, you must read up the necessary information on the topic, and then present it in your own words and writing. If you want to use an exact sequence of text or an idea or data from someone else's work, that is considered a quote, then that work must be cited (you must give a proper credit to the author) specifically as a reference. Therefore, if you are caught cheating on any component of Chem.741 you will be assigned a grade of zero for the course. We shall also place a letter describing the offense in your student file.

If you see someone cheating during an exam or writing a paper or report, inform us/the proctors in the following ways: 1) Write a short message on your exam paper or report indicating what is happening. 2) Raise your hand and the proctor or myself will come over – then let us know and point out your note; we will take it from there.



It is important to point out that there is a difference between plagiarism and working out answers to a lab report or an assignment with a friend. If your writing is based on your own words and your understanding of the material, then that is acceptable. If, however, you simply write your friend's thought or answer, i.e. the same thing (cut and paste), then you have committed plagiarism. Simply, plagiarism is cheating; if you are unclear about any part of this issue or have any question, please speak up and let me know.

E- Grading Scheme and policy:

Assignments are due at the beginning of the class, unless otherwise specified.

Assignments, and suggested problems are intended as partial preparation for exams. Failure to put forth effort is perilous.

F- Available university services that support achievement in the course:

- E-Learning resources
- Computer resources
- Computer and a Data Show

25 References:

A- A- Required book(s), assigned reading and audio-visuals:

- **Textbook** : D. Skoog, F. Holler and S. Crouch, Principles of Instrumental Analysis, 6th or 7th edition , Thomson/Brooks/Cole, New York, 2007.
- Lecture notes
- Handouts

A- B- Recommended books, materials, and media:


1. محمدخير الحوراني : الكيمياء الكهروتحليلية، الطبعة الثانية دار الضياء ، عمان (2010).



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26 Additional information:

None

Name of Course Coordinator: Prof. Dr. Mohammed Khair Hourani	Signature: 
Date: November 12, 2023	
Head of Curriculum Committee/Department: -----	Signature: -----
Head of Department: -----	Signature: -----
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Head of Curriculum Committee/Faculty: -----	Signature: -----
-	
Dean: -----	Signature: -----