مركز الاعتماد وضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER

Course Syllabus

1	**Course title**	Special Topics in analytical chemistry
2	**Course number**	0353411
3	**Credit hours**	Three
	Contact hours (theory, practical)	3 hours theory/week
4	**Prerequisites/corequisites**	0333312
5	**Program title**	B.Sc.
6	**Program code**	03
7	**Awarding institution**	The University of Jordan
8	**School**	Science
9	**Department**	Chemistry
10	**Course Level**	4th Level
11	**Year of study and semester (s)**	4th, First semester, seconds and summer
12	**Other department (s) involved in teaching the course**	NA
13	**Main teaching language**	English
14	**Delivery method**	Face to face learning ✓Blended ☐Fully online
15	**Online platforms(s)**	☐Moodle ☐Microsoft ✓Teams ☐Skype ☐Zoom ☐Others……
16	**Issuing/Revision Date**	Sep 24,2024

17 Course Coordinator:

Name: **Prof. Dr. Sharif Arar** Contact hours:10:30-11:30

Office number: 203 Phone number:22150

Email: s.arar**@ju.edu.jo**

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18 Other instructors:

Name: Office number: Phone number: Email: Contact hours: Name: Office number: Phone number: Email: Contact hours:

19 Course Description:

Water quality, chemistry of the environment, pharmaceutical analytical applications

20 Course aims and learning outcomes (CLOs):

A- Course Learning Outcomes: 0353411 Special topics in analytical chemistry

Upon successful completion of this course, students will be able to:

CLO-1 **Students** will gain adequate knowledge about the pharmaceutical concepts ,fundamentals, analysis, and pharmaceutical analytical applications
CLO-2 Provide knowledge about chemistry of the environment
CLO-3 To provide the students with the knowledge about water quality

B- Students Learning Outcomes (SLOs):

SO-1. Problem Solving: Graduates will be able to apply mathematical and scientific knowledge to identify, formulate, and solve technical or scientific problems relevant to the discipline of chemistry.
SO-2. Design: Graduates will be able to use their understanding of chemistry concepts and principles to formulate and design systems, processes, procedures, or programs to meet desired goals and outcomes.
SO-3. Experimental Skills: Graduates will be able to design, conduct, and analyze experiments or test hypotheses, utilizing appropriate chemical techniques and scientific judgment to draw meaningful conclusions.
SO-4. Communication: Graduates will be able to communicate scientific information effectively and accurately to a range of audiences, including both technical and non-technical audiences.
SO-5. Ethics and Global Context: Graduates will understand and apply ethical and professional responsibilities in the context of the impact of technical and scientific solutions on global, economic, environmental, and societal issues.
SO-6. Teamwork: Graduates will be able to work effectively as part of a team, establishing goals, planning tasks, meeting deadlines, and analyzing risk and uncertainty in the context of chemistry-related projects and initiatives.
SO-7. Handling Chemicals: An ability to apply the proper procedures for safe handling of chemicals.

303411 Identification of Organic Compounds

		Student Outcomes (SO)						
		SO-1	SO-2	SO-3	SO-4	SO-5	SO-6	SO-7
Course Learning Outcomes (CLO)	CLO-1	✓	✓					
	CLO-2	✓	✓					
	CLO-3	✓	✓					

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 analytical pharmaceutical chemistry: definition, concepts and scope-I	CLO-1	**Blended**	Microsoft teams	**Asynchronous Lecturing**	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
	1.2	Introduction to analytical pharmaceutical chemistry: definition, concepts and scope-II	CLO-1	**Blended**	Microsoft teams	**Asynchronous Lecturing**	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
	1.3	Pharmacopoeias-I	CLO-1	**Blended**	Microsoft teams	**Asynchronous Lecturing**	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019

	1.4	Pharmacopoeias-II	CLO-1	**Blended**	Microsoft teams	**Asynchronous Lecturing**	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
	1.5	Quality of Analytical Data and Validation-I	CLO-1	**Blended**	Microsoft teams	**Asynchronous Lecturing**	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
2	2.1	Quality of Analytical Data and Validation-II	CLO-1	Face to Face	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
	2.2	Fundamentals of Bases, Acids, Solubility, Polarity, Partition, and stereochemistry-I	CLO-1	**Blended**	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
	2.3	Fundamentals of Bases, Acids, Solubility, Polarity, Partition, and stereochemistry-II	CLO-1	**Blended**	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug

								Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
	2.4	Aqueous and non-aqueous titrations, and automated titrations and endpoint titrations and endpoint-I	CLO-1	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
	2.5	Aqueous and non-aqueous titrations, and automated titrations and endpoint-II	CLO-1	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
3	3.1	Fast review for analytical techniques used pharmaceutical analytical chemistry -I	CLO-1	**Blended**	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019; Skoog, D.; Holler, and West, Principles of Instrumental Analysis, 7th edition.
	3.2	Fast review for analytical techniques used pharmaceutical analytical chemistry	CLO-1	**Blended**	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine

		-II-Asserting state of the art techniques						GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019, Skoog, D.; Holler, and West, Principles of Instrumental Analysis, 7th edition.
	3.3	Sample preparation and extraction techniques in pharmaceutical analytical chemistry (liquid-liquid extraction (LLE) and solid phase extraction (SPE)) Chemical analysis of pharmaceutical ingredients and preparations-I	CLO-1	**Blended**	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
	3.4	Sample preparation and extraction techniques in pharmaceutical analytical chemistry (liquid-liquid extraction (LLE) and solid phase extraction (SPE))	CLO-1	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019

		Chemical analysis of pharmaceutical ingredients and preparations-II						
	3.5	Stability and impurity testing for drugs	CLO-1	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
4	4.1	Chemical analysis of pharmaceutical ingredients and preparations	CLO-1	**Blended**	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
	4.2	Bioanalysis (Chemical Analysis of Pharmaceuticals in Biological Fluids)	CLO-1	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, midterm exam, Final exam	Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019
	4.3	Introduction to environmental chemistry	CLO-2	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
	4.4	Air chemistry and air pollutants	CLO-2	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry,

								ninth edition. CRC press, 2010
	4.5	Air-pollution remediation	CLO-2	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
5	5.1	Soil Chemistry	CLO-2	**Blended**	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
	5.2	Water chemistry-I Fundamentals of aquatic chemistry	CLO-2	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
	5.3	Pollutants nature and types	CLO-2	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
		Organic pollutants	CLO-2	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
		Inorganic pollutants	CLO-2	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
6	6.1	Microbial pollutants	CLO-2	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
	6.2	Toxicological chemistry	CLO-3	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition.

								CRC press, 2010
	6.3	Pollutants toxicology	CLO-3	Blended	Microsoft teams m	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
	6.4	Introduction to water quality	CLO-3	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
	6.5	Water quality parameters	CLO-3	Blended	Microsoft teams	Asynchronous Lecturing	Quiz Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
7	7.1	Water quality parameters -testing methods	CLO-3	Blended	Classroom	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010, (APHA. Standard Methods for Examination of Water and Wastewater, 24th edn. American Public Health Association, Washington 2024.
	7.2	Water treatment processes	CLO-3	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
	7.3	Municipal water treatment	CLO-3	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition.

								CRC press, 2010
	7.4	Industrial wastewater treatment	CLO-3	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010
	7.5	Sewage treatment	CLO-3	Blended	Microsoft teams	Asynchronous Lecturing	Quiz, Final exam	Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010

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
quizzes	10%	Water quality, chemistry of the environment, pharmaceutical analytical applications	CLO-1 CLO-2 CLO-3	six weeks	In the department and Microsoft teams
Participation/assignment /seminar	10 %	Water quality, chemistry of the environment, pharmaceutical analytical applications	CLO-1 CLO-2 CLO-3		Microsoft teams
Mid exam	30%	pharmaceutical analytical applications	CLO-1	Three weeks	In the department

Final exam	50%	Water quality, chemistry of the environment, pharmaceutical analytical applications	CLO-1 CLO-2 CLO-3	eight weeks	In the department

23 Course Requirements

(e.g., students should have a computer, a laptop or smartphone to be able to get recorded lectures or assignments or instructions through Microsoft teams

24 Course Policies:

A- Attendance policies: A- Attendance policies:

A maximum of 15% absence is allowed.

B- Absences from exams and submitting assignments on time:

Incomplete Exams are conducted later after arranging a new date.

C- Health and safety procedures:

This is a theoretical course.

D- Honesty policy regarding cheating, plagiarism, and misbehavior:

The general Jordan University's laws are applied in any case of cheating.

E- Grading policy:

The letters scale is applied.

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

Free Internet access and E-learning.

25 References:

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

B- Recommended books, materials, and media:

Skoog, D.; Holler, and West, Principles of Instrumental Analysis, 7th edition. Or any updated copy

Stanley E. Manahan. Environmental chemistry, ninth edition. CRC press, 2010

Stig Pedersen-Bjerjaard, Bente Gammelgaard, Trine GrØnhaug Halvorsen. Introduction to pharmaceutical analytical chemistry, second edition. Willy, 2019

26 Additional information:

Name of Course Coordinator: ---Sharif Arar--------Signature: ----------,,,---- Date: ---Sep 24,2024
Head of Curriculum Committee/Department: ---------- Signature: ----------
Head of Department: ---------- Signature: ----------
Head of Curriculum Committee/Faculty: ---------- Signature: ----------
Dean: ---------- Signature: ----------