



مركز الاعتماد
وإضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER



The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

**CourseName:
Real Analysis**

Course Syllabus

1	Course title	Real Analysis	
2	Course number	(0331212)	
3	Credit hours	3	
	Contact hours (theory, practical)	3	
4	Prerequisites/corequisites	(0301211)	
5	Program title	B.Sc.	
6	Program code		
7	Awarding institution	The University of Jordan	
8	School	Science	
9	Department	Mathematics	
10	Course level	College requirement	
11	Year of study and semester (s)	all 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 checked="" 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	7.11.2022	

17 Course Coordinator:

Name: Dr. Saja Hayajneh

Contact hours: 2:30 – 4 (Mon, Wed)

Office number:

Phone number:

Email: s.hayajneh@ju.edu.jo



18 Other instructors:

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19 Course Description:

As stated in the approved study plan.

The completeness property of \mathbb{R} . The archimedean principle in \mathbb{R} . Limit of a sequence. convergent sequences. Monotone and bounded sequences. Cauchy sequences. Subsequences and limit points. Bolzano--Weierstrass Theorem. Open sets, closed sets, bounded sets and compact sets in \mathbb{R} . Limits of real valued functions. Definition of limits by neighborhoods. Definition of limits by sequences. Continuous functions on \mathbb{R} . Sequence definition and neighborhood definition of continuity. Boundedness of continuous functions on compact intervals. The extreme value theorem. The intermediate value theorem. Uniformly continuous functions. The sequential criterion for uniform continuity. The derivative of functions. Rolles Theorem Mean value theorem. Generalized Mean value theorem. Taylor Theorem with remainder. L' Hospital's rule

20 Course aims and outcomes:

A- Aims:

1. Discuss the concepts of cont. differential of integral of functions on \mathbb{R} .
2. Be prepared for the real analysis courses sequel to this course.
3. Be able to think in mathematical analysis.

B- Students Learning Outcomes (SLOs):

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

SLOs SLOs of the course	SLO (7)				
1 Write and read proofs in real analysis	●				
2 Produce rigorous proofs of results that arise in the context of real analysis.	●				
3 Understand the main concepts in real analysis	●				
4 Comprehend the main theorems in real analysis	●				
5 Make mathematical thinking and reasoning, and ask/answer relevant questions	●				

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	The completeness property of \mathbb{R} .	7	Face to Face	Microsoft Teams		quiz	Textbook
	1.2	The Archimedean principle in \mathbb{R} .	7	Face to Face	Microsoft Teams		quiz	Textbook
	1.3							
2	2.1	Limit of a sequence.	7	Face to Face	Microsoft Teams		quiz	Textbook
	2.2	Convergent sequences.	7	Face to Face	Microsoft Teams		quiz	Textbook
	2.3							
Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
3	3.1	Monotone and bounded sequences.	7	Face to Face	Microsoft Teams		quiz	Textbook
	3.2	Cauchy sequences.	7	Face to Face	Microsoft Teams		quiz	Textbook
	3.3							
4	4.1	Subsequences	7	Face to Face	Microsoft Teams		quiz	Textbook
	4.2							
	4.3							
5	5.1	Bolzano-Weierstrass Theorem.	7	Face to Face	Microsoft Teams		quiz	Textbook
	5.2							

	5.3							
6	6.1	Open sets, closed sets, bounded sets and compact sets in \mathbb{R} .	7	Face to Face	Microsoft Teams		quiz	Textbook
	6.2							
	6.3							
7	7.1	Limits of real valued functions.	7	Face to Face	Microsoft Teams		quiz	Textbook
	7.2	Definition of limits by neighborhoods.	7	Face to Face	Microsoft Teams		quiz	Textbook
	7.3							
8	8.1	Definition of limits by sequences.	7	Face to Face	Microsoft Teams		quiz	Textbook
	8.2							
	8.3							
9	9.1	Continuous functions on \mathbb{R} .	7	Face to Face	Microsoft Teams		quiz	Textbook
	9.2	Sequence definition and neighborhood definition of continuity.	7	Face to Face	Microsoft Teams		quiz	Textbook
	9.3							
10	10.1	Boundedness of continuous functions on compact intervals.	7	Face to Face	Microsoft Teams		quiz	Textbook
	10.2							
	10.3							

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
11	11.1	The extreme value theorem.	7	Face to Face	Microsoft Teams		quiz	Textbook
	11.2	The intermediate value theorem.	7	Face to Face	Microsoft Teams		quiz	Textbook
	11.3							
12	12.1	Uniformly continuous functions.	7	Face to Face	Microsoft Teams		quiz	Textbook
	12.2	The sequential criterion for uniform continuity.	7	Face to Face	Microsoft Teams		quiz	Textbook
	12.3							
13	13.1	The derivative of functions.	7	Face to Face	Microsoft Teams		quiz	Textbook
	13.2	Roles Theorem.	7	Face to Face	Microsoft Teams		quiz	Textbook
	13.3	Mean value theorem.	7	Face to Face	Microsoft Teams		quiz	Textbook
14	14.1	Generalized Mean value theorem.	7	Face to Face	Microsoft Teams		quiz	Textbook
	14.2	Taylor Theorem with remainder.	7	Face to Face	Microsoft Teams		quiz	Textbook
	14.3	L'Hospital,s rule.	7	Face to Face	Microsoft Teams		quiz	Textbook
15	15.1	R-Integral	7	Face to Face	Microsoft Teams		quiz	Textbook
	15.2	Fundamental Theorem of Calculus	7	Face to Face	Microsoft Teams		quiz	Textbook
	15.3							



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
Quiz #1	10		7		On Campus
Quiz #2	10		7		On Campus
Midterm	30		7		On Campus
Final Exam	50		7		On Campus

23 Course Requirements

Each student must have:

- Account on Microsoft Teams

24 Course Policies:

- A- . Attendance is absolutely essential to succeed in this course. You are expected to attend every class; please notify your instructor if you know you are going to be absent. All exams must be taken at the scheduled time. Exceptions will be made only in extreme circumstances, by prior arrangement with the instructor.
2. If a student is absent for more than 10% of lectures without an excuse of sickness or due to other insurmountable difficulty, then he/she shall be barred from the final examination also he/she will get a failing grade in this course.
 3. Medical certificates shall be given to the University Physician to be authorized by him. They should be presented to the Dean of the Faculty within two weeks of the student's ceasing to attend classes.
 4. The exams would be essay questions.
 5. Cheating is prohibited. The University of Jordan regulations on cheating will be applied to any student who cheats in exams or on home works.



25 References:

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

R. Bartle and D. Sherbert. Introduction to real analysis.

B- Recommended books, materials, and media:

Bartel Introduction to analysis.

26 Additional information:

Name of Course Coordinator: Dr Saja Hayajneh-----Signature:---- Date: 7-11-2022-----
Head of Curriculum Committee/Department: Prof. Ahmad Al Zghoul-- Signature: ----- -----
Head of Department: -Prof. Manal Ghanem - Signature: -M. Ghanem
Head of Curriculum Committee/Faculty: ----- Signature: ----
Dean: Mahmoud Jaghoub Signature: -----