Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	
	Deans Council Approval Decision Number	2/3/24/2023
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	Number of Pages	08

1.	**Course Title**	**Real analysis**
2.	**Course Number**	0331212
3.	**Credit Hours (Theory, Practical)**	3
	Contact Hours (Theory, Practical)	3
4.	**Prerequisites/ Corequisites**	0301211
5.	**Program Title**	B.Sc.
6.	**Program Code**	
7.	**School/ Center**	Science
8.	**Department**	Mathematics
9.	**Course Level**	Bsc
10.	**Year of Study and Semester (s)**	Second or third
11.	**Other Department(s) Involved in Teaching the Course**	
12.	**Main Learning Language**	English
13.	**Learning Types**	■Face to face learning ☐Blended ☐Fully online
14.	**Online Platforms(s)**	☐Moodle ■Microsoft Teams
15.	**Issuing Date**	22-10-2024
16.	**Revision Date**	23-10-2024

17. Course Coordinator:

Name: Isra Al-Shbeil Contact hours:(M,W) 8:30-10:0

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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:

The completeness property of R. The archimedean principle in 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 R. Limits of real valued functions. Definition of limits by neighborhoods. Definition of limits by sequences. Continuous functions on R. Sequence definition and neighborhood definition of continuity. Bound-edness of continuous functions on compact intervals. The extreme value theorem. The intermediate value theorem. Uniformly continuous functions. The sequencial 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. Program Student Outcomes (SO's):

(To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

7. Utilize research methods, critical and creative thinking skills to assess and analyze information) to solve problems properly, then draw valid reasoning and logical conclusions leading to true consequences.

21. Course Intended Learning Outcomes (CLO's):

(Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

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.

Course CLOs	The learning levels to be achieved					
	Remembering	Understanding	Applying	Analysing	evaluating	Creating
1	■	■		■		
2		■	■	■	■	
3				■		
4		■		■		
5		■	■	■		

22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

Program SO's / Course CLO's	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)	SO (6)	SO (7)	SO (8)
CLO (1)							■	
CLO (2)							■	
CLO (3)							■	
CLO (4)							■	
CLO (5)							■	

23. Topic Outline and Schedule:

Week	Lecture	Topic	CLO/s Linked to the Topic	Learning Types Face to Face (FF) Blended (BL) Fully Online (FO)	Platform Used	Synchronous (S) Asynchronous (A)	Evaluation Methods	Learning Resources
1	1.1	The completeness property of R.	1,2	FF	Teams	S		Text Book
	1.2	The Archimedean principle in R.	1,2	FF	Teams	S		Text Book
	1.3			FF	Teams	S		Text Book
2	2.1	Limit of a sequence.	1	FF	Teams	S		Text Book
	2.2	Convergent sequences	2,3	FF	Teams	S		Text Book
	2.3			FF	Teams	S		Text Book
3	3.1	Monotone and bounded sequences.	2	FF	Teams	S		Text Book
	3.2	Cauchy sequence	3,4	FF	Teams	S		Text Book
	3.3			FF	Teams	S		Text Book
4	4.1	Subsequences	2,5	FF	Teams	S		Text Book
	4.2			FF	Teams	S		Text Book
	4.3			FF	Teams	S		Text Book
5	5.1	Bolzano-Weierstrass Theorem.	5	FF	Teams	S		Text Book
	5.2			FF	Teams	S		Text Book
	5.3			FF	Teams	S		Text Book

6	6.1	Open sets, closed sets, bounded sets and compact sets in R.	1	FF	Teams	S		Text Book
	6.2			FF	Teams	S		Text Book
	6.3			FF	Teams	S		Text Book
7	7.1	Limits of real valued functions.	1	FF	Teams	S		Text Book
	7.2	Definition of limits by neighborhoods.	1	FF	Teams	S		Text Book
	7.3			FF	Teams	S		Text Book
8	8.1	Definition of limits by sequences.	3	FF	Teams	S		Text Book
	8.2			FF	Teams	S		Text Book
	8.3			FF	Teams	S		Text Book
9	9.1	Continuous functions on R	1	FF	Teams	S		Text Book
	9.2	Sequence definition	3	FF	Teams	S		Text Book
	9.3	Neighborhood defention of continuity	3	FF	Teams	S		Text Book
10	10.1	Boundedness of continous functions on compact intervals.	1	FF	Teams	S		Text Book
	10.2			FF	Teams	S		Text Book
	10.3			FF	Teams	S		Text Book
11	11.1	The extreme value theorem.	4	FF	Teams	S		Text Book
	11.2	The intermediate value theorem.	5	FF	Teams	S		Text Book
	11.3			FF	Teams	S		Text Book
12	12.1	Uniformly continuous	4	FF	Teams	S		Text Book

		functions.						
	12.2	The sequential criterion for uniform continuity.	4	FF	Teams	S		Text Book
	12.3			FF	Teams	S		Text Book
13	13.1	The derivative of functions.	1	FF	Teams	S		Text Book
	13.2	Roles Theore	5	FF	Teams	S		Text Book
	13.3	Mean value theorem.	1,5	FF	Teams	S		Text Book
14	14.1	Generalized Mean value theorem.	2,5	FF	Teams	S		Text Book
	14.2	Taylor Theorem with remainder.	2,5	FF	Teams	S		Text Book
	14.3	L'Hospital,s rule	1,5	FF	Teams	S		Text Book
15	15.1	R-Integral	5	FF	Teams	S		Text Book
	15.2	Fundamental Theorem of Calculus	5	FF	Teams	S		Text Book
	15.3	Course revision.	1,2,3,4,5	FF	Teams	S		Text Book
16							Final Exam	

24. Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	CLO/s Linked to the Evaluation activity	Period (Week)	Platform
Midterm exam	30		1,2,3,4,5	8	Exam builder
Second exam	20		1,2,3,4,5	11	Exam builder
Final	50		1,2,3,4,5	Final exams period	Exam builder

25. Course Requirements:

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

-Data show, Microsoft Teams account.

26. Course Policies:

According to university regulations, attendance is mandatory. If a student is unable to attend a class, then he/she should contact the instructor. If a student misses more than 10% of the classes without excuse, then he/she will be assigned a falling grade in class. In cases of extreme emergency or serious illness, the student will be allowed to make up the missed exams. Times and dates for makeup exams will be assigned later. There are severe sanctions for cheating, plagiarizing and any other form of dishonesty. The university regulations on cheating will be applied to any student who cheats in exams or on any homework.

- **A.** Attendance policies:
- **B.** Absences from exams and submitting assignments on time:
- **C.** Health and safety procedures:
- **D.** Honesty policy regarding cheating, plagiarism, misbehavior:
- **E.** Grading policy:
- **F.** Available university services that support achievement in the course:

27. 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.

28. Additional information:

Name of the Instructor or the Course Coordinator: **Dr.Isra Al-Shbeil**	Signature: ……	Date: 22-10-2024
Name of the Head of Quality Assurance Committee/ Department: **Prof. Manal Ghanem**	Signature: ……	Date: ……
Name of the Head of Department: **Prof. Baha Alzalg**.	Signature: ……	Date: ……
Name of the Head of Quality Assurance Committee/ School of Science: **Prof. Emad A. Abuosba**	Signature: ……	Date: ……
Name of the Dean or the Director: **Prof. Mahmoud I. Jaghoub**	Signature: ……	Date: ……