Form: Course Syllabus		
	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
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	Number of Pages	07

1.	**Course Title**	**Mathematical analysis 1**
2.	**Course Number**	0301311
3.	**Credit Hours (Theory, Practical)**	3+0
	Contact Hours (Theory, Practical)	3
4.	**Prerequisites/ Corequisites**	0331212
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 / all semesters
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**	22-10-2024

17. Course Coordinator:

Name: Khalid Bdarneh Contact hours:(S,T,W) 10:30-11:30

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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:

Functions of bounded variation on [a,b]. Continuous functions of bounded variation. Riemann integral ,the definition. Existence of Riemann integral. Basic properties of Riemann integral. Classes of Riemann integrable functions (step functions, continuous functions, monotone functions). Mean value theorems for Riemann integral. Fundamental theorem of calculus. The Riemann-Stieltjes integral,the definition. Basic properties of R-S integral. Integration by parts. Continuous functions and the R-S integral. Monotone functions and the R-S integral. Mean value theorems for R-S integral. The fundamental theorem for R-S integral. Linear transformations on R^n and their matrix representation(fast revision). Functions from R^n to Rm (basic setup and examples). The derivative of vector valued functions of several variables,The definition. directional derivatives. Differentiability implies continuity. Partial derivatives. Matrix representation of the derivative. The gradiant and its properties. The chain rule. The mean value theorem. Higher order derivatives (the second). Inverse and implicit mapping theorems (statements). Taylor series in two variables.

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. Understand the main concepts in real analysis. Write and read proofs in mathematical analysis.
2. Write and read proofs in mathematical analysis.
3. Produce rigorous proofs of results that arise in the context of 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	Functions of bounded variation on [a, b].	1	FF	Teams	S		Text Book
	1.2	Total variation of a function on [a, b].	1	FF	Teams	S		Text Book
	1.3	Total variation of a function on [a, b].	1	FF	Teams	S		Text Book
2	2.1	Total variation of a function on [a, b].	1	FF	Teams	S		Text Book
	2.2	Total variation of a function on [a, b].	1	FF	Teams	S		Text Book
	2.3	Continuous functions of bounded variation.	1,2	FF	Teams	S		Text Book
3	3.1	The Riemannstieltjes integral, the definition.	1,2	FF	Teams	S		Text Book
	3.2	The Riemannstieltjes integral, the definition.	1,2	FF	Teams	S		Text Book
	3.3	Basic properties of R-S integral.	1,2	FF	Teams	S		Text Book
4	4.1	Integration by parts	1,2	FF	Teams	S		Text Book
	4.2	Integration by parts	1,2	FF	Teams	S		Text Book
	4.3	Continuous functions and the RS integral.	1,2	FF	Teams	S		Text Book
5	5.1	Continuous functions and the RS integral.	3	FF	Teams	S		Text Book
	5.2	Continuous functions and the RS integral.	3	FF	Teams	S		Text Book
	5.3	Continuous functions and the RS integral.	3	FF	Teams	S		Text Book

6	6.1	Monotone functions and the RS integral.	3	FF	Teams	S		Text Book
	6.2	Mean value theorems for R-S integral.	3	FF	Teams	S		Text Book
	6.3	Mean value theorems for R-S integral.	3	FF	Teams	S		Text Book
7	7.1	The fundament al theorem for R-S integral.	3	FF	Teams	S		Text Book
	7.2	The fundament al theorem for R-S integral.	3	FF	Teams	S		Text Book
	7.3	The fundament al theorem for R-S integral.	3	FF	Teams	S		Text Book
8	8.1	Linear transformat ions on Rn and their matrix representat ion (quick revision).	3	FF	Teams	S		Text Book
	8.2	Functions from Rn to Rm (Vector fields) basic setup and examples).	3	FF	Teams	S		Text Book
	8.3	Midterm Exam	1,2,3	FF	Teams	S		Text Book
9	9.1	The derivative of a vector field.	4	FF	Teams	S		Text Book
	9.2	The derivative of a vector field.	4	FF	Teams	S		Text Book
	9.3	The derivative of a vector field.	4	FF	Teams	S		Text Book
10	10.1	Differentiab ility of vector forces.	4	FF	Teams	S		Text Book
	10.2	Matrix representat ion of the derivative	4	FF	Teams	S		Text Book
	10.3	Matrix representat ion of the derivative	4	FF	Teams	S		Text Book
11	11.1	The gradiant and its relation to derivative of vector forces.	4	FF	Teams	S		Text Book
	11.2	The chain rule.	4	FF	Teams	S		Text Book
	11.3	Second exam	4	FF	Teams	S		Text Book

12	12.1	The mean value theorem.	4	FF	Teams	S		Text Book
	12.2	Higher order erivatives (the second).	4	FF	Teams	S		Text Book
	12.3	Higher order erivatives (the second).	4, 5	FF	Teams	S		Text Book
13	13.1	The inverse function theorem.	4, 5	FF	Teams	S		Text Book
	13.2	The inverse function theorem.	4, 5	FF	Teams	S		Text Book
	13.3	The inverse function theorem.	4, 5	FF	Teams	S		Text Book
14	14.1	The implicit function mapping theorem.	4, 5	FF	Teams	S		Text Book
	14.2	The implicit function mapping theorem.	4,5	FF	Teams	S		Text Book
	14.3	The implicit function mapping theorem.	4,5	FF	Teams	S		Text Book
15	15.1	Course revision.	1,2,3,4,5	FF	Teams	S		Text Book
	15.2	Course revision.	1,2,3,4,5	FF	Teams	S		Text Book
	15.3	Course revision.	1,2,3,4,5	FF	Teams	S		Text Book
16			1,2,3,4,5				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	8	On Campus
Second exam	20		4	11	On Campus
Final	50		1,2,3,4,5	Final exams period	On Campus

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: Mathematical Analysis, Apostol, T.M. **B-** Recommended books, materials, and media:

28. Additional information:

Name of the Instructor or the Course Coordinator: **Khalid Bdarneh**	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: ……