Jordan University of Science and Technology

Faculty of Science & Arts

Mathematics Department

MATH407 Real Analysis (2) - JNQF Level: 7

Second Semester 2023-2024

Course Catalog
3 Credit Hours. Series of numbers, tests of convergence. Sequences and series of functions, types of convergence, tests of convergence, the interchange theorems. Integration of real valued functions of several variables, Riemann sums and Riemann integrable functions, properties of the integral, iterated integrals and Fubini?s theorem. Integration over regions in Rn. Differentiation of vector valued valued functions of several variables (functions from Rn into Rm).
Teaching Method: On Campus

Text Book	
Title	The Elements of Real Analysis
Author(s)	R. Bartle
Edition	2nd Edition
Short Name	Ref #1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #2	Analysis with an introduction to proof	S. Lay	4th Edition	
Ref #3	Introduction to Real Analysis	R. Bartle and D. Sherbert	4th Edition	

Instructor	
Name	**Prof. Mohammed Ali**
Office Location	Ph2 L-1
Office Hours	
Email	myali@just.edu.jo

Class Schedule & Room

Section 1:
Lecture Time: Sun, Tue, Thu : 11:30 - 12:30
Room: NG54

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
903071	MATH307 Real Analysis (1)	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Weeks 1, 2	Sequences of functions, types and tests of convergence	From **Ref #1**, From **Ref #2**
Weeks 3, 4	Interchange theorems: Interchange of limits and continuity, differentiability and integrability	From **Ref #1**, From **Ref #2**
Week 5	Series of functions, types and tests of convergence	From **Ref #1**
Week 6	Interchang theorems for series	From **Ref #1**, From **Ref #2**
Week 7	Power series, integration and differentiation of power series, applications to numerical integration.	From **Ref #1**, From **Ref #2**, From **Ref #3**
Week 8	Linear transformations from Rn into Rm , partial and directional derivatives, the derivative of a function from Rn into Rm . The Jacobian, Chain Rule, Mean Value Theorems.	From **Ref #1**, From **Ref #2**
Week 9	Higher derivatives, Taylor?s Theorem	From **Ref #3**
Week 10	Surjective and Open Mapping Theorems	From **Ref #1**
Weeks 11, 12	Inverse Function Theorem, Implicit Function. And Theorem Integration: Content of a set, content function, content zero.	From **Ref #1**, From **Ref #3**

Weeks 13, 14	Riemann sums, Rieman Integral, Cauchy Criterion. Properties of the integral, Integrability theorem.	From **Ref #1**, From **Ref #3**
Week 15	Mean Value Theorem. Iterated integration, Fubini?s Theorem.	From **Ref #1**, From **Ref #3**
Week 16	Final Exams	

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Be able to understand the meaning of pointwise and uniformly convergence for sequences and series of functions. Also, be able to know some the properties of these concepts. [1SLO1(K1S1)] [1L7K1, 1L7S1]	50%	
Be able to know the concept of the differentiablity of a function from R^n into R^m with some applications [1SLO1(K1S1)] [1L7K1, 1L7S1]	40%	
Be able to define and evaluate integration of functions in several variables, and prove related theorems. [1SLO1(K1S1)] [1L7K1, 1L7S1]	10%	

Relationship to Program Student Outcomes (Out of 100%)					
SLO1(K1S1)	SLO2(S23C1)	SLO3(C24)	SLO4(C3)	SLO5(C4)	SLO6(S2C3)
100					

Relationship to NQF Outcomes (Out of 100%)	
L7K1	L7S1
50	50

Evaluation	
Assessment Tool	**Weight**
First Exam	30%
Second Exam	30%
Final Exam	40%

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