



Jordan University of Science and Technology
Faculty of Science & Arts
Mathematics Department

MATH201 Intermediate Analysis - JNQF Level: 7

First Semester 2024-2025

Course Catalog

3 Credit Hours. Three-Dimensional Space: vectors, lines, planes. Vector-Valued Functions: calculus of vector-valued functions, arc length parameterization, unit tangent vector, unit normal vector, binormal vector, and curvature. Partial Derivatives: limits and continuity, partial derivatives, chain rule, gradient and directional derivatives, Lagrange multipliers. Multiple and Triple Integrals: double integral over (non)rectangular regions, double integral in polar coordinates, applications (area, surface area, and volume), triple integral over (non)rectangular solids, triple integral in cylindrical and spherical coordinates, application (volume). Vector Calculus: line integrals, independence of path; conservative vector fields, and Green's Theorem.

Teaching Method: On Campus

Text Book

Title	Calculus: Late Transcendentals
Author(s)	H. Anton, I. C. Bivens, and S. Davis
Edition	10th Edition
Short Name	TextBook
Other Information	2012, ISBN 978-0-470-64769-1

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref 1	Calculus	R. Smith and R. Minton	3rd Edition	
Ref 2	Calculus and Analytic Geometry	G.Thomas and R. Finney	9th Edition	
Ref 3	Calculus: One and Several Variables	S. Salas and E. Hille	7th Edition	

Instructor

Name	Prof. Mahmoud Alrefaei
Office Location	D1 Level 0

Office Hours	
Email	alrefaei@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue, Thu : 13:30 - 14:30 Room: NF45 Section 2: Lecture Time: Mon, Wed : 08:30 - 10:00 Room: NG55

Prerequisites		
Line Number	Course Name	Prerequisite Type
821023	HSS102MATH Calculus 2	Prerequisite / Pass
901020	MATH102 Calculus 2	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Ch.11 Vectors: Parametric Equations of Lines	Section 11.5 From TextBook
Week 2	Planes in 3-Space, Quadric Surfaces	Sections 11.6,11.7 From TextBook
Week 3	Ch.12 Vector-Valued Functions : Introduction to Vector-Valued Functions, Vector-Valued Functions, Arc Length Parameter	Sections 12.1, 12.2, 12.3 From TextBook
Week 4	Unit Tangent, Normal, and Binormal Vectors, Curvature	Sections 12.4, 12.5 From TextBook
Week 5	Ch. 13 Partial Derivatives: Functions of Two or More Variables, Limits and Continuity, Partial Derivatives, Differentiability and Local Linearity	Sections 13.1, 13.2, 13.3, 13.4 From TextBook
Week 6	The Chain Rule, Directional Derivatives and Gradients, Tangent Planes and Normal Vectors	Sections 13.5, 13.6, 13.7 From TextBook
Weeks 7, 8	Maxima and Minima in 2-Variables, Lagrange Multipliers	Sections 13.8, 13.9 From TextBook
Week 9	Ch. 14 Multiple Integrals: Double Integrals, Double Integrals over Non-rectangular	Sections 14.1, 14.2 From TextBook
Week 10	Double Integrals in Polar Coordinates	Section 14.3 From TextBook
Week 11	Surface Area, Triple Integrals	Sections 14.4, 14.5 From TextBook

Weeks 12, 13	Triple Integrals in Cylindrical and Spherical Coordinates	Section 14.6 From TextBook
Week 14	Ch. 15 Topics in Vector Calculus: Vector Fields, Line Integrals, Independence of Path; Conservative Vector Field	Sections 15.1, 15.2, 15.3 From TextBook
Week 15	Green's Theorem	Section 15.4 From TextBook
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 recognize the rectangular coordinate systems in three dimensions, and the analytic geometry of lines, planes, and other basic surfaces. Also, be able to understand the calculus of vector-valued functions and apply these concepts to describe the curvature of a given curve. [1SLO1(K1S1)] [1L7K1]	30%	
Be able to know the real valued functions of several variables, their graphs: level curves, and level surfaces, and their analytical geometry. Also, to solve optimization problems involving two and three variables. [1SLO1(K1S1)] [1L7K1]	35%	
Be able to evaluate double and triple integrals, volumes of bounded solids, and areas of bounded regions. [1SLO1(K1S1)] [1L7S1]	25%	
Be able to evaluate line integrals and analyze properties of vector fields and flow. [1SLO1(K1S1)] [1L7K1]	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
75	25

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

Policy	
Attendance	Course attendance is a must, students who absent more than 20% of the classes equivalent to 10 classes (Sun Tues Thu classes) or 7 classes (Mon Wed classes) (with or without excuse) will not be allowed to continue the course.
Cheating	Cheating is prohibited; and in case of cheating, the student will be subject to punishment according to the Standard JUST policy.
Exams	All exams are closed book and notes. The final exam is comprehensive (covers all the material). Incomplete exams need approval from the department head or the dean of the faculty.
Withdraw	The deadline for theoretical courses withdrawal (without reimbursement of tuition fees) is 10/1/2025. Students who are prohibited because they exceed the absentee limit can withdraw before this time also.
Communications	Student can communicate through JUST email or e-learning system, any other personal emails or social media communication are not allowed.

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