Lahore University of Management Sciences
MATH 102 – Calculus II
Fall 2014-2015

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Course URL (if any)	Math.lums.edu.pk/moodle Click on course name, Login as guest

Course Basics				
Credit Hours	3			
Lecture(s)	Nbr of Lec(s) Per Week	2	Duration	75min
Recitation/Lab (per week)	Nbr of Lec(s) Per Week		Duration	
Tutorial (per week)	Nbr of Lec(s) Per Week		Duration	

Course Distribution	
Core	Core for math majors
Elective	
Open for Student Category	All students
Close for Student Category	None

COURSE DESCRIPTION

This is the second of a two-semester Calculus sequence. This course covers, Sequences and Series, Vectors, Partial Derivatives and Linear Approximations, Maxima and Minima for functions of several variables, Lagrange Multipliers, Multiple Integrals, Vector Calculus, Green's, Gauss' and Stokes' theorem

COURSE PREREQUISITE(S)

- MATH 101 Calculus I or MATH 101A Calculus with Theory

COURSE OBJECTIVES

Students should be able to:

- Work with limits in two and three dimensions
- Work with derivatives in two and three dimensions
- Work with integrals in two and three dimensions Work with power series

Learning Outcomes

Students will learn to:

- Work with sequences, series, and power series and determine their convergence and divergence
- Understand three dimensional Cartesian Co-ordinate system and make connections between sets of points and equations
- Be able to determine limits in two and three dimensions

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	Be able to determine partial derivatives in two and three dimensions by algorithms and by first principles Find equations of tangent planes to surfaces Give linear approximations to functions in two and three dimensions Comprehend and be able to apply concepts of multivariable optimization Use the method of Lagrange multipliers for constrained optimization Be able to integrate in two and three dimensions Be familiar with some applications of integration in higher dimensions. Evaluate vector and scalar surface integrals Use the divergence theorem, Green's theorem, Stokes' theorem and fundamental theorem of calculus for integration Evaluate triple integrals in Cartesian, cylindrical, and spherical coordinates Evaluate double integrals using Jacobians and changes of coordinates Calculate gradients and directional derivatives

Grading Breakup and Policy

Assignment(s): 15%
Midterm Examination: 30%
Final Examination: 55%

Examination Detail

Midterm Exam	Yes/No: Yes Combine/Separate: Combine Duration: 75min Preferred Date: Exam Specifications: No notes/No books/No calculators
Final Exam	Yes/No: Yes Combine/Separate: Combine Duration: 180min Exam Specifications: No notes/No books/No calculators

COURSE OVERVIEW

Module	Topics	Recommended Readings	Objectives/ Application
1	Sequences and tests for convergence	**10.1-10.5**	**Sequences and series**
2	Series and tests for convergence	**10.1-10.5**	**Sequences and series**
3	Taylor series	**10.1-10.5**	**Taylor series**
4	Vectors in two and three dimensions	**11.1-11.3**	**Vectors**
5	Surfaces and level curves	**13.1**	**Derivatives**
6	Partial derivatives	**13.2**	**Derivatives**
7	Linear approximations	**13.4**	**Derivatives**
8	Directional derivatives	**13.5**	**Derivatives**
9	Chain rule	**13.5**	**Derivatives**
10	Optimization	**13.6**	**Optimization**
11	Constrained optimization by Lagrange multipliers	**13.7**	**Optimization**
12	Double integrals	**14.1**	**Integrals**
13	Double integrals by change of coordinates	**14.2**	**Integrals**

14	Triple integrals	**14.3-14.4**	**Integrals**
15	Vector fields, div, grad, curl	**15.1**	**Derivatives**
16	Line integrals	**15.2**	**Integrals**
17	FTOC for line integrals	**15.2**	**Integrals**
18	Green's theorem	**15.3**	**Integrals**
19	Surface integrals of vector fields	**15.4**	**Integrals**
20	Surface integrals of scalar fields	**15.4**	**Integrals**
21	Divergence theorem	**15.5**	**Integrals**
22	Stokes' theorem	**15.6**	**Integrals**
23	Physical applications of the three big theorems	**Handout**	**Integrals**

Textbook(s)/Supplementary Readings

Text: James Stewart, 6th Edition

Calculus by Gilbert Strang (Also available as online text from MIT open courseware)
http://ocw.mit.edu/ans7870/resources/Strang/strangtext.htm

Thomas' Calculus, 11/E George B. Thomas,Jr. or a similar text may also be used.