University of Macau

Undergraduate Electrical and Computer Engineering Program

Coordinating Unit:	Department of Mathematics, Faculty of Science and Technology		
Supporting Unit(s):	Nil		
Course Code:	MATH 200	Year of Study:	2
Course Title:	Mathematical Analysis III		
Compulsory/Elective:	Compulsory		
Course Prerequisites:	Nil		
Prerequisite Knowledge:	Nil		
Duration:	One semester	Credit Units:	4
Class/Laboratory Schedule:	Three hours of lecture and two hours of tutorial per week.		
Laboratory/Software Usage:	Nil		
Course Description:	This course aims at providing students with a solid foundation of basic techniques in discrete mathematics. The topics include elementary set theory, counting principle, and graph theory		
Course Objectives:	1. Understand the fundamental theories of calculus of several variables. [a] 2. Be able to formulate physical problems using partial derivatives and multiple integrals. [a] 3. Possess the problem-solving skills using derivatives and integrals. [a]		
Learning Outcomes (LOs):	Upon completion of this course, students are expected to: 1. be able to compute partial derivatives [PO: a]; 2. be able to calculate double, triple and line integrals [PO: a]; 3. have basic understanding of conservative field and potential functions [PO: a]		
Texts & References: *(* recommended textbook(s))*	1. * Calculus, 6th Ed, C. H. Edwards and D. E. Penney, Prentice Hall. 2. Calculus and analytical geometry, 9th Ed. Thomas and Finney, Addison Wesley.		
Student Assessment:	• Assignments: 10% • Midterm examination: 30% • Final examination: 60%		
Learning Outcome Assessment:	• Assignments, midterm and final examination		

Pedagogical Methods:	☑ Lecture	☐ Service learning
	☐ Guest speakers	☐ Internship
	☐ Case study	☐ Field study
	☐ Role playing	☐ Company visits
	☐ Student presentation	☐ e-learning
	☐ Project	☐ Independent study
	☐ Simulation game	☐ Others: _____
	☑ Exercises and problems	

Major Assessment Methods: For each Major Assessment Method below, please indicate the specific pedagogical methods involved (by putting a ✓ in the relevant box(es) on the right-hand side).	Case Study	Role Playing	Student Presentation	Individual project/paper	Group project/paper	Simulation Game	Exercises & problems	Service learning	Internship	Field Study	Company visits	Written examination	Oral examination	Others (please specify)
Class Participation/ Discussion (0%)														
Assignments (10%)							✓							
Midterm Exam (30%)												✓		
Final Exam (60%)												✓		
Others *(please specify)*														
Course Web: (if any)	http://www.sftw.umac.mo/~fstitl/2012-calculus.html													

Course Content: (topic outline)

Week no.	Topics	Assignment no.	LO no.
1	**Introduction:** Coordinate system, vector and scalar products Equation of straight lines, planes and quadratic surfaces, cylinders Interior and Boundary points	--	
2	**Functions of several variables** Domain and Range of functions, Graph and Level curves, Limits **Limits and Continuity** Laws of limits, Composition and continuity of functions.	1	
3	**Partial and Mixed Derivatives, Tangent Planes** Tangent planes, and Geometric Meaning, Differentials	2	
4	**Global and Local Minimum and Maximum** Existence Theorem, Critical Points, Derivative Tests	3	
5	**Applications of Partial Derivatives** First order approximation, Chain Rules, Directional Derivatives, Rate of Most Rapid Changes, Geometric meaning of Gradients, Lagrange Multipliers	4	
6	**Double and Triple Integrals** Double Integral, Iterated integral Area, Volume and Double Integrals Cross section and Interchange of order of integration	5	
7	**Transformation and Triple Integrals** Polar coordinates, Application of double integrals, Triple integral, Cross section Method	6	
8	**Review and Mid-Term Examination**		
9	**Surface Area, and Curves** Vector Fields and their operators, Review of Parameterization of Curve.	7	
10	**Line integral** Line integral, Evaluation of Line Integral, Fundamental Theorem of line integral	8	
11-12	**Potential Functions and Green Theorem** Potential functions and Independence of Path Green's Theorem and its applications.	9	
13-14	**Applications of Integral** Geometric meaning of divergence and flux of vector fields Surface Integrals, Divergence Theorem, Stokes' Theorem and Review	10	
TBA	**Final Examination**		

TBA: To be arranged by the Registry

Course Instructor(s):	Dr. I. T. Leong