

University of Macau
Undergraduate Civil Engineering, Electrical and Electronic Engineering, Electromechanical
Engineering, Software Engineering Programs

Coordinating Unit:	Department of Mathematics, Faculty of Science and Technology		
Supporting Unit(s):	Nil		
Course Code:	MATH102	Year of Study:	1
Course Title:	Mathematical Analysis II		
Compulsory/Elective:	Compulsory		
Course Prerequisites:	MATH101 Mathematical Analysis I		
Prerequisite Knowledge:	Nil		
Duration:	One semester	Credit Units:	5
Class/Laboratory Schedule:	Four hours of lecture and two hours of tutorial per week.		
Laboratory/Software Usage:	Nil		
Course Description:	This course is a continuation of the course Mathematical Analysis I. The two course together aim at providing students with a solid foundation of one variable calculus. Topics include methods of integration, sequence and series, vectors and curves in space, and an introduction to partial derivative.		
Course Objectives:	<ol style="list-style-type: none"> 1. To introduce more methods of integration, and parametric curves 2. To introduce sequence and series 3. To introduce vectors and curves in space 4. To introduce partial derivatives 		
Learning Outcomes (LOs):	<p>Upon completion of this course, students are expected to:</p> <ol style="list-style-type: none"> 1. be able to find integrals using various methods 2. be able to do computations with parametric curves 3. understand and be able to deal with infinite series 4. to be familiar with vectors and curves in space 5. understand and be able to find partial derivatives 		
Texts & References: <i>(* recommended textbook(s))</i>	<ol style="list-style-type: none"> 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:	<ul style="list-style-type: none"> • Assignments: 15% • Midterm examination: 25% • Final examination: 60% 		
Learning Outcome Assessment:	<ul style="list-style-type: none"> • Assignments, midterm and final examination 		

Pedagogical Methods:	<input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Guest speakers <input type="checkbox"/> Case study <input type="checkbox"/> Role playing <input type="checkbox"/> Student presentation <input type="checkbox"/> Project <input type="checkbox"/> Simulation game <input checked="" type="checkbox"/> Exercises and problems	<input type="checkbox"/> Service learning <input type="checkbox"/> Internship <input type="checkbox"/> Field study <input type="checkbox"/> Company visits <input type="checkbox"/> e-learning <input type="checkbox"/> Independent study <input type="checkbox"/> Others: _____
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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 (15%)							✓							
Quizzes (0%)														
Midterm Exam (25%)												✓		
Final Exam (60%)												✓		
Others (please specify)														
Course Web: (if any)	http://www.sftw.umac.mo/~fstcmc/math102.html													

Course Content: (topic outline)	Week no.	Topics	Assignment no.	LO no.
	1,2,3	Techniques of integration Substitution, integration by parts, trigonometric integrals, partial fractions, trigonometric substitution, improper integral	1,2,3	1
	4	Polar coordinate and parametric curves Area computation in polar coordinates, parametric curves, integral computations with parametric curves	4	2
	5	Infinite sequence Convergence of sequence, operation of limit of sequences	5	3
	6-8	Infinite series Infinite series and convergence, Taylor series and Taylor polynomials, integral test, comparison test, alternating series and absolute convergence, power series	6,7,8	3
	9	Midterm examination		
	10-12	Vectors, curves and surface in space Vectors in plane and space, cross product, lines and planes, curves and motion in space, curvature and acceleration, cylinder and quadric surfaces, cylindrical and spherical coordinates	9,10	4
	13, 14	Partial derivative Functions of several variables, limit and continuity, partial derivatives.		5
	TBA	Final Examination		

TBA: To be arranged by the Registry

Contribution to Program Outcomes:	Program Outcomes	Contribution to POs [#]				
		5 -----> 1				
		5 Significant	4	3	2	1 Least
	(a) apply knowledge of mathematics, science, and engineering	✓				
	(b) design and conduct experiments, and analyze data					
	(c) design components, systems or processes in presence of constraints					
	(d) Function in a multi-disciplinary team					
	(e) Engineering problem solving					
	(f) Understand professional and ethical responsibility					
	(g) Communicate effectively					
	(h) Understand the impact of engineering solutions to the society					
	(i) Recognize the need and have the ability for lifelong learning					
	(j) Have knowledge of contemporary issues					
	(k) Apply the skills, techniques, modern engineering tools					
	(l) Use the computer/IT tools relevant to the discipline					
	# Note 5: Significant contribution; 4: Supporting contribution; 3: Moderate contribution; 2: Marginal support; 1: Least support					
Course Instructor(s):	Dr. C. M. Cheng					