University of Macau
Undergraduate Computer and Information Science Program

Coordinating Unit:	Department of Mathematics, Faculty of Science and Technology		
Supporting Unit(s):	Nil		
Course Code:	MATB120	Year of Study:	1
Course Title:	Calculus II		
Compulsory/Elective:	Compulsory		
Course Prerequisites:	MATB110 Calculus I		
Prerequisite Knowledge:	Nil		
Duration:	One semester	Credit Units:	3
Class/Laboratory Schedule:	Three hours of lecture and one hours of tutorial per week.		
Laboratory/Software Usage:	Nil		
Course Description:	This course is a continuation of the course Calculus I. The topics include methods of integration, parametric curves, sequence and series, vectors and curves in space. The two courses together aim at providing students with a solid foundation of one variable calculus.		
Course Objectives:	1. To introduce more methods of integration, and parametric curves 2. To introduce sequence and series 3. To introduce vectors and curves in space		
Learning Outcomes (LOs):	Upon completion of this course, students are expected to: 1. be able to find integrals using various methods [PO: a] 2. be able to do computations with parametric curves [PO: a] 3. understand and be able to deal with infinite series [PO: a] 4. to be familiar with vectors and curves in space [PO: a]		
Texts & References: (* recommended textbook(s))	1. *Calculus, Early Transcendentals Version, 7th 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: 15% • Quizzes: 10% • Midterm examination: 25% • Final examination: 50%		
Learning Outcome Assessment:	• Assignments, quizzes, 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 (15%)							✓							
Quizzes (10%)												✓		
Midterm Exam (25%)												✓		
Final Exam (50%)												✓		
Others (please specify)														
Course Web: (if any)														

	Week no.	Topics	Assignment no.	LO no.
Course Content: (topic outline)	1-3	**Techniques of integration** Substitution, integration by parts, trigonometric integrals, partial fractions, trigonometric substitution, improper integral	1 - 3	1
	4, 5	**Polar coordinate and parametric curves** Area computation in polar coordinates, parametric curves, integral computations with parametric curves	4, 5	2
	6	**Infinite sequence** Convergence of sequence, operation of limit of sequences	6	3
	7	**Midterm examination**		
	8-11	**Infinite series** Infinite series and convergence, Taylor series and Taylor polynomials, integral test, comparison test, alternating series and absolute convergence, power series	7-10	3
	12-14	**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	11 - 13	4
	TBA	**Final Examination**		

TBA: To be arranged by the Registry

	Program Outcomes	Contribution to POs[#] 5 -------------> 1 Significant Least				
		5	4	3	2	1
Contribution to Program Outcomes:	(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, Ms. L. Chen