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:	MATH103	Year of Study:	1
Course Title:	Linear Algebra		
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:	Systems of linear equations and matrices., Determinants, Vectors in 2-space and 3-space, Euclidean vector spaces, General vector spaces, Inner product spaces, Eigenvalues and eigenvectors, Linear transformations.		
Course Objectives:	1. Understand the fundamental theories of linear algebra. 2. Be able to formulate problems using matrix algebra and linear transformations. 3. Possess problem-solving skills using matrix techniques and Gaussian elimination.		
Learning Outcomes (LOs):	Upon completion of this course, students are expected to: 1. Understand and be able to solve system of linear equations 2. Understand and be able to operate matrix algebra 3. Understand and able to use n Euclidian spaces and related equalities and inequalities 4. Understand and be able to use linear transformations, eigenvalues and eigenvectors. 5. Understand basic of determinants.		
Texts & References: *(* recommended textbook(s))*	1. Elementary Linear Algebra, H. Anton, Wiley; 8 edition (January 6, 2000)		
Student Assessment:	• Homework 10% • In – class Quizzes 10% • Mid-term 20% • Final Exam 60%		
Learning Outcome Assessment:	• Assignments, Quizzes, midterm and final examination		

	Lecture	Service learning
	☑ Lecture	☐ Service learning
	☐ Guest speakers	☐ Internship
	☐ Case study	☐ Field study
Pedagogical Methods:	☐ 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%)							✓							
Quizzes (10%)												✓		
Midterm Exam (20%)												✓		
Final Exam (60%)												✓		
Others (please specify)														
Course Web: (if any)														

	Week no.	Topics	Assignment no.	LO no.
	1	**A brief review of system of linear equations.**	--	1
	2	**Solve linear equations by gauss elimination**	1	1
	3	**Solve linear equations by gauss Jordan elimination**	2	1
	4,5,6	**Operations on matrix and test**	3,4	2
	7,8	**Transpose and inverse of matrix**	5,6	2
	9	**Midterm examination**		
	10	**Symmetric, diagonal and elementary matrix**	7	2
Course Content: (topic outline)	11,12	**Euclidian spaces and related equalities and inequalities, linear transformations**	8,9	3,4
	13, 14	**Basic of determinants.**		5
	TBA	**Final Examination**		

TBA: To be arranged by the Registry

Program Outcomes	Contribution to POs[#]				
	5 Significant --------------> 1 Least				
	5	4	3	2	1
(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

Contribution to Program Outcomes: (row label in left margin)

Course Instructor(s):	Sik-Chung Tam