

University of Macau
Faculty of Science and Technology
Department of Electrical and Computer Engineering

Course Code:	ECEB253	Year of Study:	2
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:	<ol style="list-style-type: none"> 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):	<p>Upon completion of this course, students are expected to:</p> <ol style="list-style-type: none"> 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))	<ol style="list-style-type: none"> 1. Elementary Linear Algebra, H. Anton, Wiley; 8 edition (January 6, 2000) 		
Student Assessment:	<ul style="list-style-type: none"> • Homework 10% • In – class Quizzes 10% • Mid-term 20% • Final Exam 60% 		
Learning Outcome Assessment:	<ul style="list-style-type: none"> • Assignments, Quizzes, 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 (10%)							✓							
Quizzes (10%)												✓		
Midterm Exam (20%)												✓		
Final Exam (60%)												✓		
Others (please specify)														
Course Web: (if any)														

Course Content: (topic outline)	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
	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	4	3	2	1 Least
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):	Sik-Chung Tam					