Course Code		
Course Title	NREC3100 - Mathematics for Economics and Business	
Credits	3 CH , 12 CP, 6 ECTS	
Pre-requisite	CAMS2003	
Co-requisite		
Equivalent	NREC 4101	
Course Category	☐ University Requirement	☐ University Elective
	☐ College Requirement	☐ College Elective
	☒ Department Requirement	☐ Department Elective
	☐ Specialization Requirement	☐ Specialization Elective
	☐ Other (specify):	
Course Owner	College: CAMS	Department:NRE
Course Type	☐ Lecture	☒ Lecture/Lab
	☐ Lecture/Seminar	☐ Lecture/Studio
	☐ Lecture/Tutorial	☐ Lecture/Lab/Seminar
	☐ Tutorial	☐ Lab or Practical
	☐ Field Work	☐ Field Placement
	☐ Studio	☐ Seminar
	☐ Internship	☐ Workshop
	☐ English Language Skill	☐ Project
Language of	English	

Course Description
This course will introduce mathematical concepts and their applications on economics and business. Materials in this course will emphasize on three topics, i.e. matrices and calculus. In contemporary world, calculus and matrix are widely used to almost all branches of sciences, including business and economics. Therefore, this course is designated to provide strong mathematical foundations. This course also aims to give the students practical skills by providing tutorial classes and computer lab sessions to solve mathematical problems and demonstrates how to express basic economic theory in mathematical form.

Teaching/Learning Strategies
The course is taught using a combination of lectures and EXCEL tutorials as well as individual assignments. The goal of the course is to teach students topics in mathematics for Economics to help students familiarize real life applications that illustrate the use of mathematical concepts in economics as well as in decision making process. Therefore, During the course, students are encouraged to computer usage via EXCEL computational platforms.

Evaluation Methods
Students will be assessed against the learning outcomes by a series of assignments, a mid-term examination during the semester and an examination at the end of the semester. Academic performance will be assessed in accordance with SQU Courses and Awards Rules. The final grades for students will be assigned on the basis of the weighted aggregate of marks obtained for each of the summative assessment items in this course. Assessment summary

Assessment item*	Type	Weighting	Due Date
Assignment I		5%	
Assignment II		5%	
Quiz I		5%	Not Announced
Mid-term	Exam	15%	Specify Date
Quiz II		5%	Not Announced
PC-Labwork	Exam	15%	Specify Date
Final Exam		50%	TBA

* Contents of each test/assignment and examination will be discussed in the class. Marking criteria will be attached to assignment (if applicable).

Required Course Core Material
The lecture notes, selected chapters from the following texts and additional readings (will be supplied if necessary) from other relevant sources will be sufficient for student study purposes and preparation. Where appropriate lecture notes will be set in the e-learning module at the beginning of each lecture.

Matching Course Objectives with Program Outcomes and SQU Graduate Attributes
SQU Graduate Attributes

SQU graduates should be able to: apply the knowledge and skills relevant to the specialization communicate effectively and use information and communication technologies critically analyze complex information and present it in simple legible manner	SQU graduates possess interpersonal communication skills and alignment with culture of international labour market to assist them in practical life and in living successfully skills and motivation for independent learning and engagement in lifelong learning and research work ethics and positive values, and intellectual independence and	SQU graduates should relish good citizenship qualities, conscious of their national identity and socially responsible, engage in community affairs and mindful of contemporary issues.

		autonomy teamwork skills and display potential leadership qualities	

#	Course Learning Objective	Relevant Program Outcome(s)	Applicable Attribute(s)
	1. Express basic economic theory in mathematical form.	Demonstrate in-depth knowledge on theory and analytical methods in natural resource economics and business	4
	2. Apply appropriate mathematical methods and techniques for solving economic problems.	The ability to identify, formulate, analyse and solve economics and business problems	4
	3. Interpret results with economic implications.	Demonstrate knowledge of contemporary issues	2

Student Responsibilities
It is the student's responsibility to know and comply with all University Academic Regulations relevant to participation in this course. These regulations specifically include attendance requirement and students` academic code of conduct.

For attendance, it is the student's responsibility to be punctual and to attend all classes. Students are expected to perform their work with honesty and avoid any academic misconduct, which is defined as the use of any dishonest or deceitful means to gain some academic advantage or benefit. This can take many forms, including but not limited to, the following: copying, plagiarism, collusion and forging documents. For full details please refer to the Undergraduate Academic Regulations and to the Student Academic Misconduct Policy.

Additionally, this course requires that you:

Attendance at all assigned class times is expected. You should take note of all announcements made in class. Should you miss a class for whatever reason try to get the missed information from a classmate. If you review the reading material and still have questions, then approach me during office hours with your specific concerns

Course Code		Course Title	
Year/Semester		Section	
Day, Time, and Place			

Course Coordinator			
Office Location		Office Hours	
Office Tel. Ext.		Email	

Tentative Schedule

Week	Lecture/Topic	Material to be covered	Assignment/Exam	Weight (%)
1	Introduction to mathematics in economic theory Terminology, concepts, and tools	Chapter 1: Mathematical Preliminaries 1. Formulate and solve problems involving percentages and currency conversion. 2. Evaluate of and transpose formulae. 3. Enter data onto Excel worksheets 4. Enter formulae in Excel to perform arithmetic operations. 5. Plot bar charts, pie charts and line graphs in Excel		
2	The derivative and the rules of differentiation with economic application	Chapter 2: 1. Describe and illustrate graphically the properties of linear functions 2. The concept of a linear equation, illustrate graphically 3. How go about plotting graphs, defining a sensible scale for both the horizontal and vertical axis, calculating a table of points, then plotting the graph. 4. Plot a linear function by calculating, then joining the		

		horizontal and vertical intercepts. This is particularly useful in when plotting demand, supply, cost revenue functions which are only economically meaningful for positive values of the variables. 5. Plotting and describing demand, supply, cost, revenue and profit functions. 6. Plotting and describing budget and cost constraints. Describing the effect of changes in prices and budget limits and illustrating these graphically.		
3	The Simultaneous equations . Introductory applications on break–even, market equilibrium in the goods and labour markets; consumer and producer surplus , the effect of tax, subsidies, price controls, consumer and producer surplus.	CHAPTER 3: SIMULTANEOUS EQUATIONS 1. Solving simultaneous linear equations. 2. Equilibrium and break-even. 3. Consumer and producer surplus.		
4	The Simultaneous equations . Introductory applications on break–even, market equilibrium in the goods and labour markets; consumer and producer surplus , the effect of tax, subsidies, price controls, consumer and producer surplus.	CHAPTER 3: SIMULTANEOUS EQUATIONS 1. Solving simultaneous linear equations 2. Equilibrium and break-even 3. Consumer and producer surplus. 4. The National Income Model and the IS-LM Model. 5. Measurement and Interpretation of Elasticities	Quiz I	5
5	The derivative and the rules of differentiation with economic application Differentiation and its applications i) marginal functions,	CHAPTER 4: The derivative and the rules of differentiation Chapter 5:		

8	(ii) optimization, (iii) curvature.	1. Introductory level a. Differentiation of polynomials b. Determine maximum/minimum points 2. Further mathematics a. Determine points of inflexion b. Differentiation of exponential and logarithm functions c. The chain rule d. Product and quotient rules		
6	One-variable calculus with economic application.	Chapter 6: 1. Slope of a curve and differentiation 2. Applications of differentiation, marginal functions, average functions 3. Optimization for functions of one variable 4. Economic applications of maximum and minimum points 5. Curvature and other applications 6. Further differentiation and applications 7. Elasticity and the derivative		
7	One-variable calculus with economic application.	Chapter 6: 1. Slope of a curve and differentiation 2. Applications of differentiation, marginal functions, average functions 3. Optimization for functions of one variable 4. Economic applications of maximum and minimum points 5. Curvature and other applications 6. Further differentiation and applications 7. Elasticity and the derivative		
8	Economic Applications of	Chapter 6:	Midterm	15

	Maximum and Minimum Points	1. Sketch curves Find the value of output at which TR is at a maximum 2. Find the value of output at which profit (π) is at a maximum 3. Understand the use of the rule: MC = MR in profit optimization 4. Show the profit-maximizing point of a price-discriminating firm 5. Show the profit-maximizing points for a perfectly competitive firm and a monopoly in the goods market.	Exam	
9	Review of logarithms and exponents with economic application	Chapter 6 1. Review indices 2. Relationship between indices and logs 3. Logs: The log of a number…. 4. Rules for Logs		
10	Partial Differentiation	Chapter 7: 1. What is partial differentiation 2. How to get first order partial derivatives 3. How to get second order partial derivatives		
11	System of linear equations & matrix algebra with economic application	Chapter8: 1. Linear programming for two variables. 2. Definition of a matrix: simple arithmetic matrix operations, including the inverse matrix 3. Definition of a determinant. 4. Evaluation of 2x2 and 3x3 determinants 5. Cramer's rule 6. Elimination methods: Gaussian and Gauss-Jordan		
12	System of linear equations & matrix algebra with economic application	Chapter 9:	Quiz II	5

		1. Linear programming 2. Matrices 3. Solution of equations: elimination methods 4. Determinants 5. The inverse matrix and input/output analysis		
13	System of linear equations & matrix algebra with economic application	Chapter 9: 1. Linear programming 2. Matrices 3. Solution of equations: elimination methods 4. Determinants 5. The inverse matrix and input/output analysis		
14	System of linear equations & matrix algebra with economic application	1. Linear programming 2. Matrices 3. Solution of equations: elimination methods 4. Determinants 5. The inverse matrix and input/output analysis	LabExam	15
15	Revision			

appendix A: Instructors of multiple sections

Section	Instructor	Day, Time, and Location	Office Location and Extension	Email	Office Hours

appendix B: ADDITIONAL INFORMATION