FORMAN CHRISTIAN COLLEGE
(A CHARTERED UNIVERSITY)

Course Name: Mathematics for Economists		
Course Code: ECON 103	**Course Type (major):** Core	**Course Credits:** 3
Class Timings: TR 11:00pm – 12:15pm	**Section:** A	**Student Meeting Hours/ Office Hours:** Mon, Wed 1:00pm – 2:00pm, Thurs 12:15pm – 1:15pm
Instructor Name: Dr Humna Ahsan		
A Note from the Instructor: This is a 100 level course in economics. Lectures will be conducted in class as scheduled i.e. TR 11:00pm – 12:15pm. Classes will be conducted in person and on campus. All course material will be uploaded on Moodle.		
Instructor Contact Details Email: humnaahsan@fccollege.edu.pk Room No: E-206 Guidelines for contacting instructor: To get in touch, you can email me at humnaahsan@fccollege.edu.pk		
Course Description: This course is designed for students who intend to pursue a major in Economics. It will provide students with the basic tools of mathematical economics and their applications to economic analysis required to prepare students for higher level courses in economics. The objective of this course is to provide the basic foundations of the nature of mathematical economics, real number system, set theory and economics, comparative static analysis, linear models and matrix algebra, tools of algebra and calculus, application of calculus in economics, optimization of one and multivariable functions, optimization with constraints, and economic application of optimization. Students are encouraged to take MATH 102 and MATH 201 before taking this course to ensure better understanding of the concepts taught in class.		
Course Objectives This course aims to: ➢ Demonstrate understanding of basic mathematical concepts and methods used by economists ➢ Boost the student's ability to understand economic reasoning using basic mathematical tools and improve their problem solving skills ➢ Provide students with the basic foundations of mathematical techniques required for understanding economic concepts in Microeconomic II (ECON 201) and Macroeconomics II (ECON 202)		

LEARNING OUTCOME	PROGRAM LEARNING OBJECTIVES	ASSESSMENT CRITERIA
1. Differentiate between linear and non-linear functions, and solve models using these functions under Partial Market and General Market Equilibrium	Objective 1 Objective 2	Assignment Quiz Midterm Exam
2. Use the basic principles of calculus to differentiate functions and locate local/global maximum and minimum values	Objective 1 Objective 2	Assignment Quiz Midterm Exam

3. Understand the concept of derivatives and learn the rules of differentiation, partial derivatives, derivative of explicit and implicit functions	Objective 1 Objective 2	Assignment Quiz Midterm Exam
4. Understand the concept and difference between slope and elasticity and their economic interpretation	Objective 1 Objective 2	Assignment Quiz Midterm Exam
5. Use first order and second order conditions to understand optimization problems of one and multivariable functions for utility maximization, profit maximization and cost minimization	Objective 1 Objective 2 Objective3	Assignment Quiz Midterm Exam Final Exam
6. Solve optimization problems for one multivariable functions using Lagrange Multiplier method and check for optimization conditions using bordered hessian	Objective 1 Objective 2 Objective 3	Assignment Quiz Midterm Exam Final Exam
7. Solve the linear equation system using matrix approach	Objective 1 Objective 2 Objective 3	Assignment Final Exam

Course Content, Learning Material & Activities Schedule

The schedule is tentative because it is not possible to anticipate exactly how much time each topic will require. Pl check out the online resources and alternate options for instructional tasks as linked below.

Wk	Topic/ Title	Assessment Criteria
1	Why should we study mathematical economics? Ingredients of mathematical models: variables, constant, parameters and their economic interpretation, equations and its types, and their economic application basic graphs, relations and functions, types of functions	Assignment Quiz Midterm
2	Equilibrium Analysis in Economics: the meaning of equilibrium, Partial Market Equilibrium – A Linear and Non-linear market models	Assignment Quiz Midterm
3	General Market equilibrium – Two Commodity Market Model, Equilibrium in National – Income Analysis	Assignment Quiz Midterm
4	Nature of Comparative Statics, Rate of Change and Derivative, Derivative and Slope of a Curve, Concept of limit. Rules of differentiation involving one, two or more Functions of the same variable and it's economic application, Rules of differentiation involving one, two or more Functions of the same variable and it's economic application	Assignment Quiz Midterm
5	Partial differentiation, Applications to comparative statistic analysis: Market model and national income model, Jacobian determinants and its application	Assignment Quiz Midterm
6	Exponential and logarithmic functions: derivative of exponential and logarithmic functions	Assignment Quiz Midterm

7	Optimization with one variable: Optimum Values and Extreme Values, Relative Maximum and Minimum: First Derivative Test, Second and higher derivatives, Second Derivative Test	Assignment Quiz Final Exam
8	Optimization with one variable: Profit maximisation, Cost minimisation and utility maximisation	Assignment Quiz Final Exam
9	Optimization with more than one variable: conditions for optimization and its application: Profit maximisation, Cost minimisation and utility maximisation	Assignment Quiz Final Exam
10	Optimization with equality constraints: Effects of a constraint, finding the stationary values, Lagrange Multiplier Method)	Assignment Quiz Final Exam
11	Linear Models and Matrix Algebra: Matrices and vectors, Identity matrices and null matrices , Transpose and Inverses, Conditions for non-singularity, determinant of a 2x2 and 3x3 matrix and basic properties of determinants	Assignment Quiz Final Exam
12	Optimization with Bordered Hessian, Application: Profit maximisation, Cost minimisation and utility maximisation	Assignment Quiz Final Exam
13	Optimization with Bordered Hessian, Application: Profit maximisation, Cost minimisation and utility maximisation	Assignment Quiz Final Exam
Revision		

'Out-of-class' Study Required

The students are expected to regularly solve the practice questions given during class. It is a blended mode of instruction so preparing for classes and going over your previous class notes is recommended. You will be given assignments which are an essential part of the course in addition to in-class activities (i.e. quizzes, worksheets and practice problems). The assignments will be marked so you have to submit your work on the prescribed dates. We will discuss the answers in class and you will be expected to participate in the discussion. Since the problems on the exams will be similar in character to the assigned problems, your serious effort on the problem sets/assignments is a necessary condition for good performance on the exams

Textbooks

Chiang, Alpha, C. and K. Wainwright, Fundamental Methods of Mathematical Economics, 4th Edition, 2004. McGraw Hill/Irwin.

Course Requirements:

The breakup is as follows:

Assignments:	20%
Quizzes:	15%
Midterm exam:	30%
Final term exam:	35%
TOTAL	**100%**

Grading Legend

Below is the grading legend of FCCU (published in all catalogues and available on the FCCU website) as approved by the Academic Council and applies for Fall as well

Grade	Point Value	Numerical Value	Meaning
A	4.00	93-100	Superior
A-	3.70	90-92	
B+	3.30	87-89	Good
B	3.00	83-86	
B-	2.70	80-82	
C+	2.30	77-79	Satisfactory
C	2.00	73-76	
C-	1.70	70-72	
D+	1.30	67-69	Passing
D	1.00	60-66	
F	0.00	59 or below	Failing

Student Conduct & Other Issues:

- Students are not allowed to use mobile phones inside the classrooms at any time and should be switched off before entering the class room.
- Students will not be allowed to enter the class after 10 minutes of class time.
- Students are expected to attend classes regularly. Incase of an absence, the students are responsible for covering the syllabus or any announcement made and material provided.
- Minimum 80% of class attendance is required to sit for the final examination.
- This class is available 24/7 but the instructor is not. I will respond to an email Monday through Friday (until 3 pm) unless it is a holiday or extenuating circumstances intervene. During the workweek, you can expect a response within 24 hours, and I expect the same courtesy from my students.
- The course includes regular assignment and homework problems from the text or other sources. The problem sets/assignments must be submitted on the due date, and no late submissions will be entertained. There will be no makeup quiz or examinations, therefore, don't miss any exam or quiz
- Students can learn more from each other; therefore, you are encouraged to work together on problem sets/assignments outside the class as long as problem sets/assignments do not look like identical copies
- Plagiarism and cheating are considered to be a most serious breach of academic integrity (see your students manual for detail). Any student found responsible for dishonest practice (for example, copying, use of unauthorized material in exam, etc.) in relation to any piece of work submitted for assessment shall be subject to the FCC's dishonest practice regulations which may result in various penalties, including forfeiture of marks for the piece of work submitted, an F grade for the paper, or in extreme cases exclusion from the University

Changes to the Syllabus:

This syllabus was designed to convey course information and requirements as accurately as possible. It is important to note however that it **may** be subject to change during the course depending on the needs of the class and other situational factors. Such changes would be for your benefit and you will be notified of them as soon as possible.

Student Support Services

- Student Counseling Services
- Writing Center
- Mercy Health Center

Other Useful Policy Documents:

- Sexual Harassment Policy
- Anti-Corruption Policy
- Academic integrity
- Plagiarism Policy
- Academic Calendar

I expect that you will strictly follow the core values of FCCU and put your entire efforts to learn as per the course requirements, attend classes, read the textbook(s)/other assigned reading material and do the assignments in the stipulated time period