



Kuwait University
College of Business Administration
Economics Department



Course Syllabus
ECON 230 – Mathematics for Economists¹
(ECON 205 – Mathematics for Economists)²
Fall 2023
Prof. Dr. Talat S. Genc

Lecture Time and Location

Thu, 5:00 PM – 7:50 PM, Room 03, C3, 1007

Contact Information

Location: Economics Department – 3rd Floor – Zone A – Office No. 1068

Email: talat.genc@ku.edu.kw

Office Hours: Sun 11:00 AM – 1:00 PM, Th 4:00 PM-4:45 PM, or by appointment

Teaching Assistant

Name: Dina Behbahani

Location: Economics Department – 3rd Floor – Zone A – Office No ?

Email: ?@ku.edu.kw

Office Hours: ?

Tutorial: Tu 4:00 PM – 4:50 PM, Room ?

Course Description

The course applies mathematical concepts to economic applications. It covers the basic mathematical tools required for the study of economic intermediate theory courses, econometrics, and upper-division electives in economics. Topics include economic applications of functions, derivatives and integrals, optimization with two or more independent variables, constrained optimization, matrix algebra, and difference and differential equations.

¹ For students admitted starting from the 2021/2022 academic year

² For students admitted before the 2021/2022 academic year

Prerequisites

For students admitted starting from the 2021/2022 academic year:

ECON 140 (Principles of Macroeconomics) & ISOM 110 (Business Math)

For students admitted before the 2021/2022 academic year:

ECON 111 (Principles of Macroeconomics)

Taking ISOM 110 (Business Math) before this course is highly recommended

Corequisites

No corequisites

Course Learning Objectives (CLOs)

Upon successful completion of the course, students will be able to:

CLO1. Model economic questions as mathematical problems.

CLO2. Apply their prior knowledge of calculus and matrix algebra to economic applications.

CLO3. Mathematically express economic concepts and successfully interpret relevant variables and parameters in economic models.

CLO4. Acquire foundations of major techniques used to solve constrained optimization problems in economics.

CLO5. Acquire foundations of major difference and differential equations techniques used in economic theory.

CLO Mapping to CBA Skill Based Competency Goals³

CLO	Competency Goal			
	Analytical	Communication	Information Technology	Business Ethics
1	I			
2	A			
3	R			
4	I			
5	I			

Type of Emphases:

- **(I)ntroduce:** Students will be introduced to the skill and their grasp of it assessed in the course.
- **(A)pply:** The course will not cover the skill. Students should have a high-level grasp of the skill and are required to apply it in the course.
- **(R)einforce:** Students should have an introductory-level grasp of the skill and the course will improve their mastery to a higher level.

Required Material

Textbook: Vassilis C. Mavron, and Timothy N Philips, *Elements of Mathematics for Economics and Finance*, Springer, 2007.

³ CBA Competency Goals can be found at the end of this document

There is a downloadable free-access electronic version of this textbook on the KU’s library website. Follow the steps below:

1. Visit the KU’s library website: <http://kuniv.vdiscovery.org>
2. Login using your KU ID and password
3. Click on the “eBooks” tab
4. Search for the book using the title above or using the following ISBN number : 978-1-84628-561-5
5. Download the textbook as a PDF file

Additional Material: Lecture slides are available on MS Teams.

E-Learning System: MS Teams

Course Website:

Tutorial

Attending tutorials is optional.

Course Requirements and Policies

- **In-Class Tests:** If the university allows on-campus examinations, you will come to campus to write it. Otherwise, it will be an online real-time exam.
- **Assignments:** There will be several assignments. Late submissions are not accepted. If you do not submit your work on time, expect zero.
- **Participation:** The quality of our classroom discussions in large part depends on you and your preparation for class. Participation should include, among other things, (1) presenting case facts, (2) defining the problem, (3) exploring different alternatives, (4) persuasive, thoughtful, integrated analysis supported by the data given in the case.
- **Class Preparation** It is very important that students are prepared for each class period. Students are expected to read the assigned materials before class.
- **Attendance and Participation:** Every student in this course must abide by the Kuwait University Policy on Attendance (published in the Student Guide, Chapter 3, Section 13). A copy of the student guide can be accessed online on:
http://www.ku.edu.kw/cs/groups/ku/documents/ku_content/kuw055940.pdf
- **Cheating and Plagiarism:** Every student in this course must abide by the Kuwait University Policy on Cheating and Plagiarism (published in the Student Guide, Chapter 3, Section 2). A copy of the student guide can be accessed online on:
http://www.ku.edu.kw/cs/groups/ku/documents/ku_content/kuw055940.pdf
Please carefully note all sources and assistance when you turn in your work. Under no circumstances should you take credit for work that is not yours. You should neither receive nor give any unauthorized assistance on any deliverable. If you have any questions about what constitutes “unauthorized assistance” please email me before the deliverable is submitted.
- **Writing Style:** Students must refer to APA writing style for their assignments and report writing. Refer to the English Language Center for help.

Grading

The scores in this course will be the weighted average of the following items:

Weight	Description
10%	Participation
20%	Assignment

30%	Midterm exam
40%	Final exam
100%	TOTAL

Grade Distribution

Grade	Range
A	≥ 95
A-	≥ 90 and < 95
B+	≥ 87 and < 90
B	≥ 83 and < 87
B-	≥ 80 and < 83
C+	≥ 77 and < 80
C	≥ 73 and < 77
C-	≥ 70 and < 73
D+	≥ 65 and < 70
D	≥ 60 and < 65
F	< 60

Course Outline

Title	Topics and Readings on Textbook	Week (Tentative)
I. Introduction		
Introduction and Motivation	<ul style="list-style-type: none"> Why mathematics is important What are models Types of Models Examples 	1
II. Economic Applications of Linear and Nonlinear Functions		
Linear Functions	<ul style="list-style-type: none"> Review of solving and graphing linear equations (Sections 2.2 and 2.4) and solving simultaneous equations (Section 2.3). 2.6 Applications of demand and supply models 	1–2
Nonlinear Functions	<ul style="list-style-type: none"> Review of solving quadratic equations (Section 3.3) 3.4 Quadratic demand and supply models 4.4 Cost functions Review of exponential and logarithmic functions (Sections 5.1–5.3) 5.4 Applications to linearization of production function 	3
III. Economic Applications of Differentiation and Optimization		
Single Variable Differentiation	<ul style="list-style-type: none"> 4.2 Basics of limits Review of differentiation and differentiation rules (Sections 6.1–6.3) 6.4 Applications of marginal functions: concept of marginals, marginal revenue, marginal cost, marginal propensities 6.7 Applications of marginal functions: marginal products 	4–5
Single Variable Optimization	<ul style="list-style-type: none"> Review of local and global extremum, functions concavity, and second order derivative tests (Sections 7.1–7.5) 7.6 Applications of production functions 7.7 Applications of perfect competition and monopoly 7.8 Applications of government taxation 	6

Partial Differentiation	<ul style="list-style-type: none"> Review of partial differentiation, differentials, and total derivatives, and chain rules (Sections 8.1–8.6) <p>8.7.2 Elasticity and cross-elasticities</p> <p>Extra Notes: Estimating Arc and point elasticities (Provided by the instructor and are based on Chapter 9: Elasticity of <i>“Maths for Economics”</i> Geoff Renshaw, Oxford University Press)</p> <p>8.7.4 Marginal products of labor and capital (Covering MRTS is optional based on the instructor’s preference)</p>	7
Unconstrained multivariable optimization	<ul style="list-style-type: none"> Review of multivariate optimization (Sections 9.1–9.2) <p>9.2 Application of cost minimization</p>	8
Constrained multivariable optimization	9.3.2–9.3.3 Lagrange multiplier and its interpretation	8
IV. Economic Applications of Integration		
Integration	<ul style="list-style-type: none"> Review of definite and indefinite integrals and integration rules (Sections 11.1–11.4) <p>11.5 Producer’s surplus 11.6 Consumer’s surplus 11.6 Finding total cost function from marginal cost function 11.6 Finding total revenue function from marginal revenue function</p>	9
V. Matrix Algebra		
Matrix Algebra	<p>10.1 Fundamentals 10.2 Matrix operations 10.3 Systems of equations (Application: Finding equilibrium price and quantity using matrix algebra) 10.5 Determinants and the adjoint Method</p>	10–11
VI. Difference and Differential Equations		
Difference Equations	<p>12.1–12.2 Introduction to difference equations 12.3 Solution of first order linear difference equations 12.4 Stability of first order linear difference equations</p>	12
Differential Equations	<p>13.1 Introduction to differential equations 13.2 First order linear differential equations 13.3 First order nonlinear differential equations</p>	13

Important Dates

Date	Event
TBD	Last day to drop a course
TBD	Submit assignment
TBD	Midterm Exam
TBD	Final Exam

CBA Competency Goals

1. Analytical Competency: A CBA graduate will be able to use analytical skills to solve business problems and make a well-supported business decision.

Student Learning Objectives:

- 1.1. Use appropriate analytical techniques to solve a given business problem.
- 1.2. Critically evaluate multiple solutions to a business problem.
- 1.3. Make well-supported business decisions.

2. Communication Competency: A CBA graduate will be able to communicate effectively in a wide variety of business settings.

Student Learning Objectives:

- 2.1. Deliver clear, concise, and audience-centered presentations.
- 2.2. Write clear, concise, and audience-centered business documents.

3. Information Technology Competency: A CBA graduate will be able to utilize Information Technology for the completion of business tasks.

Student Learning Objectives:

- 3.1. Use data-processing tools to analyze or solve business problems.

4. Ethical Competency: A CBA graduate will be able to recognize ethical issues present in business environment, analyze the tradeoffs between different ethical perspectives, and make a well-supported ethical decision.

Student Learning Objectives:

- 4.1. Identify the ethical dimensions of a business decision.
- 4.2. Recognize and analyze the tradeoffs created by application of competing ethical perspectives.
- 4.3. Formulate and defend a well-supported recommendation for the resolution of an ethical issue.

5. General Business Knowledge: A CBA graduate will be able to demonstrate a basic understanding of the main business disciplines' concepts and theories.

Student Learning Objectives:

- 5.1. Acquire a fundamental understanding of knowledge from the main business disciplines (e.g. finance, accounting, marketing, and management information systems, among others).