City University of Hong Kong
Course Syllabus

offered by Department of Economics and Finance
with effect from Semester B 2018/19

Part I Course Overview

Course Title:	**Mathematics for Economics & Finance**
Course Code:	**EF2452**
Course Duration:	**1 Semester**
Credit Units:	**3**
Level:	**B2**
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☐ Science and Technology
Medium of Instruction:	**English**
Medium of Assessment:	**English**
Prerequisites: *(Course Code and Title)*	**Nil**
Precursors: *(Course Code and Title)*	**Nil**
Equivalent Courses: *(Course Code and Title)*	**Nil**
Exclusive Courses: *(Course Code and Title)*	**Nil**

Part II Course Details

1. Abstract

This course aims to equip students with a set of fundamental mathematical concepts underlying decision-making in economics and finance.

It also aims to develop students' creativity and originality through various assessment tasks and teaching and learning. The lectures encourage students to develop their discovery ability through in-class discussions, which enhance students' understanding of mathematical concepts.

Students are required to apply fundamental mathematical concepts to solve real world problems in designed scenarios. Only an accurate understanding of the underlying economic concepts can direct which mathematical tools can be applied to the situation. A final interpretation of the numerical solution with economic concepts shows the accomplishment of students' ability to discover and innovate.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Demonstrate proficiency over underlying fundamental mathematical tools in economics and finance. Students are encouraged to discover the underlying economic theory in real world cases and designed scenarios.	40%	√	√	
2.	Identify and apply the requisite quantitative techniques towards investigating decision-making in economics and finance. The attitude and ability to discover and innovate are demonstrated in case studies to derive the mathematical solution from the real-life applications.	50%	√	√	√
3.	Analyze economics and financial issues through a more quantitative approach. The mathematical solutions have to be completed by appropriate economic interpretation. Students are to innovate and broaden their understanding of real world economic issues.	10%		√	√
** If weighting is assigned to CILOs, they should add up to 100%.*		100%			

[#] *Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.*

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
Lectures	Students are encouraged to apply mathematical concepts to solve economic problems. It helps reveal students' attitudes to innovate and apply	√	√		3 hours lecture per week
Self-learning exercises	In classes, teachers will guide the students to compare different concepts (e.g. public goods, optimal tax rate) in different economies and practise model setting with computer software (e.g. set up a matrices model with Excel). Students are to analyse and synthesize mathematical concepts with economic concepts and practise their ability to discover and innovate.			√	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.					Weighting*	Remarks
	1	2	3	4	5		
Continuous Assessment: 60%							
Midterm examination The midterm exams will include questions that require students to identify and apply the mathematic tools to solve optimization problems in economics and finance.		√	√			20%	
Assignments and Quizzes The assignments are designed to help students master the mathematical tools and let them better understand the economic intuitions behind mathematical derivation.	√	√				40%	
Examination: 40% (duration: 2 hours, if applicable)							
Final exam Through innovative scenario questions, students are required to discover their ability to apply mathematical skills into economic concepts. The numerical result of the answer will be completed by an interpretation of their result with appropriate economic concepts.		√	√			40%	
** The weightings should add up to 100%.*						100%	

Students are required to pass both coursework and examination components in order to pass the course.

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Midterm examination		Strong evidence of mastering the mathematical tools in economics and finance. Students have demonstrated very strong overall ability to independently formulate an economic problem into a mathematic optimization problem.	Evidence of mastering the mathematical tools in economics and finance. Students have demonstrated strong overall ability to independently formulate an economic problem into a mathematic optimization problem.	Some evidence of knowing the mathematical tools in economics and finance. Students have demonstrated some ability to formulate an economic problem into a mathematic optimization problem.	Marginal familiarity with the mathematical tools in economics and finance. Students have demonstrated marginal ability to solve an optimization problem independently.	Little evidence of knowing the mathematical tools in economics and finance. Students have demonstrated little ability to solve optimization problem independently.

Assessment Task	**Criterion**	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
2. Assignments and Quizzes		Strong evidence of knowing how to apply the mathematical techniques outlined in CILOs. Students have demonstrated very strong overall ability to discover and innovate, and shown very strong evidence of accomplishments in discovery.	Evidence of knowing how to apply the mathematical techniques outlined in CILOs. Students have demonstrated strong overall ability to discover and innovate, and shown very strong evidence of accomplishments in discovery.	Some evidence of knowing how to apply the mathematical techniques outlined in CILOs. Students have demonstrated some ability to discover and innovate, and shown very strong evidence of accomplishments in discovery.	Marginal evidence of knowing how to apply the mathematical techniques outlined in CILOs. Students have demonstrated marginal ability to discover and innovate, and shown very strong evidence of accomplishments in discovery.	Little evidence of knowing how to apply the mathematical techniques outlined in CILOs. Students have demonstrated little ability to discover and innovate, and shown very strong evidence of accomplishments in discovery.

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
3. Examination	Exam questions	Strong evidence of mastering the mathematical tools in economics and finance. Students have demonstrated very strong overall ability to independently formulate an economic problem into a mathematic optimization problem.	Evidence of mastering the mathematical tools in economics and finance. Students have demonstrated strong overall ability to independently formulate an economic problem into a mathematic optimization problem.	Some evidence of knowing the mathematical tools in economics and finance. Students have demonstrated some ability to formulate an economic problem into a mathematic optimization problem.	Marginal familiarity with the mathematical tools in economics and finance. Students have demonstrated marginal ability to solve an optimization problem independently.	Little evidence of knowing the mathematical tools in economics and finance. Students have demonstrated little ability to solve optimization problem independently.

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

Mathematical Concepts:
Linear and Non-Linear Functions
Systems of Equations
Matrix and Linear Algebra
Sequences and Series
Calculus
Univariate Optimization
Optimization in Two Variables
Constrained Optimization

Applications:
Consumption Functions
Production & Costs
Elasticity, Revenues and Profits
Supply and Demand
Discounting and Net Present Value
Pricing of Risky Assets
Input-output model

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	*Mathematics for Economics and Finance* by Martin Anthony and Norman Briggs, Cambridge University Press.

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	*Essential Mathematics for Economic Analysis (2nd ed.)* by Knut Sydsaeter and Peter Hammond, Prentice Hall, 2006.
2.	*Mathematics for Economists* by Carl P. Simon and Lawrence E. Blume, W.W. Norton, 1994.