B.E. International Program

Faculty of Economics, Thammasat University

Course Outline

EE 320 Introductory Mathematical Economics (Section 046401)

Semester 1/2013 (August 13 – November 30, 2013)

Number of credits 3 credits

Lecture time Tuesday & Thursday, 11.00 AM – 12.30 PM

Lecture venue Room 303, 3rd floor, Faculty of Economics
Thammasat University, Tha Prachan campus

Instructor Dr. Thanet Makjamroen
E-mail: thanet@econ.tu.ac.th
Office hours: by appointment

Course description

Study of mathematical concepts and tools such as functions, matrices and higher-order derivatives in cases of single and multiple independent variables. Emphasis is on the application of optimization, both with and without constraints, and introductory integral, for understanding relationships of various economic variables and concepts, such as the relationship of aggregate, average and marginal functions. Other topic covered analyses of elasticities, market equilibrium, impacts of taxation and input-output models.

Prerequisites: *EE 211, EE 212 and MA 216*

Students may take EE421 as a compulsory course in substitution of EE320 (Credit will not be awarded to students who are taking or have taken EE 421).

Course objectives:

1. To equip students with essential mathematical concepts and tools in studying economics
2. To expose students to the application of mathematical concepts in analysing economic problems.

Main Text:

Chiang, A. C. and Wainwright, K. (2005) *Fundamental Methods of Mathematical Economics*, 4th edition, McGraw-Hill, Inc., Singapore. (**CW**)

Other Recommended Books:

Dowling, E. T. (2001) *Schaum's Outline of Theory and Problem of Introduction to Mathematical Economics*, 3rd edition, The McGraw-Hill Companies, Inc.

Holden, K. and Pearson, A.W. (1992) *Introductory Mathematics for Economics and Business* Second edition, The Macmillan Press Ltd.

Sydsaeter, K. and P. Hammond. (2006) *Essential Mathematics for Economic Analysis*, 2nd edition, Prentice Hall.

Course Outline:

Date	Topics	
13 August 2013 (1 lecture)	**1. Introduction** - Importance and needs to use mathematics in economics. - The nature of theory, economic model and mathematics.	CW. Ch. 1
15 August 2013 (1 lecture)	**2. Mathematics and Economic Relations** - Relations and functions - Types of functions	CW. Ch.2
20, 22, 27 August 2013 (3 lectures)	**3. Static and Comparative Static Equilibrium Analysis** - Linear models in economics - Simultaneous system of equations - Linear equation and graph - Breakeven analysis - Individual and market demand - Individual and market supply - Partial market equilibrium - Excise tax and market equilibrium - Elasticity concept - Simple macroeconomic model - IS-LM model	CW. Ch. 3

29 August, 3 and 5 September 2013 (3 lectures)	**4. Linear Model, Basic Matrix Algebra and Applications** - Terminology (Type of matrix) - Matrix operations (Add, Subtract, multiply) - Representation of system of equation by matrix notation - Matrix inversion by determinants - Determinant and singularity of matrix - Cramer's rule - Matrix applications in - Partial market equilibrium - Excise tax and market equilibrium - Simple macroeconomic model - IS-LM model	CW. Ch. 4, 5
10, 12, 17 September 2013 (3 lectures)	**5. Nonlinear Model and Differential Calculus in Economic Theory** - Quadratic theory - Other nonlinear functions - Slope and derivatives of a function - Rule of differentiation - Non differentiable functions - Examples in Economics - Derivative and marginality - Relations among the total, the average and the marginal functions - Elasticity, total revenue and marginal revenue	CW. Ch. 6, 7, 8
19, 24, 26 September 2013 (3 lectures)	**6. Optimization without Constraints : One Independent Variable Case** - Maxima, minima and inflection point - Convexity and concavity - Maximize profits - Competitive market case - Monopoly case - Effects of taxes - Lump-sum tax - Profit tax - Excise tax - Maximization of tax revenue	CW. Ch. 9
1 October 2013	**MIDTERM**	

8, 10, 15, 17, 22 October 2013 (5 lectures)	**6. Derivatives of More-Than-One Independent Variable Function** - First-order partial derivatives - Second-order partial derivatives - Differential - Total differential - Total derivatives - Implicit function and its derivative - Examples in economics - Partial market equilibrium - Multipliers in macro models - Utility function - Production function - Etc.	CW. Ch. 7, 8
24, 29, 31 October, 5 November 2013 (4 lectures)	**8. Optimization without Constraint : More-Than-One Independent Variable Cases** - Conditions for maximum or minimum - Third degree price discrimination - Multiplant-firm - Multiproduct-firm	CW. Ch. 11
7, 12, 14, 19 November 2013 (4 lectures)	**9. Optimization under Equality Constraint** - Lagrange multiplier - Conditions for optimization - Maximize output level subject to cost constraint - Minimize cost subject to output constraint - Minimize utility subject to fixed budget	CW. Ch. 12
21, 26, 28 November 2013 (3 lectures)	**10. Integration and Its Application** - Terminology in Integration - Rules of Integration - Definite Integration - Applications: - Total revenue function from marginal revenue function - Total cost function from marginal cost function - Profit function from MR-MC - Utility function from marginal utility function - Consumption and saving functions from marginal propensity functions - Capital formation and investment functions - Consumer surplus, producer surplus and total surplus - First degree price discrimination - Differential equation (if time allows)	CW. Ch. 14

Note: The class schedule shown above may be adjusted during the semester as needed.

Assessment:

1.	Homework	10 %
2.	Quizzes	10 %
3.	**Midterm Exam (October 1, 2013, 10.30 AM – 12.30 PM)**	**30 %**
4.	**Final Exam (December 6, 2013, 9.00 AM – noon)**	**50 %**

Important Dates

Class Begins	August 13, 2012
Adding and Dropping Course	August 13 – 27, 2013
Midterm Exam Period	September 30 - October 5, 2013 (No Lectures)
Midterm Exam	**October 1, 2013 : 10.30 AM – 12.30 PM**
Course Withdrawal with "W"	October 16 – 21, 2013
Class Ends	November 30, 2013
Final Exam	**December 6, 2013 : 9.00 AM – noon**