# Course Outline

## EE320: INTRODUCTORY MATHEMATICAL ECONOMICS (SECTION 046402)

## Semester 2/2024 (January 20 – May 14, 2025)

**Number of Credit:** 3 credits

**Prerequisite:** a) EE 211, EE 212 and MA 216 (or MA211) or

b) EE 213, EE 214 and MA216 (or MA 211)

**Information about Instructor:**


**Name:** Kittichai Saelee, Asst. Prof.

**Lecture classroom:** Room 201, Econ-TPC bldg.

**Office:** Rm#517 Econ-TPC bldg.

**Office Hours:** By appointments only.

**Email:** kittichai_lee[at]econ.tu.ac.th


| Class Time and Logistic | |
|---|---|
| **Class day**: | Thursday |
| **Class time**: | 09.00 AM – 12.00 PM |
| **LMS:** | Google classroom, by invitation to students' email (@st.econ.tu.ac.th) |
| **Venue**: | Room 201, 2nd floor, Faculty of Economics |

**Course Description:**

Applying mathematical concepts and tools such as functions, equations, matrices, univariate and multivariate differential calculus, constrained and unconstrained optimization and integral to explain concepts of microeconomic and macroeconomic theory and to understand the relationship between different economic variables. An emphasis will be placed on relationships between total, average, and

marginal functions, the analyses of elasticity, market equilibrium, impacts of taxation, and the basic input-output model.

**Course Learning Outcomes:**

**CLO1**: Demonstrate a solid understanding of fundamental mathematical concepts, including functions, equations, matrices, differential calculus, and optimization, and explain their applications in economic theory.

**CLO2**: Apply mathematical techniques such as differential calculus and optimization to analyze and solve economic problems in both microeconomic and macroeconomic contexts.

**CLO3**: Analyze key economic phenomena, including market equilibrium, elasticity, and the effects of taxation, using mathematical models, and interpret their real-world implications.

**CLO4**: Construct and apply mathematical models, including basic micro-market and Keynesian IS-LM models, to predict economic outcomes and assess the impact of various economic policies and scenarios.

**CLO5**: Evaluate the ethical considerations of economic decisions, such as taxation and market interventions, and demonstrate a responsible approach to applying mathematical analysis for the benefit of society.

**Main Text:**

Kittichai Saelee **(**KS: 2025**)** "Lecture on introductory mathematical economics" **(**To be posted on Google classroom**)**

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

## Program Learning Outcomes (Applicable to EE320):

| *Catergories* | *Program Learning Outcome (Applicable)* | *CLOs* | *Teaching Methods* | *Assesment methods* |
|---|---|---|---|---|
| *Knowledge* | K1. Demonstrate the ability to analyze and solve problems using economic theories and tools, and apply this knowledge effectively in practical work. | CLO 1 - CLO5 | Lecture / Workshop | Exans / Quizzes / Group Assignments |
| *Skills* | S1. Select and apply economic principles, tools, and methods appropriately to solve economic and social challenges. | CLO 1 - CLO5 | Lecture / Workshop | Exans / Quizzes / Group Assignments |
| | S3 Use digital tools for data collection, statistical analysis methods, and presentation. | CLO 1 - CLO5 | Lecture / Workshop | Exans / Quizzes / Group Assignments |
| *Ethics* | E1. Uphold academic integrity and respect academic freedom | CLO5 | Lecture / Workshop | Exans / Quizzes / Group Assignments |
| | E3. Recognize the ethical dimensions of economic decision-making and policy design, particularly in relation to social impacts, resource distribution, and sustainability, with a focus on social responsibility. | CLO5 | Lecture / Workshop | Exans / Quizzes / Group Assignments |
| *Character* | C2. Demonstrate a commitment to lifelong learning, creative thinking, openness to diverse perspectives, systematic planning, and continuous self-improvement. | CLO 1 - CLO5 | Lecture / Workshop | Exans / Quizzes / Group Assignments |

**Teaching schedules:**

| Session | Date | | Month | Topics | Details | Note / Activity |
|---|---|---|---|---|---|---|
| **1** | 23 | Thur | Jan | Overview & Equilibrium model I | - Course overview & Logistics information<br>- Mathematical Economics Models: why and what for?<br>- Structure of mathematical economics model<br>- Review concept on mathematical functions<br>- Types of commonly used functions | |
| **2** | 30 | Thur | | Equilibrium model II | - Equilibrium model<br>- Solution method for system of equations<br>- Micro-market equilibrium model: Basic Analysis and Some extensions<br>- Multi-market equilibrium model | *HW1 posted* |
| **3** | 6 | Thur | Feb | Equilibrium model III | - Macroeconomics model<br>- Keynesian cross, IS-LM, AD-AS model<br>- Non-linear model | |
| **4** | 13 | Thur | | Matrix algebra I | - Algebraic operation of matrix<br>- Determinant<br>- Inversion | *HW 2 posted*<br>**HW1 due** |
| **5** | 20 | Thur | | Matrix algebra II | - Matrix method to the solution of system of equations<br>- Economics Applications | Quiz 1 |
| **6** | 27 | Thur | | Calculus I | - Derivative: Methods and interpretation<br>- Characteristics of function by derivatives<br>- Differential and Approximation<br>- Extreme points problem: Conditions and solution methods | **HW2 due** |
| **7** | 6 | Thur | Mar | Calculus II | - Extreme points problem: Conditions and solution methods (contd.)<br>- Economics Applications | Quiz 2 |
| **Midterm Exam / Tuesday, March 11, 2025 \| 12.00-14.00 hrs. (2 hours) - closed book exam; collects 35%** | | | | | | |

| Session | Date | | Month | Topics | Details | Note / Activity |
|---|---|---|---|---|---|---|
| **8** | 20 | Thur | Mar | Multivariate Calculus I | - Methods of multivariate differentiation<br>- Partial derivative / Total differentials / Total derivative / Partial total derivative<br>- Some economics applications | |
| **9** | 27 | Thur | | Multivariate Calculus II | - Implicit function Theorem<br>- Characteristic of function by multivariate differentiation | |
| **10** | 3 | Thur | April | Unconstrained optimization I | - General theory: Conditions and solution methods<br>- Economics Applications | *HW3 posted* |
| **11** | ~~10~~ | ~~Thur~~ | | Unconstrained optimization II | - Economics Applications | Make-up: Wednesday April 9th, 16.30-19.30 |
| **12** | 17 | Thur | | Constrained optimization I | - General theory: Conditions and solution methods<br>- Economics applications | *HW4 posted*<br>**HW3 due** |
| **13** | 24 | Thur | | Constrained optimization II | - Economics applications | Quiz 3 |
| **14** | 1 | Thur | May | Integration I | - Methods & Economics applications | **HW4 due** |
| **15** | 8 | Thur | | Integration II<br>Review session | - Economics application<br>- Review questions | Quiz 4 |
| **Final Exam / Wednesday, Date May 28, 2025 13.30-16.30 hrs. (3 hours); collects 45%** | | | | | | |

**Note:**

- Cancelled session / make-up class
    - April 10th, cancelled. Make-up April 9th between 16.30 – 19.30 (Venue: TBA)
- Instructor reserves the right to adjust teaching schedule as needed.

**Assessments:**

| Types of assessment methods | Weight | Note |
|---|---|---|
| **Quiz** | **12%** | ● 4 Quizzes will be given. **The best THREE will be selected; I will drop the lowest one out.**<br>● All quizzes are pre-scheduled in advance, between 0840 and 0910. (You must arrive at **Room 101** about 30 minutes before the starting time of each regular session.) When time is up, we will have a 10-minute break and then resume our regular class until 12.15.<br>● Check the dates when quizzes will be given from the above table. **No makeup quiz will be given, except under only few circumstances or rare situations.** |
| **Group assignments** | **8%** | ● 4 Group assignments. **All count.**<br>● All group assignments will be informed at least one week in advance.<br>● You must have **at least 3 students** in your group. The number is capped at a **maximum of 5 students**.<br>● Select a member in your team as the group leader. Group head will **submit the ID lists of your group members by Jan 31st, before 1600.** Use the following links -> https://forms.gle/XvCdLK7W4B6niAtp7<br>● The group head will also be responsible for uploading the answer file to Google classroom. Discuss with all group members before submitting the name list. (I don't accept submissions from others.)<br>● To submit your group homework, followings are required<br>○ Upload the answer file **(in .pdf only)** to Google classroom. Followings.<br>○ The required format of your filename is *group_x_hw_y* when x is your group number, and y is the assignment number. **If you do not follow this instruction, your marking score will be deducted by 50%.**<br>○ In your first submission, put your group number and IDs of all members into the private comment box. Your information will be cross-checked with your form.<br>● **As usual, no late homework will be accepted. That is, you get zero for the whole group.** |
| **Midterm exam** | **35%** | Scheduled on Tuesday March 11th, 2025 **(**12**.**00**-**14**.**00**:** 2 hours)<br>See the exam policy below |
| **Final exam** | **45%** | Scheduled on May, Wednesday 28th, 2025 **(**13**.**30**-**16**.**30**:** 3 hours**)**<br>See the exam policy below**.** |

**Note:**

1. Practice problems for each topic will be posted on the class website. Students are encouraged to practice these exercises by themselves regularly.
2. Guideline for midterm and final exams:
   - Accommodation for students with verified medical conditions will be made according to the University's and Faculty's policies. For privacy purposes and record tracking, please contact B.E. office by email. Your request will be reviewed by the program's officer.

- Students who intend to miss either of the exams or have other plans on either of the planned exam dates should make a request for a rescheduled exam or accommodation with the B.E. office in advance. However, please keep in mind that your request for a rescheduled exam or accommodation will be granted in only a few reasonable cases. (Please note that personal travel plans do not qualify for exam postponement.) In any case, plan ahead of time and contact B.E. office as early as possible. The review process takes some time.
- Students who miss the exam due to an emergency or unforeseen circumstance should contact the B.E. office as soon as possible. You may file the request to schedule a makeup exam. Your request will be reviewed by B.E. office.

**Grading Criteria:**

We have two sections in this semester. Grading will be determined separately. To determine the letter grade, I use a mixed procedure between the criteria-based and the distribution-based method. When the criteria-based grading can be directly applied, I follow the general guideline of the university described below. In any case, I reserve the right to adjust the grading criteria as I see fit.

A = 4.0 (85-100) B+ = 3.5 (75-84) B = 3.0 (70-74) C + = 2.5 (65-69)

C = 2.0 (60-64) D+ = 1.5 (50-59) D = 1.0 (40-49) F = 0 (0-39)

**Note***:* When your letter grade is posted in the Reg-TU, you can file the request for a grade reconsideration. For the purpose of record tracking, contact B.E. office and fill out the request form. BE office will review your request and proceed with their steps.

BACHELOR OF ECONOMICS
THAMMASAT UNIVERSITY

# ACADEMIC CALENDAR & HOLIDAY
# SEMESTER 2/2024

| Semester 2/2024 (January 20 – May 14, 2025) | |
|---|---|
| Create Plan from Quota via TU Greats App (*ID.64 – 67) | December 13 – 20, 2024 |
| Registration via TU Greats App (*ID.64 – 67) | December 16 – 20, 2024 |
| Tuition Fee Payment Period (Via TU Greats App) (*ID.64 – 67) | December 16, 2024 – January 17, 2025 |
| Classes Begin | January 20, 2025 |
| Add-drop period | January 20 – February 2, 2025 *(from 9.00 AM of January 20 to 10.30 PM of February 2).* |
| Tuition Fee Payment Period (Via TU Greats App) | January 20 – February 3, 2025 *(9 AM - 10.30 PM)* |
| *Makha Bucha Day * | *February 12, 2025* |
| Mid-term Examination Period | March 9 – 16, 2025 |
| Withdrawal period with "W" on record | February 3 – March 30, 2025 *(from 9.00 AM of February 3 to 10.30 PM of March 30).* |
| Special Withdrawal with "w" on record | March 31 – 2 May, 2025 |
| *Substitution for Chakri Memorial Day** | *April 7, 2025* |
| *Songkran Festival Day** | *April 13 – 16, 2025* |
| Last day of class for Semester 2/2024 | May 14, 2025 |
| *Substitution for Visakha Bucha Day** | *May 12, 2025* |
| Final exam period | May 16 - 30, 2025 |
| Submitting Forms for Degree Conferral | January 20 – February 2, 2025 |

Remark * Holiday, No classes during this period
***Updated:*** *October 17, 2024*

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