

Course Outline

MA217 Calculus for Social Science 2

Semester 1/2023 (August 15 - December 4, 2023)

Lecture Time: Monday, 13.00-16.00 hours

Lecture Venue: Room 304

Teaching Materials Platform: MS Team

Instructor: Dr. Thanet Makjamroen

Office Hours: By appointment

Email: thanet@econ.tu.ac.th

Number of Credit: 3 Credits (3-0-6)

Prerequisite: MA216

Course Description:

Matrices, determinants, solutions of system of linear equations, higher order partial derivatives, application of maximum and minimum of several variables functions with unconstraint and constraint, techniques of integration for one variable functions, polar coordinates and area in polar coordinates, multiple integration and its applications.

Course Objectives:

Students will learn the WHY's of mathematics, not just how to solve a given problem to get a numerical answer.

Main Text:

1) Lecture Notes

2) Knut Sydsaeter, Peter Hammond, Arne Strøm and Andrés CarvajaEssential, Mathematics for Economic Nalysis, 6th Ed., Pearson, 2021.

Computer Application: GeoGebra Suite <https://apps.apple.com/th/app/geogebra-calculator-suite/id1504416652>

Grading Criteria: Midterm 45%, (Monday, October 2, 2023; 12.00-14.00 hrs.)

Final 55%, (Wednesday, December 13, 2023; 09.00-12.00 hrs.)

Topics:

1 System of Linear Equations

- 1.1 System of Linear Equations
- 1.2 Solving System of Linear Equations by Gaussian Elimination Method

2 Matrices

- 2.1 Matrices
- 2.2 Matrices and System of Linear Equations
- 2.3 Row Echelon Form and Reduced Row Echelon Form
- 2.4 Rank of a Matrix
- 2.5 Rank and Solutions of System of Linear Equations

3 Matrix Algebra

- 3.1 Matrix Operations
- 3.2 Matrix Representation of System of Linear Equations
- 3.3 Laws of Matrix Operations
- 3.4 Transposition of a Matrix
- 3.5 Special Types of Matrices
- 3.6 Elementary Matrices and Elementary Row Operations

4 Determinants

- 4.1 Motivations for the Definition of Determinants
- 4.2 Properties of Determinants
- 4.3 Determinant and Elementary Matrices
- 4.4 Determinant and Rank of a Square Matrix
- 4.5 Determinant of Product of Matrices

5 Inverses

- 5.1 Properties of Inverse
- 5.2 Computation of Inverse
 - 5.2.1 Computing Inverse by Elementary Row Operations
 - 5.2.2 Computing Inverses by Adjoint Matrix
- 5.3 Inverse and Determinants
- 5.4 Cramer's Rule

6 Review of Calculus of Single Variable

- 6.1 Derivatives and Second-order Derivatives
- 6.2 Optimization of Single Variable Functions
- 6.3 Necessary Conditions
- 6.4 Sufficient Conditions
- 6.5 Concave and Convex Functions

7. Calculus of Several Variable

- 7.1 Partial Derivatives
- 7.2 Second-order Partial Derivatives
- 7.3 Cross Partial Derivatives
- 7.4 Young's Theorem
- 7.5 Hessian
- 7.6 Homogeneity

8. Optimization without Constraints

- 8.1 Necessary Condition
- 8.2 Sufficient Condition
- 8.3 Test of Definiteness of the Hessian

8.4 Concavity, Convexity and Optimization

9. Optimization with Equality Constraints

9.1 Lagrangian Method

9.2 First-order Sufficient Condition

9.3 Second-order Sufficient Condition

9.4 Test of Bordered Hessian

10. Multiple Integration

10.1 Double Integrals over Finite Rectangles

10.2 Infinite Rectangles of Integration

10.3 Discontinuous Integrands and other Extensions

ACADEMIC CALENDAR & HOLIDAY SEMESTER 1/2023

Semester 1/2023 (August 15 – December 4, 2023)	
<i>the TU Office of the Registrar (TU REG) will process the registration (semester 1/2023) for all BE students who have completed the pre-registration via BE Portal.</i>	July 17 – 20, 2023
Tuition Fee Payment Period (Via TU Greats App)	July 21 – August 11, 2023
Create Plan from Quota via TU Greats App (*ID.66)	August 1 - 9, 2023
Registration via TU Greats App (*ID.66)	August 10, 2023
Classes Begin	August 15, 2023
Add-drop period	August 15 – 28, 2023 <i>(from 9.00 AM of August 15 to 10.30 PM of August 28)</i>
Tuition Fee Payment Period (Via TU Greats App)	August 15 – 29, 2023 <i>(9 AM - 10.30 PM)</i>
Mid-term Examination Period	October 1 – 7, 2023
<i>H.M. King Bhumibol Adulyadej The Great Memorial Day*</i>	<i>October 13, 2023</i>
<i>King Chulalongkorn's Day*</i>	<i>October 23, 2023</i>
Withdrawal period with "W" on record	September 4 – October 22, 2023 <i>(from 9.00 AM of September 4 to 10.30 PM of October 22)</i>
Special Withdrawal with "w" on record	October 24 – November 20, 2023
Last day of class for Semester 1/2023	December 4, 2023
Final exam period	December 12 – 23, 2023
<i>H.M. King Bhumibol Adulyadej The Great's Birthday*</i>	<i>December 5, 2023</i>
<i>Constitution Day*</i>	<i>December 10, 2023</i>
<i>Substitution for Constitution Day*</i>	<i>December 11, 2023</i>
Submitting Forms for Degree Conferral	August 15 – 28, 2023

Remark * Holiday, No classes during this period
Updated: July 24, 2023