Course Outline

MA216 Calculus for Social Science 1

Semester 2/2023 (January 8 – May 4, 2024)

Lecture Time: Section 046401 Tuesday 09.00-12.00 hours

Section 046402 Thursday 09.00-12.00 hours

Lecture Venue: Room 303

Teaching Materials Platform: MS Team, Team Code: TBA

Instructor: Section 046401 and Section 046402

Name: Assoc. Prof. Dr. Saifon Chaturantabut

Office Hours:

Email: saifon@mathstat.sci.tu.ac.th

Phone:

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

Prerequisite: -

Course Description:

Limits and continuity of one variable functions, derivatives of algebraic functions and transcendental functions, implicit differentiation, higher order derivatives, Roll's theorem, the mean value theorem, applications of derivative for determining limits and maximum and minimum of functions, differentials and its applications, antiderivatives, indefinite integrals and integration, definite integrals and application of area solving, functions of several variables, limits and continuity of functions of several variables, partial derivatives, the chain rule, total differential and its applications.

Course Objectives:

- Introduce calculus and its applications
- Strengthen mathematical skills to prepare for higher-level mathematics
- Raise the appreciation for mathematics and its applications

Expected Learning Outcomes

Students understand the course materials and can apply them to some related situations, as well as other related classes in the future.

Main Text: Stewart, James, Calculus, 8th ed., Cengage Learning, 2016.

Recommended Texts & Materials

- Anton, H., Bivens, I., and Davis, S. Calculus, 9th ed., John Wiley & Sons, Inc., 2009.
- L.J. Goldstein, D.C. Lay, and D.L. Schneider, Calculus and its Applications, 12th ed., Prentice Hall, 2010

Suggested Readings: Any calculus textbook

Grading Criteria:

Midterm Examination 40% (Tuesday, February 29, 2024 / 12.00-14.00 hrs.)

Final Examination 50% (Wednesday, May 15, 2024 / 09.00-12.00 hrs.)

Quizzes/Assignments/Attendance/Participation 10%

**Note: Any change will be announced during the class.*

Tentative Class Schedule:

Week	Topic	Activities/Text & Materials/Media
1	Course Overview Limits and Continuity - Limits (An Intuitive Approach) - Computing Limits	Lecture Discussion Practice
2	Limits and Continuity - Techniques for computing limits - Limits at Infinity	Lecture Discussion Practice
3	Limits and Continuity - Limits of Trigonometric Functions - Continuity	Lecture Discussion Practice Quiz
4	Differentiation - The Derivative - Techniques of Differentiation	Lecture Discussion Practice Quiz
5	Differentiation - The Chain Rule - Implicit Differentiation	Lecture Discussion Practice Quiz

Week	Topic	Activities/Text & Materials/Media
6	Differentiation - Derivatives of Logarithmic and Exponential Functions - Higher Derivatives	Lecture Discussion Practice Quiz
7	Applications of Differentiation - Linear Approximations and Differentials - L'Hospital's Rule; Indeterminate Forms	Lecture Discussion Practice Quiz
	Midterm Exam	
8	Applications of Differentiation - Related Rates - Rolle's Theorem; Mean Value Theorem	Lecture Discussion Practice Quiz
9	Applications of Differentiation - Interval of Increase and Decrease; Concavity - Relative Extreme; First and Second Derivative Tests - Curve Sketching	Lecture Discussion Practice Quiz
10	- Maximum and Minimum Values of a Function and applications Integration - Antiderivatives; The Indefinite Integral - Integration by Substitution	Lecture Discussion Practice Quiz
11	Integration - The Definite Integral - The Fundamental Theorem of Calculus - Evaluating Definite Integrals by Substitution	Lecture Discussion Practice Quiz
12	Techniques of Integration - Integration by Parts - Improper Integrals	Lecture Discussion Practice Quiz
13	Applications of Definite Integral - Area Between Curves	Lecture Discussion Practice Quiz
14	Functions of several Variables - Function of Two or More Variable - Partial Derivatives	Lecture Discussion Practice Quiz
15	Functions of Several Variables - The Chain Rule - Total Differential and Its Applications	Lecture Discussion Practice Quiz
	Final Exam	