BACHELOR OF ECONOMICS
THAMMASAT UNIVERSITY

Course Outline

MA216 Calculus for Social Science 1

Semester 2/2025 (January 5 – May 2, 2026)

Lecture Time: Section 046401 Tuesday 09.00-12.00 hours

Section 046402 Thursday 09.00-12.00 hours

Lecture Venue: **TBA**

Teaching Materials Platform: MS Team

Instructor: Section 046401 and Section 046402

Name: Assoc. Prof. Dr. Saifon Chaturantabut

Office Hours: TBA

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

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 and Evaluation:

Program Learning Outcomes (PLOs)

PLO	Learning Management	Evaluation
PLO#1	Explain mathematical principles, concepts, and theories correctly	Assignments/Quiz/ Exam
PLO#5	Demonstrate behavior indicating responsibility to oneself and academic ethics	Attendance/Participations/ Assignments/Quiz

Course Learning Outcomes (CLOs)

PLO	CLO	Learning Management	Evaluation
PLO#1	CLO#1	Explain principles and theories of limits and continuity, derivatives of algebraic and transcendental functions, chain rule, implicit differentiation, higher-order derivatives, antiderivatives, indefinite integrals, definite integrals, integration by substitution, multivariable functions, limits and continuity of multivariable functions, partial derivatives, chain rule, total differentials, and approximation.	Assignments/ Quiz/Exam
	CLO#2	Correctly find limits, derivatives, and integrals of single-variable functions.	Assignments/ Quiz/Exam
	CLO#3	Correctly identify the continuity of functions and specify how to fix discontinuities of single-variable functions.	Assignments/ Quiz/Exam
	CLO# 4	Explain principles for solving problems regarding rates of change, related rates, L'Hopital's rule, graphing, and applied maximum/minimum problems by relying on knowledge of limits, derivatives, Rolle's Theorem, and the Mean Value Theorem.	Assignments/ Quiz/Exam
	CLO#5	Explain principles of approximation using differentials and total differentials.	Assignments/ Quiz/Exam
	CLO#6	Correctly find the area between curves using knowledge of definite integrals.	Assignments/ Quiz/Exam
	CLO#7	Correctly find limits and partial derivatives of multivariable functions.	Assignments/ Quiz/Exam
	CLO#8	Correctly draw graphs of surfaces in three-dimensional space.	Assignments/ Quiz/Exam
PLO#5	CLO#9	Attend class regularly and punctually.	Attendance/ Participations/ Assignments
	CLO#10	Submit assigned work completely and within the specified time.	Attendance/ Participations/ Assignments
	CLO#11	Follow course requirements and university rules and regulations.	Attendance/ Participations/ Assignments

Learning Assessment Plan

CLO#	Methods of Learning Assessment	Assessment Week	Proportion of Assessment
1-3	Midterm Exam	1 - 7	40%
4-8	Final Exam	8 - 15	50%
9-11	Attendance/Participation/ Assignments/Quiz	1 - 15	10%

Main Text : Stewart, James, Calculus, 9th ed., Cengage Learning, 2020.

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 (Thursday, February 26, 2026, 12.00-14.00 hrs.) 40%
- Final Examination (Wednesday, May 13, 2026, 09.00-12.00 hrs.) 50%
- 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

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	Integration - Maximum and Minimum Values of a Function and applications - 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		