



## Course Outline

### MA216 Calculus for Social Science 1

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

**Lecture Time:** Section 046401 Tuesday 09.00-12.00 hours  
Section 046402 Thursday 09.00-12.00 hours

**Lecture Venue:** Room 302

**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% (Thursday, October 5, 2023 / 12.00-14.00 hrs.)

Final Examination 50% (Saturday, December 23, 2023 / 13.30-16.30 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 <ul style="list-style-type: none"><li>- Limits (An Intuitive Approach)</li><li>- Computing Limits</li></ul>	Lecture Discussion Practice
2	Limits and Continuity <ul style="list-style-type: none"><li>- Techniques for computing limits</li><li>- Limits at Infinity</li></ul>	Lecture Discussion Practice
3	Limits and Continuity <ul style="list-style-type: none"><li>- Limits of Trigonometric Functions</li><li>- Continuity</li></ul>	Lecture Discussion Practice Quiz
4	Differentiation <ul style="list-style-type: none"><li>- The Derivative</li><li>- Techniques of Differentiation</li></ul>	Lecture Discussion Practice Quiz
5	Differentiation <ul style="list-style-type: none"><li>- The Chain Rule</li><li>- Implicit Differentiation</li></ul>	Lecture Discussion Practice Quiz

<b>Week</b>	<b>Topic</b>	<b>Activities/Text &amp; Materials/Media</b>
6	Differentiation <ul style="list-style-type: none"> <li>- Derivatives of Logarithmic and Exponential Functions</li> <li>- Higher Derivatives</li> </ul>	Lecture Discussion Practice Quiz
7	Applications of Differentiation <ul style="list-style-type: none"> <li>- Linear Approximations and Differentials</li> <li>- L'Hospital's Rule; Indeterminate Forms</li> </ul>	Lecture Discussion Practice Quiz
<b>Midterm Exam</b>		
8	Applications of Differentiation <ul style="list-style-type: none"> <li>- Related Rates</li> <li>- Rolle's Theorem; Mean Value Theorem</li> </ul>	Lecture Discussion Practice Quiz
9	Applications of Differentiation <ul style="list-style-type: none"> <li>- Interval of Increase and Decrease; Concavity</li> <li>- Relative Extreme; First and Second Derivative Tests</li> <li>- Curve Sketching</li> </ul>	Lecture Discussion Practice Quiz
10	<ul style="list-style-type: none"> <li>- Maximum and Minimum Values of a Function and applications</li> </ul> Integration <ul style="list-style-type: none"> <li>- Antiderivatives; The Indefinite Integral</li> <li>- Integration by Substitution</li> </ul>	Lecture Discussion Practice Quiz
11	Integration <ul style="list-style-type: none"> <li>- The Definite Integral</li> <li>- The Fundamental Theorem of Calculus</li> <li>- Evaluating Definite Integrals by Substitution</li> </ul>	Lecture Discussion Practice Quiz
12	Techniques of Integration <ul style="list-style-type: none"> <li>- Integration by Parts</li> <li>- Improper Integrals</li> </ul>	Lecture Discussion Practice Quiz
13	Applications of Definite Integral <ul style="list-style-type: none"> <li>- Area Between Curves</li> </ul>	Lecture Discussion Practice Quiz
14	Functions of several Variables <ul style="list-style-type: none"> <li>- Function of Two or More Variable</li> <li>- Partial Derivatives</li> </ul>	Lecture Discussion Practice Quiz
15	Functions of Several Variables <ul style="list-style-type: none"> <li>- The Chain Rule</li> <li>- Total Differential and Its Applications</li> </ul>	Lecture Discussion Practice Quiz
<b>Final Exam</b>		

## ACADEMIC CALENDAR & HOLIDAY SEMESTER 1/2023

Semester 1/2023 (August 15 – December 4, 2023)	
<b><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></b>	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