Department of Mathematics, Faculty of Applied Science
King Mongkut's University of Technology North Bangkok (KMUTNB)
Course Syllabus: 040283101 Mathematics I
Semester 1, Academic Year 2023

Course Title: 040283101 Mathematics I   **Credits:** 3(3-0-9)

Prerequisite: None

Course Description :

Limit and continuity of functions, slope and tangent line, derivative of function, velocity and rate of change, differentiation rules, higher-order derivative, derivatives of elementary functions, parametric equations, applications of derivative, related rates, maxima and minima, indeterminate forms, definite and indefinite integrals, area between curves, techniques of integration, numerical integration.

Course Learning Outcomes (CLOs): Students should be able to:

CLO 1. Find limits of functions and determine the continuity and differentiability of a function at a point and on a domain set.

CLO 2. Differentiate with first-order or higher-order of elementary functions and parametric equations.

CLO 3. Apply the idea of derivatives to solve the related problems: related rate, maxima and minima for example.

CLO 4. Recognize indeterminate forms and using the L'Hopital rule to find the limits of functions.

CLO 5. Identify concepts and evaluate definite and indefinite integrals of functions.

CLO 6. Apply the idea of definite integral to compute the area between curves.

CLO 7. Examine various techniques of integration.

CLO 8. Use appropriate numerical methods to approximate definite integrals.

Lecturers:

No.	Lecturer's Name	Section	Study Time	Class Room
1	Asst. Prof. Dr. Walailuck Chavanasporn	1	W 13.00-16.00	72-401
2	Asst. Prof. Dr. Khomsan Neamprem	2	W 13.00-16.00	72-405
3	Assoc. Prof. Dr. Sanoe Koonprasert	3	W 13.00-16.00	78-311

Assessments:

Midterm examination	40 %
Final examination	40 %
Assignments and Class attention	20 %

Reading List

Core reading book:

Dennis G. Zill and Warren S. Wright, (2011). Calculus Early Transcendentals, 4th ed*ition*, Jones and Bartlett Publishers.

Supplementary reading and study material:

1. James Stewart, (2011). Calculus 7th revised edition. Brooks/Cole CENGAGE Learning.
2. George B. Thomas, Jr., Ross L. Finney, Maurice D. Weir and Frank R. Giordano, (2003). Thomas' Calculus 10th edition. Addison-Wesley.
3. Howard Anton, Irl Bivens and Stephen Davis, (2009). Calculus 9th edition. John Wiley and Sons.

Note : Students can use other textbooks which include calculus topics as similar to the topics in the teaching outline for each week.

Required Prerequisite Knowledge / Skills:

1. Standard functions, such as trigonometry functions, exponential and logarithmic functions, and hyperbolic functions
2. Basic knowledge of analytic geometry and conic section

Detailed Syllabus

Week	Lecture	Chapter
1	course overview, functions	Ch1
2	limit and continuity of functions	Ch2
3	limit and continuity of functions (cont.)	Ch2
4	derivative of function, velocity and rate of change, differentiation rules, higher-order derivative	Ch3
5	derivatives of elementary functions, chain rule, derivatives of implicit functions, parametric equations	Ch3
6	applications of differentiation	Ch4
7	applications of differentiation (cont.)	Ch4
8	indeterminate forms	Ch4: 4.5
	Midterm Week (28th August 2023)	
9	maxima and minima	Ch4: 4.3
10	maxima and minima (cont.)	Ch4: 4.3
11	indefinite integrals	Ch5: 5.1, 5.2
12	definite integrals	Ch5: 5.4
13	area between curves	Ch5: 5.3 Ch6: 6.2
14	techniques of integration	Ch7: 7.2-7.6
15	numerical integration	Ch7: 7.8
	Final Week (30th October 2023)	

Note: Some changes may be made to this syllabus during the semester.