Department of Mathematics, Faculty of Applied Science
King Mongkut's University of Technology North Bangkok (KMUTNB)
Course Syllabus: 040283102 Mathematics II
Semester 2, Academic Year 2023

Course Title: 040283102 Mathematics II   **Credits:** 3(3-0-6)

Prerequisite: 040283101 Mathematics I

Course Learning Outcomes (CLOs) :

Students should be able to:

CLO 1.   Understand the idea of improper integrals.

CLO 2.   Apply the idea of definite integral to compute arc length, area of surface of revolution and volume of revolution.

CLO 3.   Find limits of functions of several variables and determine the continuity and differentiability of a function.

CLO 4.   Find partial derivative of functions of several variables.

CLO 5.   Apply the idea of partial derivatives to solve the related problems.

CLO 6.   Identify concepts and evaluate double and triple integrals of functions of several variables.

CLO 7.   Apply the idea of multiple integral to compute the related problems.

CLO 8.   Recognize and understand the concept of sequences and series.

CLO 9.   Determine the convergence of the series.

CLO 10. Understand power series, and find the Taylor and Maclaurin series of the functions.

Course Description:

Improper integrals, applications of definite integrals, arc length, area of surface of revolution, volume of revolution, functions of several variables, limit and continuity, partial derivative and applications, double and triple integrals, applications of multiple integral, sequences and series, tests for convergence, power series, Taylor and Maclaurin series.

Reading List

Core reading book:

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

Supplementary reading and study material:

1. Howard Anton, Irl C. Bivens and Stephen Davis, (2009). Calculus, 9th edition. John Wiley & Sons.

2. James Stewart, (2011). Calculus, 7th revised edition. Brooks/Cole.

3. George B. Thomas, Jr., Ross L. Finney, Maurice D. Weir and Frank R. Giordano (2003) Thomas' Calculus 10th ed., Boston: Addison-Wesley.

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

Lecturers:

Section	Lecturer	Time	Room	Office Hours	Office
1	Dr. Ekkachai Kunnawuttitreechachan (EKC)	T 09.00 – 12.00	78-304	M 13.00 – 16.00 W 13.00 – 16.00	78-510
2	Asst. Prof. Dr. Khomsan Neamprem (KNP)	T 09.00 – 12.00	78-306	M 13.00 – 16.00 F 09.00 – 12.00	78-1006
3	Asst. Prof. Dr. Walailuck Chavanasporn (WCN)	T 09.00 – 12.00	78-308	M 09.00 – 12.00 F 09.00 – 12.00	78-504

Assessments:

Midterm examination   40 %

Final examination   40 %

Assignments and class attention   20 %

Teaching / Learning Activities:

Week No.	Learning Topics	Topics in the Core Reading Book
1	Improper Integrals	7.7 Improper Integrals
2	Applications of definite integral: arc length, area of surface of revolution	6.5 Length of a Graph 6.6 Area of Surface of Revolution
3	Applications of definite integrals: volume of revolution	6.3 Volumes of Solids: Slicing Method 6.4 Volumes of Solids: Shell Method
4	Functions of several variables, quadric surface	11.7 Cylinders and Spheres 11.8 Quadric Surfaces 13.1 Functions of Several Variables
5	Limit and continuity of functions of several variables	13.2 Limits and Continuity
6	Definition of partial derivative, higher-order derivative	13.3 Partial Derivatives
7	Chain rule of functions of several variables, partial derivative of implicit function	13.5 Chain Rule
8	Applications of partial derivative: the extrema of functions of several variable and extrema problem	13.8 Extrema of Multivariable Functions
Midterm Examination (Date : 22 January 2024; Time 09.00 – 12.00)		
9	Double integrals in rectangular and polar coordinates and their applications	14.1 The Double Integral 14.2 Iterated Integrals 14.3 Evaluation of Double Integrals 14.5 Double Integrals in Polar Coordinates
10	Triple integrals in rectangular coordinate and its applications	14.7 The Triple Integral
11	Triple integrals in cylindrical and spherical coordinate and their applications	14.8 Triple Integrals in Other Coordinate Systems
12	Sequences and series	9.1 Sequences 9.2 Monotonic Sequences 9.3 Series
13	Testing for convergence for infinite series	9.4 Integral Test 9.5 Comparison Tests 9.6 Ratio and Root Tests
14	Alternating series and power series	9.7 Alternating Series 9.8 Power Series 9.9 Representing Functions by Power Series
15	Taylor and Maclaurin series	9.10 Taylor Series
Final Examination (Date : 22 March 2024; Time 09.00 – 12.00)		

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