



Shanghai Jiao Tong University

MA081 Calculus II

Instructor Information	Gexin Yu Home Institution: College of William & Mary Email: gyu@wm.edu		
Term	June 28, 2021 - July 23, 2021	Credits	4 units
Course Delivery	The class will be delivered in the format of online. Other than recorded lecture videos, the instructor will arrange 2 hours' real-time interactions with students per week (via discussion forum, zoom meeting, and WeChat). The workload students are expected to complete to properly pass this course is about 10-15 hours per week.		
Required Texts (with ISBN)	EssentialCalculus early transcendentals, by James Stewart, Second Edition. ISBN: 978-1-133-11228-0		
Prerequisite	Calculus I		



Course Overview

We will cover the following topics: area between curves, volumes (disk, washers, slicing), work, fluid force and pressure, substitution method of integration, integration by parts, trigonometric integrals, trigonometric substitution, partial fractions, numerical methods of integration, improper integrals, arc length, modeling with differential equations, sequences, series, various test for convergence of series, power series, and Taylor and Maclaurin series. Topics are presented with an emphasis on definitions and proofs as well as applications.

Learning Outcomes

We will cover three parts in this course: evaluate integrals, applications of integrals, and series.

1. Evaluation of Integrals (Chapter 5, 6.1--6.3, 6.5--6.6 from Steward's book): We cover Fundamental Theorem of Calculus, substitution rules and integral by parts, trig integration and substitution, partial fraction. We will cover approximation of integration and improper integrals;
2. Applications of Integrals (Chapter 7.1--7.7): We will talk about how to use integrals to find area between curves, volumes, and arc length, as well as the applications in physics and engineering. We will also talk about some simple differential equations;
3. Series (Chapter 8.1--8.7): We talk about series and different ways to test whether a series is convergent or not. We will also talk about power series and Taylor series.

Grading Policy

Quizzes and Homework	30%
Midterm Examination	30%
Final Examination	40%

Grading Scale is as follows

Number grade	Letter grade	GPA
90-100	A	4.0
85-89	A-	3.7
80-84	B+	3.3
75-79	B	3.0
70-74	B-	2.7
67-69	C+	2.3
65-66	C	2.0
62-64	C-	1.7
60-61	D	1.0
≤59	F (Failure)	0



Class Schedule

Date	Lecture	Readings	Recorded video
Day 1	Areas and distances, integral	5.1-5.2	Video 1
Day 2	The fundamental theorem of calculus	5.3	Video 2
Day 3	The net change theorem and substitution rule	5.4-5.5	Video 3
Day 4	Integral by parts	6.1	Video 4
Day 5	Trig substitution and partial fraction decomposition	6.2-6.3	Video 5
Day 6	Partial fraction decomposition	6.3	Video 6
Day 7	Approximate integral and improper integral	6.5-6.6	Video 7
Day 8	Area and volume problems	7.1-7.2	Video 8
Day 9	Mid Exam	Chapter 5.1-7.2	
Day 10	Shell method for volume and arc length	7.3-7.4	Video 9
Day 11	Surface area and work of a force	7.5-7.6	Video 10
Day 12	Hydrostatic force and centroid of a mass	7.6	Video 11
Day 13	Differential equation	7.7	Video 12
Day 14	Sequences	8.1	Video 13
Day 15	Series	8.2	Video 14
Day 16	Integral and comparison tests and Alternating Series Test	8.3	Video 15
Day 17	Test for Convergence of series	8.4	Video 16
Day 18	Power series, Taylor series and Maclaurin series	8.5-8.7	Video 17
Day 19	Final review		
Day 20	Final Exam	Chapter 7.3-8.7	