Shih Chien University

STP Program (June 02-July 04)

MATH 121 Calculus II

Course Outline

Course Code: MATH 121

Instructor: Vadim Olshevsky

Home Institution: University of Connecticut

Office Hours: TBA

Email: olshevsky@gmail.com

Credits: 4

Class Hours:

This course will have 144 class hours, including 50 lecture hours, professor 30 office hours, 20-hour TA discussion sessions, 10-hour review sessions, 34-hour extra classes.

Course Description:

Calculus II is the second of a sequence of three courses in calculus covering basic concepts of calculus. The course covers integration techniques, applications of integrals, basic differential equations, sequences, and power series.

Course Objectives:

The objective of the course is to build an understanding of the fundamental principles and applications of integral calculus through lectures, homework, discussions, quizzes and exams.

Modality:

Online asynchronous. All lectures are pre-recorded and are made available on day one. Homework assignments are online (via WebAssign). The two exams (midterm and final, 1 hour 15 minutes each) will be proctored via zoom. You are supposed to have a webcam with a wide view capturing you and the entire desk.

Required Course Materials:

Calculus: *Calculus: Early Transcendentals*, 8th Edition, by James Stewart with WebAssign Access Code. Can be purchased directly at https://www.cengage.com/c/calculus-early-transcendentals-8e-stewart/9781337771498#compare-buying-options
It is important that you purchase both the textbook and the WebAssign code, the latter is necessary for the homework assignments.

Homework: There will be online WebAssign homework assignments for each section of the text. Each assignment will be made available on several days before the section is covered in class. The due date for each assignment will be set by your instructor and will generally be two or three days after the material is covered in class. You will get five attempts for each question.

Grading & Evaluation:

Attendance and participation:	10%
Homework:	30%
Midterm:	30%
Final:	30%

Grading System (1 ~ 100):

A+ : 96 - 100	A : 91 - 95
B+ : 86 - 90	B : 81 - 85
C+ : 76 - 80	C : 71 - 75
D+ : 66 - 70	D : 60 - 65
F : 0 - 59	
Pa : Pass	Fa : Fail

Course Schedule

Week1 *Integration*: Anti-derivative, indefinite integrals, approximating areas, definite integrals, Fundamental Theorem of Calculus, integration formulas, substitutions, integration of logarithmic and exponential functions.

Week2 *Integration*: Integration by parts, trigonometric integrals and substitutions, rational fractions, other strategies, improper integrals.

Week3 *Applications of integration*: Arclength and surface area, area and volume of revolution, work, moment, center of mass, ordinary differential equations (basic concepts, direction fields, separable equations), exponential growth and decay, the logistic equation

Week4 *Polar coordinates.* Parametric equations, polar coordinates, Areas and lengths in polar coordinates. Conic sections in polar coordinates. *Sequences and series*: Sequences, infinite series, comparison and limit comparison test, divergence and integral tests

Week5 *Sequences and series*: Alternating series and ratio tests, power series, radius and interval of convergence, Taylor and Maclaurin series

Detailed Course Outline:

Week	Chapter	Topic
		1.1 Anti-derivatives 1.2 Indefinite integrals
1	1 Integration	1.3 Approximating areas 1.4 The definite integral
		1.5 Fundamental Theorem of Calculus 1.6 Integration formulas
		1.7 Substitutions 1.8 Integration of logarithmic and exponential functions 1.9 Integrals resulting in inverse trigonometric functions

		2.1 Integration by parts 2.2 Trigonometric integrals
2	2 Integration techniques	2.3 Trigonometric substitutions 2.4 Integrating rational fractions (partial fractions)
		2.5 Other strategies 2.6 Improper integrals
		Exam 1
	3 Applications of integration	3.1 Arc length of a curve and surface area 3.2 Area and volume of revolution 3.3 Work, moments, center of mass
3	4 First order Equations	4.1 Basics of differential equations 4.2 Direction fields 4.3 Separable equations 4.4 Exponential growth and decay, logistic equation
	5 Polar coordinates	5.1 Curves defined by parametric equations 5.2 Calculus with parametric curves
		5.3 Polar coordinates 5.4 Areas and arc length in polar coordinates
		5.5 Conic sections 5.6 Conic sections in polar coordinates
4	6 Sequences and series	6.1 Sequences 6.2 Infinite series
		6.3 Comparison and limit comparison test 6.4 Divergence and integral test
		Exam 2
		6.6 Alternating series test 6.7 Ratio and root tests
5		6.8 Power series 6.9 Radius and interval of convergence 6.10 Taylor and Maclaurin series

		Final Exam
		Discussion of final exam

Student responsibilities/expectations: The main course material will be presented through lectures. A discussion session, to be held every Friday will offer an opportunity for students to discuss course material and assigned problems with a teaching assistant (TA). Students are advised to keep pace with the course material as it is being presented. Consequently, students should endeavor to attend all class meetings and discussion sessions, be early for class, and spend sufficient time working on assigned homework problems. If for any reason a student misses a class, he/she should endeavor to obtain the notes and learn the missed material before the next class meeting. Students should not hesitate to ask questions or seek additional assistance to ensure that they are staying on pace with the class. Students will be expected to come to class prepared and ready to participate actively. Please, turn off your cell phones and put aside any unrelated material before class begins. Students should exhibit a sense of responsibility and respect towards fellow students. Late-coming to class or early departure from class meetings will not be allowed.

Examinations: There will be two midterm exams plus one cumulative final exam. The exams will contain problems to solve and definitions, brief explanations of concepts, and simple proofs.