East China Normal University
GEC International Summer School

MAT 12: Calculus 2

Term: June 17th to July 19th, 2024
Class Hours: Monday through Friday, 110 minutes each day (2,750 minutes in total)
Instructor: TBD
Home Institution: TBD
Office hours: TBD
Email: TBD

Course Description

Students will learn how to set up definite integrals to solve applied problems as well as how to evaluate those integrals, exactly when possible and approximately when necessary. Problems considered include computation of volume, area, surface area, arc length. Students will explore issues of convergence for infinite series of real numbers and learn how such series may be used to determine as well as approximate certain transcendental functions.

Prerequisite: MAT11 Calculus 1

Learning Objective

1. Using the principle of "integral as adding machine for infinitesimal quantities," students should be able to set up integral formulas to solve applied problems, not only those of the types discussed in this course, but also other kinds of problems they might encounter in the physical, life, applied, or social sciences.
2. Students should recognize when a function can be easily anti-differentiated using techniques discussed in the course (e.g., integration by parts), and when the techniques do apply be able to implement them.

3. When anti-derivatives can't conveniently be applied to evaluate a definite integral (by the Fundamental Theorem of Calculus), students should be able to get a rough idea of its value through consideration of area and, given access to

a computer or calculator, find a numerical approximation of its value through, say, Simpson's rule.

Required Text

Calculus: Early Transcendentals, 7th Edition by James Stewart

ISBN-13: 978-0538497879 ISBN-10: 0538497874

Course Hours

The course has 25 class sessions in total. Each class session is 110 minutes in length, for a total of 2750 minutes of in-class time. The course meets from Monday to Friday. ECNU awards 3 credits for this course. Different universities may count course credits differently. Consult officials at your own home institution.

Attendance

Summer school is very intense and to be successful, students need to attend *every class*. Occasionally, due to illness or other unavoidable circumstance, a student may need to miss a class. ECNU policy requires a medical certificate to be excused. Any absence may impact on the student's grade. Moreover, ECNU policy is that a student who has more than 3 absences will fail the course. Arriving late or leaving early will count as a partial absence.

Grading Policy

ECNU awards grades of A, A-, B+, B, B-, C+, C, D, and F. Most colleges and universities do not award transfer credit for grades of D or F.

In this course, grading will be based on the following:

Attendance/participation	5%
Assignments*5	5%*5=25%
Midterm Exam	30%
Final Exam	40%

General Expectations

Students are expected to:
- Attend all classes and be responsible for all material covered in class and otherwise assigned. Any unexcused absence may impact a student's grade.
- Arrive to class on-time: Late arrivals are disruptive to your fellow students and to the conduct of the class.
- Complete the day's required reading and assignments before class
- Review the previous day's notes before class; make notes about questions you have about the previous class or the day's reading
- Refrain from texting, phoning or engaging in computer activities unrelated to class during class (不要用手机) It is highly disrespectful to the professor and to the class.
- Participate in class discussions and complete required written work on time.

Course Schedule

The planned schedule sketched out below may be modified to suit the interests or abilities of the enrolled students or to take advantage of special opportunities or events that may arise during the term.

Week 1

- *Day 1*
    - *Course outline*
    - *Introduction, review of substitution*
- *Day 2*
    - *Integration by parts*
- *Day 3*
    - *Trigonometric integrals*
- *Day 4*
    - *Trigonometric substitution*
- *Day 5*
    - *Simpson's rule, improper integrals*
    - *In-class exercises*

- o *Assignment 1 due*

Week 2

- - *Day 1*
    - o *Comparison test*
  - *Day 2*
    - o *Area between curves*
  - *Day 3*
    - o *Volumes w/ cross-sections*
  - *Day 4*
    - o *Volumes of revolution*
  - *Day 5*
    - o *Average value, arc length*
    - o *In-class exercises*
    - o *Assignment 2 due*

Week 3

- - *Day 1*
    - o *Midterm review*
  - *Day 2*
    - o *Midterm*
  - *Day 3*
    - o *Surfaces of rotation*
  - *Day 4*
    - o *Parametric curves*
  - *Day 5*
    - o *In-class exercises*
    - o *Assignment 3 due*

Week 4

- - *Day 1*
    - o *Polar coordinates*
  - *Day 2*
    - o *Sequences and series*
  - *Day 3*
    - o *Integral test, estimating sums*
  - *Day 4*
    - o *Comparison test, alternating series*

- *Day 5*
    - *Ratio test, interval of convergence*
    - *In-class exercises*
    - *Assignment 4 due*

Week 5

- *Day 1*
    - *Taylor, Maclaurin series*
- *Day 2*
    - *Power series*
- *Day 3*
    - *Binomial series*
- *Day 4*
    - *Final review session*
- *Day 5*
    - *Final exam*
    - *Assignment 5 due*

Academic Honesty

Students are expected to maintain high standards of academic honesty. Specifically, unless otherwise directed by the professor, students may not consult other students, books, notes, electronic devices or any other source, on examinations. Failure to abide by this may result in a zero on the examination, or even failure in the course.