



**East China Normal University
GEC International Summer School**

MAT 11: Calculus 1

Term: June 16th to July 18th, 2025

Class Hours: Monday through Friday, 110 minutes each day (2,750 minutes in total)

Instructor: Peiyuan Huang

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Course Description

The course emphasizes the understanding of concepts and using them to solve physical problems. The course covers techniques and applications of differentiation. Some integration techniques are introduced including substitution. This is a standard first calculus course that will prepare the student both for a second semester of calculus and a calculus-based physics course.

Prerequisite: None

Learning Objective

A student who satisfactorily completes this course should:

1. know calculus definitions, concepts, rules, vocabulary, and mathematical notation.
2. be able to develop logical arguments and communicate them in written form.
3. have an understanding of the usage and application of mathematical abstraction.
4. have the necessary manipulative skills required for solving problems in calculus.



5. gain knowledge and appreciation of calculus as a tool in solving applied problems.

Required Text

M. Weir and J. Hass, Thomas' Calculus: Early Transcendentals, 12th edition, Addison-Wesley, (Pearson,) Reading, MA.

ISBN: 978-0-321-58876-0

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*
 - *Intros, function algebra: shifting, scaling, composition*
- *Day 2*
 - *Exponential, and Hyperbolic Trig*
- *Day 3*
 - *Inverse functions (logarithms arc trig functions)*
- *Day 4*
 - *Rates of change and tangent lines*



- *Continuity, limits at infinity*
- *Day 5*
 - *In-class exercises*
 - *Assignment 1 due*

Week 2

- *Day 1*
 - *Infinite limits and asymptotes, tangents*
 - *Product, quotient rules*
- *Day 2*
 - *Chain rule, Implicit differentiation*
- *Day 3*
 - *Inverse functions*
- *Day 4*
 - *Linear approx., differentials midterm review*
- *Day 5*
 - *In-class exercises*
 - *Midterm review session*
 - *Assignment 2 due*

Week 3

- *Day 1*
 - *Midterm exam*
- *Day 2*
 - *Diff. applications, rates of change*
- *Day 3*
 - *Concavity, curve sketching, Related rates*
- *Day 4*
 - *Extreme values, critical points, Fermat's theorem, Monotonicity*
- *Day 5*
 - *In-class exercises*
 - *Assignment 3 due*

Week 4

- *Day 1*
 - *1st derivative test, Indeterminate forms (l'Hospital's)*
- *Day 2*
 - *Optimization, Rolle's, MVT theorem*



- Day 3
 - *Newton's method, Antiderivatives*
- Day 4
 - *Integration: Estimating area, Sigma (Riemann)*
- Day 5
 - *In-class exercises*
 - *Assignment 4 due*

Week 5

- Day 1
 - *(In)definite integrals, Fundamental Theorem of Calculus*
- Day 2
 - *Substitution and other integration techniques*
- Day 3
 - *logarithm as integral*
- 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.