

AMS151-91

Applied Calculus I

Spring 2023

Welcome to Applied Calculus I! This is an introductory course designed primarily for science, business, engineering, and technical majors to provide students with the fundamental concepts of differential calculus and the fundamental theorem of calculus. I hope that this course is useful for your future studies.

Instructor: Young-Seon Lee, PhD

Class Hour: Tu/Th 3:30 ~ 4:50 pm

Office: Academic Building B609

Phone: 032-626-1917

E-mail: young-seon.Lee@stonybrook.edu

Office Hours: 1:00 pm ~ 3:00 pm, and 5:00 pm ~ 6:00 pm (Tuesday and Thursday),
B609 or virtual (Zoom), particular times are possible by arrangement.

TA and TA office hours:
TBA

Course Description, and Textbooks

Course Title: Applied Calculus I

Course Description: Review of functions and their applications; analytic methods of differentiation; interpretations and applications of differentiation; introduction to integration. Intended for CEAS majors. Not for credit in addition to MAT 125 or 126 or 131 or 141.

Prerequisite: B or higher in MAT 123 or level 5 on Math Placement Test.

Textbooks:

“Calculus Early Transcendentals” by James Stewart, 8th or 9th ed.

Supplementary Textbook:

“Calculus (Single Variable)”, by Hughes-Hallett, Gleason, McCallum, et.al., 6th ed (International Student Version) or 7th Asia ed

The goal of this course

- Demonstrate how use the behavior of common mathematical functions model important real-world situations.
 - * linear functions;
 - * exponential functions;
 - * logarithmic functions;
 - * trigonometric functions.
- Demonstrate a conceptual and technical understanding of the derivative, including:
 - * different mathematical and applied settings where the derivative represents a rate of change;
 - * the technical definition of the derivative and using this definition to calculate the derivative of simple functions.
- Demonstrate proficiency with the rules for differentiation of.
 - * power function and polynomials;
 - * exponential and logarithmic functions;
 - * trigonometric functions and inverse tangent;
 - * products and quotients of functions;
 - * compositions of functions using the chain rule.
- Demonstrate facility in applying differentiation to problems in:
 - * physics and engineering;
 - * economics and business;
 - * biomedical sciences.
- Build mathematical models for optimization problems and solve them.
 - * maximization problems, with and without side constraints
 - * minimization problems, with and without side constraints.
- Demonstrate a conceptual understanding of integration, including
 - * integration as the inverse operation to differentiation;
 - * integration as the area under the graph of a function;
 - * the definite and infinite integral.

Course Structure

This course consists of two lectures each week lasting 75 min each.

Methods for Assessment of Learning Outcomes

The expected learning outcomes for the course will be assessed through grading activities that include homework, attendance, exam, quiz.

Homework policy:

1. Homework will be assigned once a week on Brightspace.
2. The lowest homework grade will be dropped before the final grading.
3. Submit one file of your homework in pdf format on Brightspace. If you are not able to submit it via Brightspace, you should submit it to me by email.
4. Organize your solutions in the same order as the problems listed.
5. You **must** write neatly and legibly so that TA can recognize your writing.
6. Late homework will **NOT** be graded for credit!
7. Collaboration with other classmates is encouraged in this course. Also, you may ask homework questions during office hours with TAs, or with me. But write-ups must be done independently.
8. Show all your work by writing all the steps to arrive at the solutions. A correct answer without the steps will receive minimal credit. This is good practice for what will be expected on exams.

Exams: There are two midterms and one comprehensive final exam. No make-up exams will be allowed. Calculators are **NOT** allowed in the exams. Every exam is closed book.

Exam 1: **TBA**

Exam 2: **TBA**

Final Exam: **June 12 (Monday) 6:30 pm ~ 9:00 pm**

Quizzes: 10-15 minutes Quiz once a week. **No** make-up quizzes will be allowed.

Grading: Your course grade will be determined by the following items:

Attendance = 5%, Homework = 15%, Quiz = 15%, Exam 1 = 20%, Exam 2 = 20%, Final Exam = 25%

The final letter grade will be determined by the following scale:

A: 93% - 100%, A-: 90% - 92%, B+: 87% - 89%, B: 83% - 86%, B-: 80% - 82%, C+: 77% - 79%,
C: 73% - 76%, C-: 70% - 72%, D+: 67% - 69%, D: 63% - 66%, D-: 60% - 62%, F: < 60%

Attendance: You are required to attend every class regularly. The percentage of participation in each class should be more than 50% to be considered attending each class.

Attendance Policy

- (1) All students of SUNY Korea are required to attend every class.
- (2) Unexcused absences will affect seriously the students' final grades in the course.
- (3) If a student has over 20% unexcused absence, the student's final course grade will be an F.
- (4) Students should report the reason for absence to the instructor in advance, or immediately after the absence.
- (5) When a student excuses his/her absence, the student must provide documentation of the reason for the absence to the instructor.
- (6) The instructor of the course reserves the right to excuse absences.
- (7) The course instructor may excuse the absence if the submitted documentation fulfills the conditions below.
 - i) Extreme emergencies (e.g. death in the family)
 - ii) Severe medical reasons with doctor's note (Not a slight illness)
 - iii) Very important events (e.g. national conference, official school event)
- (8) At the end of the semester, the course instructor should submit a copy of the attendance sheet to the Academic Affairs Office.

Absence due to officially approved trips: The person responsible for a student missing class due to a trip should notify the instructor of the departure and return schedule in advance of the trip. The student may not be penalized and is responsible for the material missed.

Concerns: If you have ANY problem related to the course, please feel free to discuss it with us. We truly want you to succeed in this course and will do whatever we can to help resolve the problem. You can talk to me before or after class, during office hours or via email.

Disability Support Services (DSS) Statement:

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact One-Stop Service Center, Academic Building A201, (82) 32-626-1117. They will determine with you what accommodations, if any, are necessary and appropriate. All documentation regarding your personal information will be kept in confidential.

Academic Integrity:

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

Critical Incident Management:

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.

Cheating policy:

The grade of Q is assigned to a student found guilty of academic dishonesty. The Q remains on the transcript and is computed in your G.P.A. as a grade of F. Furthermore, a note describing the academic dishonesty is attached to your permanent records with the university.

Conduct:

Stony Brook University expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to observe national, state, and local laws and University regulations; and to respect the rights, privileges, and property of other people. Faculty are **required** to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the

learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.

Course Evaluations

Stony Brook University values student feedback in maintaining the high-quality education it provides and is committed to the course evaluation process, which includes a mid-semester assessment as well as an end-of-the-semester assessment, giving students a chance to provide information and feedback to an instructor which allows for development and improvement of courses. Please click the following link to access the course evaluation system: <http://stonybrook.campuslabs.com/courseeval/>

Class schedule (Tentative)

AMS151 Applied Calculus 1

Spring 2023

Week	Date	Topics	
1	Feb 28	Reviews: Exponential and logarithmic functions, Trigonometric functions, Inverse trigonometric functions	
2	Mar 7, Mar 9	The limit of a function, Calculating Limits Using the Limit Laws	
3	Mar 14, Mar 16	The precise definition of a limit	
4	Mar 21, Mar 23	Continuity, and Limits at infinity; Horizontal Asymptotes	
5	Mar 28, Mar 30	Derivatives and Rates of Change, The Derivative as a Function, Derivatives of Polynomials and Exponential Functions	
6	Apr 4, Apr 6	The Product and Quotient Rules, Derivatives of Trigonometric Functions	
7	Apr 11, Apr 13	The Chain Rule, The Implicit Differentiation	
8	Apr 18, Apr 20	The Implicit Differentiation, Derivatives of Inverse Trigonometric Functions, Derivatives of Logarithmic Functions, Rates of Change in the Natural and Social Sciences	
9	Apr 25, Apr 27	Rates of Change in the Natural and Social Sciences	
10	May 2, May 4	Linear Approximations and Differentials	
11	May 9, May 11	Hyperbolic Functions,	
12	May 16, May 18	Maximum and Minimum Values,	
13	May 23,	The Mean Value Theorem	
		How Derivatives Affect the Shape of a Graph	
		Optimization Problems,	
		Indeterminate Forms, L'Hospital's Rule	
		Newton's Method	
		Antiderivatives,	

	May 25	Introduction to Integrals: Areas and Distances	
14	May 30,	The Definite Integral,	
	June 1	Fundamental theorem of calculus, Final Exam Review	
Final Exam: June 12 (Monday) 6:30 pm ~ 9:00 pm			