



Shih Chien University
STP Program (July 01-Aug 02)
MATH 120 Calculus I
Course Outline

Course Code: MATH 120

Instructor: TBA

Home Institution: TBA

Office Hours: TBA

Email: TBA

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 I is the first of a sequence of three courses in calculus covering basic calculus. Topics to be covered include a review of functions, limits, differentiation, applications of the derivative, and introduction of integration.

Course Objectives:

The objective of the course is to build an understanding of the basic principles and applications of differential and integral calculus through lectures, homework, discussion, 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

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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:	<u>30%</u>

Grading System (1 ~ 100):

Quality Points	Grade	Percentage %
4	A	80-100
3	B	70-79
2	C	60-69
1	D	50-59
0	E	0-49

Course Schedule

Week1 Functions: definition, representation, types, operations, mathematical models. Limits and continuity: limit of a function, the limit law, continuity, definition of a limit. Derivatives: Definition, rates of change

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Week2 Derivatives: Differentiation rules: polynomial, trigonometric, inverse, logarithmic, exponential, implicit functions. The product, quotient, and chain rules.

Week3 Applications of differentiation: Higher derivatives, linear approximation and differentials, minima and maxima, the Mean Value Theorem, L'Hôpital's rule, limits at infinity and asymptotes, curve sketching.

Week4 Applications of differentiation: Applied optimization problems Integrals (Anti-derivatives, approximating areas, the definite integral).

Week5 Integrals: The Fundamental Theorem of Calculus, substitution rule.

Detailed Course Outline

Week	Chapter	Topic
	1 Functions	1.1 Definition and representation of functions 1.2 Types of functions 1.3 Operations on functions (Composition, inverse)
1	2 Limits and continuity	1.4 Mathematical models 2.1 The limit of a function 2.2 The limit laws
		2.3 Continuity 2.4 Precise definition of a limit
	3 Derivatives	3.1 Definition of a derivative 3.2 Derivatives as rates of change
		3.3 Differentiation rules (constants and polynomials) 3.4 The chain, product, and quotient rules
2	3 Derivatives	3.5 Derivatives of trigonometric functions 3.6 Derivatives of inverse functions
		3.7 Implicit differentiation 3.8 Derivatives of exponential and logarithmic functions
		Exam 1
		3.9 Higher derivatives 4.1 Linear Approximation and Differentials
3		4.2 Maxima and minima
	4 Applications of derivatives	4.3 The Mean Value Theorem 4.4 L'Hôpital's rule
		4.5 Limits at infinity and asymptotes 4.6 Curve sketching

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		4.6 Curve sketching 4.7 Applied Optimization problems
4	5 Integrals	5.1 Anti-derivatives
		5.2 Approximating areas 5.3 The definite integral
		Exam 2
		5.4 The Fundamental Theorem of Calculus
5	5 Integrals	5.5 Substitution Rule
		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 must be responsible and show respect towards fellow students. Latecoming 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.