



University of International Business and Economics International Summer Sessions

MAT 110: Calculus I

Term: July 4-August 4, 2016

Instructor: Winston Ou

Home Institution: Scripps College

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Class Hours: Monday through Thursday, 120 minutes each day

Office Hours: TBA

Teaching Assistant: TBD

Email: TBD

Discussion session: TBD

Total Contact Hours: 64 contact hours (45 minutes each, 48 hours in total)

Credit: 4 units

Course Overview

In this course, the student will gain knowledge of the theory and applications of differential calculus and integral calculus (up to the Fundamental Theorem of Calculus and basic substitution) that is, understanding and use of at least the following notions: limit, continuity, infinite limits, differentiability, implicit differentiation, Mean Value Theorem, L'Hopital's Rule, Riemann integral, Fundamental Theorem of Calculus).

Course Goals

A student who satisfactorily completes this course will:

1. Have facility with the theory and techniques of differential calculus (the notion of the derivative as a limit; the Mean Value Theorem, etc.) and have an understanding of why the theory and techniques are valid.
2. Have some facility with the basic theory and techniques of integral calculus: the notion of the Riemann integral, an understanding of the Fundamental Theorem of Calculus, and elementary substitution).
3. Have facility with basic calculational skills, including the ability to: evaluate limits (both finite and infinite), differentiate functions (using, e.g., product rule, quotient rule, Chain Rule, implicit differentiation), find maxima and minima, evaluate the concavity of a function,



evaluate an area under the graph of a continuous function via limits of Riemann sums, use the Fundamental Theorem of Calculus to evaluate an integral, etc.

Required Text

Blank, Brian and Krantz, Steven. *Calculus: Single variable*, second edition.

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. UIBE policy requires a medical certificate to be excused. Any unexcused absence may affect the student's grade. Moreover, UIBE policy is that a student who has more than 1/3 (6 times) of the class in unexcused absences will fail the course.

Grading Policy

UIBE 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:

Participation 5%;

Homework: 20%;

Quiz: 5%;

Exams: 20%;

Final Exam: 30%.

Homework:

Will be assigned daily and due the following day. No late work will be accepted.

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. Moreover, UIBE policy is that a student who has missed more than 1/3 classes of a course will fail the course*
- *Complete the day's required reading and assignments before class*
- *Participate in group discussions and project*
- *Refrain from texting, phoning or engaging in computer activities unrelated to class during class*

- *Participate in class discussions and complete required written work on time*

Course Schedule: (Starred problems are bonus)

Week 1	Assignment
Number systems; Planar Coordinates	1.1: 6, 18, 28, 29, 30, 35, 36, 45, 50, 57, 58
	1.2: 14, 20, 24, 39, 42; 46, 63, 71
Lines; Functions and Graphs	1.3: 18, 23, 38, 47
	1.4: 8, 16, 24, 26, 40
Combining Functions; Trigonometry	1.5: 3, 4, 10, 20, 39, 40, 62, 66*
	1.6: 4, 11, 18, 30, 32, 33, 37, 53, 54
Concept of limit; Limit Theorems	2.1: 6, 16, 18, 22, 24, 29, 37
	2.2: 3, 6, 9, 17, 23, 39, 53, 55
Week 2	
Quiz; Limit Theorems	2.2: 7, 10, 13, 21, 27, 33, 50*, 57, 59, 68, 85
Continuity; Infinite Limits	2.3: 3, 16, 28, 31, 32, 33, 56, 58, 68, *78
	2.4: 7, 16, 18, 22, 28, 35, *56
Limits of Sequences; Exponential Functions	2.5: 13, 14, 18, 24, 40, 42, *63
	2.6: 4, 6, 36, 38, 51, 57, 79
Introduction to the Derivative	3.1: 6, 11, 24, 41, 43, 77
	3.2: 16, 21, 31, 35, 46, 60, *65; read 59
Week 3	
Rules of Differentiation	3.3: 15, 18, 30, 38, 39, 56, 73
	3.4: 19, 20, 22, 34, 39, 50
Exam I; Chain Rule	3.5: 13, 17, 25, 30, 45, 46, read 58, 62, 74
Derivatives of Inverses; Higher Derivatives	3.6: 9, 11, 15, 16, 30, 32, 33, 72
	3.7: 6, 16, 18, 27, 46, 77
Implicit Differentiation; Approximation	3.8: 8, 12, 14, 30, 47, *58
	3.9: 33, 35, 36, 38, 40; 4.1: 9, 12, 23, 32, 36, 38
Week 4	
Mean Value Theorem	4.2: 3, 5, 8, 12, 18, 20, 23
	4.2: 29, 38, 39, 41, 57, *66

Maxima and Minima	4.3: 7, 21, 27, 37, 42, 64
	4.4: 1, 2, 3, 6, 8, 19, *54
Exam II; Concavity	4.5: 13, 16, 19, 38, 39, 50
L'Hopital's Rule; Antiderivatives	4.7: 5, 6, 15, 20, 33, 36, 42, *86
	4.9: 6, 15, 19, 31, 34, 51, 61
Week 5	
Area and Riemann Sums	5.1: 5, 15, 16, 20, 32, 45, *50, *51, 53
	5.2: 2, 5, 9, 22, 28, 31, *69
Rules of Integration; Fundamental Theorem	5.3: 7, 11, 13, 15, 20; 40
	5.4: 2, 7, 11, 15, 21, 28, 43
Substitution	5.6: 3, 6, 13, 15, 19, 21
	5.6: 27, 28, 36, 58, 83, 87
Final Exam	

Note: The pace of the schedule, as well as topics covered, may be adjusted depending on the background, ability, and interests of the students.

General Comments

1. In order to train your minds in mathematical thinking, much of lecture will consist of the “Socratic Method” of questioning. Even if silently, do try to puzzle out the answers. An analogy: the lecture should be a “mental exercise” class. Knowledge cannot be given: it must be stolen. Engage your mind.
2. Many problems will not be solvable at first (or second) viewing. Be patient: clarify any unknown concepts, try to reduce the problem, brainstorm to unearth possibly relevant concepts, and follow your intuition. It may help to, after a period of hard work, put the problem away. Do not worry if you cannot do every problem: what is important is that you try.
3. If you find yourself getting lost in the material, come to office hours immediately! It is much easier to lead a student’s mind individually rather than in a group.
4. Note that we may not dot every i or cross every t in class: you are responsible for reading the text. In particular, it is to your advantage to read the material before coming to class; in this way the student becomes an active participant rather than a passive recipient.
5. Basic etiquette should be maintained. For example: to give your classmates time to think, please do not blurt out answers unless called upon (or overcome with excitement); please do not walk out of class without prior explanation, etc.



6. Using a cell phone in class is not permitted; students using phones will be asked to leave the class and not receive credit for attendance that day.