Basic Calculus

Unit of Study Outline

1. Unit of study information

This course covers topics regarding functions and models, limits and derivatives, differentiation rules and integrals. Those are basic elements in calculus which will lead you to the wonderful world of mathematics. It has a multitude of applications in economics, physical sciences, engineering and other social science.

2. Pre-requisite units and assumed knowledge

Students should have a strong understanding of college algebra.

3. Learning aims and outcomes

By completion of this course, the student will be able to:

- Understand main types of functions that occur in calculus and process of using these functions as mathematical models of real-world phenomena by using graphing calculators and graphing software for computers.

- Understand limits and their properties which is used to find tangents and velocities.

- Use differentiation rules to solve problems involving rates of change and the approximation of functions.

- Understand how locate maximum and minimum values of functions

- Understand how to use derivative to formulate the idea of a definite integral

4. Weighting of final grade

Participation 10%
Exams 2 10% for each
Assignments 35%
Final Exam 35%

5. Grading

A   100-95   A- 94-90   B+ 89-87

B   86-83   B- 82-80   C+ 79-77

C   76-73   C- 72-70   D+ 69-67

D   66-63   D- 62-60   F   59 or lower

6. Policies

Attendance Policy

Attendance in class is mandatory for all students enrolled in the course. Any excused absence must be discussed directly with the teacher. Being late to class within 15 minutes will be recorded as 1 LATE and being late over 15 minutes will be recorded as 1 ABSENCE. 3 LATES equal to 1 ABSENCE. 20% absences of the total teaching hours will cause an F (a failing grade) directly. However, students are still welcome to continue to attend class. F students have no right to drop this course anymore. Each unexcused absence will result in the lowering of the attendance grade by 1 point. Each excused absence will result in the lowering of the attendance grade by 0.5 point.

Participation Policy

Students should participate in their chosen classes actively and effectively. The Participation Grade is related to the Attendance Grade. Students' final attendance grade is the maximum of their participation grade.

Participation grade will be based on a variety of factors including, but not limited to taking part in class discussions and activities, completing assignments, being able to answer questions correctly, obeying class rules, and being prepared for class, frequent visiting your instructors and chatting in English during their office hours is highly recommended.

Policy on Assignments and Quizzes

Students should finish their assignments completely and punctually. Assignment should be submitted on the date appointed by the instructor. If a student cannot hand in the assignment on time, the reasonable excuse will be needed. Late assignments will receive a maximum grade of 80. An assignment that is late for 3 days will be corrected but receive 0.

You are recommended print all your assignment in the uniform format with the heading of Student's Pledge of no cheating. Written assignment or printed ones without the uniform heading of pledge will receive a maximum grade of 80.

It is mandatory to have weekend assignment every week. Any weekend assignment should be submitted on first class of next week.

It is mandatory to have holiday assignment on the public holidays. Any holiday assignment should be submitted on the first day on returning to school.

Students are required to do a multitude of presentations during the course.

Plagiarism

Any form of cheating is NEVER tolerated. Any student ONCE caught cheating on a quiz, assignment or examination will receive a 0 for that particular work of the whole semester. At the beginning of the semester the definition of plagiarism will be carefully explained. When any thoughts or writings of another person are used, the sources must be clearly identified (using quotes, bibliography and giving reference).

Classroom Policies

1. No eating, cellular phones, electronic dictionaries, smoking, chatting or drowsing in class.
2. Please speak in English rather than Chinese in class.
3. Students are not allowed to attend class without textbooks.
4. Stand up when answering questions.
5. Respect classmates' ideas, opinions, and questions of your classmates.
6. You are welcome to visit the instructor's office in his/her office hours.
7. Take good care of the laboratory facilities. Do not splash water on the desktop.
8. When each class is over, hang the earphone on the hanger. Put the trash into the trash-bin.
9. All your classroom involvement, performance and after-class communications with instructor will affect your participation score.
10. All communications with the teacher must be in English, both inside and outside class time.

7. Texts and other recourses

Stewart, James (2004). Calculus, 5th ed., Higher Education Press

8. Teaching methods

Lecture with class discussion based on assigned homework.

9. Week by week topic and study guide

Week 1		**Chapter 1. Functions and Models**
	1.1	Exponential Functions
	1.2	Inverse Functions and Logarithms
Week 2		**Chapter 2. Limits and Derivatives**
	2.1	The Tangent and Velocity Problems
	2.2	The Limit of a Function
	2.3	Calculating Limits Using the Limit Laws
Week 3	2.4	The Precise Definition of a Limit
	2.5	Continuity
Week 4	2.6	Limits at Infinity; Horizontal Asymptotes
	2.7	Tangents, Velocities, and Other Rates of Change
	2.8	Derivatives
Week 5	2.9	The Derivative as a Function
	3	**Chapter 3. Differentiation Rules**
	3.1	Derivatives of Polynomials and Exponential Functions
	3.2	The Product and Quotient Rules
	3.3	Rates of Change in The Natural and Social Sciences
Week 6		**Exam I**
	3.4	Derivatives of Trigonometric Functions
Week 7	3.5	The Chain Rule
	3.6	Implicit Differentiation
Week 8	3.7	Higher Derivatives
	3.8	Derivatives of Logarithmic Functions
	3.10	Related Rates
Week 9	3.11	Linear Approximations and Differentials
	4	**Chapter 4. Applications of Differentiation**
	4.1	Maximum and Minimum Values
	4.2	Mean Value Theorem
Week 10	4.3	How Derivatives Affect the Shape of a Graph
	4.4	Indeterminate Forms and L'Hospital's Rule
	4.5	Summary of Curve Sketching
Week 11	4.6	Graphing with Calculus and Calculators

Week 12		**Exam II**
	4.7	Optimization Problems
Week 13	4.9	Newton's Method
	4.10	Antiderivatives
	5	**Chapter 5.Integrals**
	5.1	Areas and Distances
Week 14	5.2	The Definite Integral
Week 15	5.3	The Fundamental Theorem of Calculus
	5.4	Indefinite Integrals and the Total Change Theorem
Week 16	5.5	The Substitution Rule
	5.6	The Logarithm Defined as an Integral
Week 17		**Final Exam**