King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics
Math 101 – Syllabus (Term 181)

Coordinator: Dr. Ali N. Duman

Title: Calculus I

Credit: 4-0-4

Textbook: Calculus (Early Transcendental) by J. Stewart, 8th edition, Brooks/Cole, 2015.

Description: Limits and continuity of functions of a single variable. Differentiability. Techniques of differentiation. Implicit differentiation. Local extrema, first and second derivatives tests for local extrema. Concavity and inflection points. Curve sketching. Applied extrema problems. The Mean Value Theorem and applications.

Learning Outcome:

Upon successful completion of this course, a student should be able to:

1. Compute various types of limits of functions.
2. Apply the precise definition of a limit to some simple functions.
3. Determine the region of continuity and types of discontinuity of a function.
4. Apply the intermediate value theorem to locate zeros of functions.
5. Compute the slope of a curve at a point and the rate at which a function changes.
6. Calculate derivatives of different types of functions (exponential, logarithmic, trigonometric and inverse trigonometric functions) by using derivative rules.
7. Use differentials to estimate errors.
8. Differentiate the hyperbolic functions.
9. Find extreme values of functions.
10. Sketch and analyze the graphs of various types of functions.
11. Apply Newton's method to approximate zeros of functions.
12. Solve single variable optimization problems using derivatives.
13. Recover some basic functions from their derivatives.

Grading Policy:

Exam I A common multiple choice exam	**Material:** [2.1-2.7] **Date**: 7/10 Sunday **Time:** 5:45 pm **Place:** TBA	25% (100 points)
Exam II A common multiple choice exam	**Material:** [2.8-3.9] **Date**: 11/11 Sunday **Time:** TBA **Place:** TBA	25% (100 points)
Final Exam A comprehensive common multiple choice exam	**Material:** (Comprehensive) **Date**: 22/12 Saturday **Time:** 7:30 am **Place:** TBA	35% (140 points)
Class Work	**i) Online Homework:** Online homework is provided through Blackboard	5% (20 points)
	ii) Class Activities: They are based on quizzes, class tests, or other class activities determined by the instructor. Any quiz or test under class activity should be of written type and not of multiple-choice type. The average x (out of 40) of class activities of the sections taught by the same instructor should be in the interval [28, 30].	10% (40 points)
Passing Grade	**A student must score at least 50% (200 points) to pass the course**.	

Exam Questions:
The questions of the common exams are based on the examples, homework problems, recitation problems and the exercises of the textbook.

Missing Exam I or Exam II:
No makeup exam will be given under any circumstance. When a student misses Exam I or Exam II for a legitimate reason (such as medical emergencies), his grade for this exam will be determined based on the existing formula, which depends on his performance in the non-missing exam and in the final exam.

Attendance:
Attendance is a University Requirement. A DN grade will be awarded to any student who accumulates 12 unexcused absences for UTR sections and 9 absences for MW sections, including recitation.

Academic Integrity: All KFUPM policies regarding ethics apply to this course.

The pace and material covered in the course

Week	Dates	Sec.	Topics
1	Sept. 2 – 6	2.1	The Tangent Problem (Example 1).
		2.2	The Limit of a Function.
2	Sept. 9 – 13	2.3	Calculating Limits Using the Limit Laws
		2.4	The Precise Definition of a Limit **(Examples: 1, 2 and 3)**
3	Sept. 16 – 20	2.5 2.6	Continuity Limits at Infinity; Horizontal Asymptotes
4	Sept. 24 – 27	2.7	Derivative and Rates of Change
		2.8	The Derivative as a Function + **Exercise # 64**
5	Sept. 30 – Oct. 4	2.8	Continued
		3.1	Derivatives of Polynomials and Exponential Functions
Exam I: Oct. 7 [2.1- 2.7]			
6	Oct. 7 – 11	3.2	The Product and Quotient Rules
		3.3	Derivatives of Trigonometric Functions
7	Oct. 14 – 18	3.4	The Chain Rule
		3.5	Implicit Differentiation + **Exercise # 77**
8	Oct. 21 – 25	3.6	Derivatives of Logarithmic Functions
		3.7	Rates of Change **(Example 1)**
9	Oct. 28 – Nov. 1	3.9	Related Rates
		3.10	Linear Approximations and Differentials
Exam II: Nov. 11 [2.8-3.9]			
10	Nov. 4 – 8	3.10	Continued
		3.11	Hyperbolic Functions (**Examples: 1 and 2**)
11	Nov. 11 – 15	4.1	Maximum and Minimum Values
		4.2	The Mean Value Theorem
12	Nov. 18 – 22	4.3	How Derivatives Affect the Shape of a Graph
		4.4	Indeterminate Forms and L'Hospital's Rule
13	Nov. 25 – 29	4.5	Summary of Curve Sketching
		4.7	Optimization Problems
14	Dec. 2 – 6	4.7	Continued
		4.8	Newton's Method
15	Dec. 9 – 13	4.9	Antiderivatives
			Review
Final Exam: Dec. 22(Comprehensive)			

Recitation problems & some suggested problems

Section	Recitation Problems	Suggested Problems	CAS*
2.2	6, 12, 18, 36, 40, 44	9, 11, 17, 35, 37, 39, 41	-
2.3	12, 18, 22, 24, 26, 32, 51, 54	1, 9, 11, 17, 21, 25, 29, 53	-
2.4	2, 14, 18, 22	3, 5, 13, 17, 21	-
2.5	6, 12, 16, 20, 24, 34, 36, 40, 42, 46	3, 7, 13, 15, 17, 19, 21, 23, 29, 31, 35, 43, 45, 47, 49	34
2.6	6, 10, 14, 18, 24, 28, 36, 42, 50	3, 7, 13, 15, 17, 19, 25, 35, 39, 41, 49	45
2.7	6, 10, 14, 22, 28, 36, 38	7, 9, 13, 21, 23, 25, 29, 35, 39	-
2.8	2, 4, 8, 24, 28, 50, 62	1, 3, 9, 25, 29, 41, 49, 61	55
3.1	10, 24, 38, 50, 56, 70, 72	9, 23, 35, 37, 49, 55, 59, 61, 69, 71, 73, 75, 81	47, 60
3.2	6,10, 20, 30, 32, 42, 46, 48, 52(d)	5, 9, 11, 23, 29, 31, 41,43, 49, 51, 53	38
3.3	6, 12, 22, 44, 52	3, 11, 23, 43, 49, 51	-
3.4	18, 26, 42, 50, 54, 62, 78	19, 25, 39, 53, 59, 61, 77	-
3.5	6, 14, 20, 22, 30, 58, 74(a), 78	7, 11, 15, 17, 21, 29, 57, 75, 77	-
3.6	12, 16, 18, 32, 34, 42, 48, 54	3, 9, 19, 31, 33, 41, 49, 53	-
3.7	2, 8	1, 3, 5, 9	-
3.9	4, 6, 12, 48	3, 7, 13, 19, 31	-
3.10	6, 16, 24, 28, 34	5, 17, 25, 27, 35	5
3.11	10, 20, 30, 46	7, 9, 21, 31, 57	-
4.1	10, 12, 28, 30, 34, 36, 42, 54	3, 5, 9, 11, 27, 33, 35, 39,55, 57	-
4.2	4, 8, 12, 16, 20, 26	3, 7, 9, 13, 15, 19, 25, 33	-
4.3	14, 18, 20, 24, 36, 52	11, 13, 17, 21, 23, 25, 31, 35, 53, 57	62
4.4	12, 14, 48, 52, 64	13, 15, 23, 25, 33, 47, 53, 57, 87	72
4.5	30, 44, 62, 72	19, 33, 37, 63, 71	-
4.7	2, 6, 14, 32	3, 5, 15, 23, 29, 31	-
4.8	8, 12, 22	7, 11, 17	-
4.9	6, 12, 20, 38, 44, 54, 62	7, 15, 19, 35, 37, 41, 51, 59	-

CAS problems require the use of a technology tool (e.g., graphing calculators or a computer). You are encouraged to do these problems in order to enhance your understanding of the concepts involved.