King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics
Math 101 – Syllabus (Term 171)
Coordinator: Dr. Slim Belhaiza

Title: Calculus I

Credit: 4-0-4

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

Description: To introduce the student to the basic concepts and methods of Calculus, topics include:

- Limits, continuity and differentiability of functions of a single variable (exponential, logarithmic, trigonometric and inverse trigonometric functions.)
- Applications: related rates, local linear approximation, differentials, hyperbolic functions, curve sketching and applied optimization problems.

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

1. Exam I A common multiple choice exam	**Material:** (2.1-2.8) **Date**: Sunday, October 22nd **Time: 6 pm to 8 pm Place: TBA**	25% (100 points)
2. Exam II A common multiple choice exam	**Material:** (3.1-3.9) **Date**: Tuesday, November 28th **Time: : 6 pm to 8 pm Place: TBA**	25% (100 points)
3. Final Exam A comprehensive common multiple choice exam	**Material:** (Comprehensive) **Date**: **Thursday, January 4th** **Time: 8 am to 11 am** **Place: TBA**	35% (140 points)

4. Class Work	**i) Online Homework:** The web address for online homework is: https://www.webassign.net.	5% (20 points)
	ii) Class Activities: It is 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)

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 (lecture and recitation).

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

Material and Pace

Week	Dates (2017)	Sec.	Topics
1	Sep. 17 - 21	2.1	The Tangent Problem (Example 1).
		2.2	The Limit of a Function.
2	Sep. 25 - 28	2.3	Calculating Limits Using the Limit Laws
		2.4	The Precise Definition of a Limit **(Examples 1, 2 and 3)**
3	Oct. 1 - 5	2.5	Continuity
		2.6	Limits at Infinity; Horizontal Asymptotes
4	Oct. 7 - 12 Normal Sunday Class Saturday October 7th	2.7	Derivative and Rates of Change
		2.8	The Derivative as a Function + **One-Sided Derivatives [Ex. 64].**
5	Oct. 15 - 19	2.8	Continued
		3.1	Derivatives of Polynomials and Exponential Functions
Exam#1: Oct. 22nd (2.1- 2.8)			
6	Oct. 22 - 26	3.2	The Product and Quotient Rules
		3.3	Derivatives of Trigonometric Functions
7	Oct. 29 – Nov. 2	3.4	The Chain Rule
		3.5	Implicit Differentiation + **Exercise # 77**
8	Nov. 5 - 9	3.6	Derivatives of Logarithmic Functions
		3.7	Rates of Change **(Example 1)**
9	Nov. 12 - 16	3.9	Related Rates

		3.10	Linear Approximations and Differentials
10	Nov. 19 - 23	3.11	Hyperbolic Function (**Example1 and 2**)
		4.1	Maximum and Minimum Values
Exam#2: Nov. 28th (3.1- 3.9)			
11	Nov. 26 - 30	4.2	The Mean Value Theorem
		4.3	How Derivatives Affect the Shape of a Graph
12	Dec. 3 - 7	4.3	Continued
		4.4	Indeterminate Forms and L'Hospital's Rule
13	Dec. 10 - 14	4.5	Summary of Curve Sketching
		4.7	Optimization Problems
14	Dec. 17 - 21	4.7	Continued
		4.8	Newton's Method
15	Dec. 24 - 28	4.9	Antiderivatives
			Review
Final Exam: Jan. 4th 2018.			

Recitation problems & 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	