King Fahd University of Petroleum and Minerals

Department of Mathematics & Statistics
Math 101 – Syllabus
2016/2017 (163)
Coordinator: Jawad Abuihlail (Room: 5-507; Tel: 4737)

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 Outcomes:

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 rule of derivation.
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: (Notice that the letter grade D begins with 200/400, i.e. 50%)

Exam I A common MCQ exam	**Material: 2.1 – 2.8**	**Place: TBA**	25% (100 points)
	Date: Monday, Jul. 24th, 2017	**Time:** 19:00 – 21:00	
Exam II A common MCQ exam	**Material: 3.1 – 3.9**	**Place: TBA**	25% (100 points)
	Date: Tuesday, Aug. 8th, 2017	**Time:** 19:00 – 21:00	
Final Exam A comprehensive common MCQ exam	**Material: Comprehensive**	**Place: TBA**	35% (140 points)
	Date: Tuesday August 22nd, 2017	**Time:** 19:00 – 22:00	
Class Work	**i) Online Homework:** The web address for online homework is **kfupm.mylabsplus.com**		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)
Passing Grade	A student must score at least 50% (200 points out of 400) 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 (see p. 38 of the Undergraduate Bulletin 2006-2009). A DN grade will be awarded to any student who accumulates a total of 9 unexcused absences in both Lecture & Recitation.

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

Week	**Dates (2017)**	**Sec.**	**Topics** (25 sections)
1	July 9-13	2.1	The Tangent Problem (Example 1).
		2.2	The Limit of a Function.
		2.3	Calculating Limits Using the Limit Laws
		2.4	The Precise Definition of a Limit (Examples 1, 2 and 3)
2	July **15**-20	2.5	Continuity
		2.6	Limits at Infinity; Horizontal Asymptotes
		2.7	Derivative and Rates of Change
		2.8	The Derivative as a Function + Exercise # 56
Exam I: Material 2.1- 2.8; Monday, Jul. 24th, 2017			
3	July 23-27	3.1	Derivatives of Polynomials and Exponential Functions
		3.2	The Product and Quotient Rules
		3.3	Derivatives of Trigonometric Functions
		3.4	The Chain Rule
		3.5	Implicit Differentiation + Exercise # 77
4	July 30- August 3	3.6	Derivatives of Logarithmic Functions
		3.7	Rates of Change (Example 1)
		3.9	Related Rates
		3.10	Linear Approximations and Differential
		3.11	Hyperbolic Function (Example1 and 2)
Exam II: Material 3.1- 3.9; Tuesday, August 8th, 2017			
5	August 6-10	4.1	Maximum and Minimum Values
		4.2	The Mean Value Theorem
		4.3	How Derivatives Affect the Shape of a Graph
		4.4	Indeterminate Forms and L'Hospital's Rule
6	August 13-17	4.5	Summary of Curve Sketching
		4.7	Optimization Problems
		4.8	Newton's Method
		4.9	Antiderivatives
7	August 20	Catch Up & Revision	
Final Exam (Comprehensive): Tuesday August 22nd, 2017; 19:00 – 22:00			

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 to enhance your understanding of the concepts involved.