

**King Fahd University of Petroleum & Minerals**  
**Department of Mathematics & Statistics**  
**Math 101 – Syllabus (Term 183)**  
**Coordinator: Izhar Ahmad**

**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:**

<p><b>1. Exam I</b> A common multiple choice exam</p>	<p><b>Material:</b> (2.1-2.8)  <b>Date:</b> June 25, 2019  <b>Time:</b> 19:30 – 21:00  <b>Place:</b> B#54</p>	<p style="text-align: center;">25%  (75 points)</p>
<p><b>2. Exam II</b> A common multiple choice exam</p>	<p><b>Material:</b> (3.1-3.9)  <b>Date:</b> July 08, 2019  <b>Time:</b> 19:30 – 21:00  <b>Place:</b> B#54</p>	<p style="text-align: center;">25%  (75 points)</p>
<p><b>3. Final Exam</b> A comprehensive common multiple choice exam</p>	<p><b>Material:</b> (Comprehensive)  <b>Date:</b> July 31, 2019  <b>Time:</b> 7.30 A M  <b>Place:</b> TBA</p>	<p style="text-align: center;">35%  (105 points)</p>

<b>4. Class Work</b>	<b>i) Homework:</b> The online homework is provided through BlackBoard.	5% (15 points)
	<b>ii) Class Activities:</b> It is based on quizzes, class tests, or other class activities determined by the instructor. The average x (out of 30) of class activities of the sections taught by the same instructor should be in the interval [21, 22.5] (that is [70%, 75%] of the class work grade)	10% (30 points)

**The Course Passing Grade:** A student must score at least 50% (150/300) to pass the course.

**Upgrade Policy:** The upgrade policy is applied when 3 points out of 300 are needed to get the next higher grade. For instance, the passing grade (D) starts at 150/300. If a student gets 148/300 or 149/300, then his grade will be automatically upgrade to D. However, if a student gets 147/300, his grade will be upgraded to D only if his final exam score is greater than or equal 52.5/105.

**Exams:**

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

**Cheating in Exams:** Cheating or any attempt of cheating by use of illegal activities, techniques and forms of fraud will result in a grade of **F** in the course along with reporting the incident to the higher university administration. Cheating in exams includes (but is not limited to)

- Looking at the papers of other students
- Talking to other students
- Using mobiles or any other electronic devices

**Missing an Exam:**

**Exam I or II:** No make-up exam will be given under any circumstances. In case 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 of his performance in the non-missed exam and in the final exam.

**Final Exam:** If a student misses the final exam for a legitimate reason (such as medical emergencies), he will be given a make-up final exam.

**Attendance:** Students are expected to attend all lecture and recitation classes.

- If a student misses a class, he is responsible for any announcement made in that class.
- A DN grade will be awarded to any student who accumulates
  - 08 unexcused absences in lecture and recitation classes.
  - 13 excused and unexcused absences in lecture and recitation classes.

(Note: the general rule for DN:

20% unexcused absences of the number of classes, and

33% excused and unexcused absences of the number of classes.)

**The Usage of Mobiles in Class:** Students are not allowed to use mobiles for any purpose during class time. Students who want to use electronic devices to take notes must take permission from their instructor. Violations of these rules will result in a penalty decided by your instructor.

**Academic Integrity:** All KFUPM policies regarding ethics apply to this course. See the Undergraduate Bulletin.

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Week	Dates (2018)	Sec.	Topics
1	June 09 – June 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 ( <b>Examples 1, 2 and 3</b> )
2	June 16 – June 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 + <b>Exercise # 64</b>
		2.8	Continued
3	June 23 – June 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
<b>Exam 1: Tuesday, June 25 (19:30 – 21:00) 2.1 – 2.8</b>			
4	June 30– Jul. 05	3.5	Implicit Differentiation + <b>Exercise # 77</b>
		3.6	Derivatives of Logarithmic Functions
		3.7	Rates of Change ( <b>Example 1</b> )
		3.9	Related Rates
5	Jul. 07 – Jul. 11	3.10	Linear Approximations and Differentials
		3.11	Hyperbolic Function ( <b>Example 1 and 2</b> )
		4.1	Maximum and Minimum Values
		4.2	The Mean Value Theorem
<b>Exam 2: Monday, July 08 (19:30 – 21:00) 3.1 – 3.9</b>			
6	Jul. 14 – Jul 18	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
7	Jul. 21– Jul. 25	4.7	Optimization Problems
		4.8	Newton's Method
		4.9	Antiderivatives
8	Jul. 28-Jul. 29		Review
<b>Final Exam, July 31, 2019 at 7.30 AM</b>			

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**Homework & Recitation Problems**

Section	Homework Problems	Recitation 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	-
3.1	6, 16, 24, 28, 34	5, 17, 25, 27, 35	5
3.1	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, 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.

**Tips on how to enhance your problem-solving abilities:**

1. Please do all the homework assignments on time.
2. You are urged to practice (but not memorize) more problems than the above lists.
3. You should always try to solve a problem on your own before reading the solution or asking for help.
4. If you find it difficult to handle a certain type of problems, you should try more problems of that type.
5. You should try the recitation problems before coming to class.
6. You are encouraged to solve some of the review problems at the end of each chapter.
7. The practice you get doing homework and reviewing the class lectures and recitations will make exam problems easier to tackle.
8. Try to make good use of the office hours of your instructor.