

**King Fahd University of Petroleum and Minerals**  
**Department of Mathematics & Statistics**  
**Math 101 – Syllabus (Term 201)**  
**Coordinator: Dr. Mohammad Z. Abu-Sbeih**

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<b>Title:</b>	Calculus I
<b>Credit:</b>	4-0-4
<b>Textbook:</b>	Calculus (Early Transcendental) by J. Stewart, 8 <sup>th</sup> edition, Brooks/Cole, 2016.

**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.

### The Adjusted Course Grading Policy:

Type of Assessment	Date	Time	Percentage	Material
Online Assessment 1	Sunday 4/10/2020	6:00 - 8:00 PM	15%	Sections: 2.1 - 2.7
Midterm	Sunday 18/10/2020	6:00 - 8:00 PM	25%	Sections:2.8, 3.1 - 3.4
Study Plan			20%	
Classwork			15%	
Final *			25% *	
<b>Total</b>			<b>100%</b>	

\*In case the final is face to face, the allocated marks will be adjusted

**Exam Questions:** The questions of the exams are similar to 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:

No make-up exam will be given under any circumstances for common exams. In case a student misses any of the major exams, for a legitimate reason (such as medical emergencies), his grade for this exam will be determined based on his performance in the other taken common exams.

**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
  - 12 unexcused absences in lecture and recitation classes.
  - 20 excused and unexcused absences in lecture and recitation classes.

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

### The Pacing Schedule

Week	Date (2020)	Section	Topics
1	Aug. 30- Sep. 3	2.1 2.2	The Tangent Problem (Example 1). The Limit of a Function.
2	Sep. 6- 10	2.3 2.4	Calculating Limits Using the Limit Laws The Precise Definition of a Limit ( <b>Examples 1, 2 and 3</b> )
3	Sep. 13- 17	2.5 2.6	Continuity Limits at Infinity; Horizontal Asymptotes
4	Sep. 20- 22	2.6 2.7	Continued Derivative and Rates of Change
<b>Wednesday-Thursday, Sep. 23-24, 2020: The National Day Holiday</b>			
5	Sep. 27- Oct. 1	<b>2.8</b> <b>3.1</b>	The Derivative as a Function + <b>Exercise # 64</b> Derivatives of Polynomials and Exponential Functions
6	Oct. 4- 8	<b>3.2</b> <b>3.3</b>	The Product and Quotient Rules Derivatives of Trigonometric Functions
7	Oct. 11- 15	<b>3.4</b> <b>3.5</b>	The Chain Rule Implicit Differentiation + <b>Exercise # 77</b>
8	Oct. 18- 22	<b>3.6</b> <b>3.7</b>	Derivatives of Logarithmic Functions Rates of Change ( <b>Example 1</b> )
9	Oct. 25- 29	<b>3.9</b> <b>3.10</b>	Related Rates Linear Approximations and Differentials
10	Nov. 1- 5	<b>3.10</b> <b>3.11</b>	Continued Hyperbolic Functions ( <b>Examples: 1 and 2</b> )
11	Nov. 8- 12	<b>4.1</b> <b>4.2</b>	Maximum and Minimum Values The Mean Value Theorem
12	Nov. 15- 19	<b>4.3</b> <b>4.4</b>	How Derivatives Affect the Shape of a Graph Indeterminate Forms and L'Hospital's Rule
13	Nov. 22- 26	<b>4.5</b> <b>4.7</b>	Summary of Curve Sketching Optimization Problems
14	Nov. 29- Dec. 3	<b>4.7</b> <b>4.8</b>	Continued Newton's Method
15	Dec. 6- 10	<b>4.9</b>	Antiderivatives
16	Dec. 13 Dec. 14	<b>Review/ Catching up</b>	<b>Normal Wednesday Class</b> <b>Normal Thursday Class</b>
<b>Final Exam (Comprehensive, MCQ):</b>			

## Homework Assignments

Sec	Suggested 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.