King Fahd University of Petroleum and Minerals
Department of Mathematics
Math 101 – Syllabus (Term 211)
Coordinator: Dr. Khalid Al-Shammari
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Title: Math 101

Credit: 4-0-4

Textbook: Calculus (Early Transcendental) by J. Stewart, 8th edition, Brooks/Cole, 2016.

The Course Objective: The objective of the course is to introduce students to the concepts of limits, continuity, differentiation and their applications.

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

The Course Prerequisite: One-year preparatory mathematics or its equivalent.

The Course Learning Outcomes: Upon completion of this course, students should be able to:

1. Compute various types of limits of functions of one variable.
2. Determine the region of continuity and types of discontinuity of a function.
3. Compute the slope of the tangent line at a point.
4. Calculate derivatives of polynomial, rational, trigonometric, inverse trigonometric, exponential, logarithmic, hyperbolic, piecewise, and related functions.
5. Find extreme values, regions of monotonicity and concavity, asymptotes of a function of one variable.
6. Apply derivatives in estimating errors, approximating roots of equations via Newton's method and in solving optimization problems.
7. Recover some basic functions from their derivatives.

The Course Grading Policy:

	Date (Tentative)	Time (Tentative)	Place	Materials	Percentage
Exam I (15 MCQ)	Sunday, 3 Oct.	06:00-07:30 pm	Building 54	2.1 – 2.8	25% (75 pts)
Exam II (15 MCQ)	Sunday, 7 Nov.	06:00-07:30 pm	Building 54	3.1 – 3.10	25% (75 pts)
Final Exam (21 MCQ)	Follow the registrar final schedule on his webpage.			Comprehensive	35% (105 pts)
Homework	The online homework.				5% (15 pts)
Class Work	▪ It is based on quizzes, class tests, or other class activities determined by the instructor. ▪ The average x (out of 30) of the class work of all 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 pts)

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 (2021)	Section	Topics
1	Aug. 29-Sep.2	2.1 2.2	The Tangent Problem (Example 1). The Limit of a Function.
2	Sep. 5-9	2.3 2.4	Calculating Limits Using the Limit Laws The Precise Definition of a Limit **(Examples 1, 2 and 3)**
3	Sep. 12-16	2.5 2.6	Continuity Limits at Infinity; Horizontal Asymptotes
4	Sep. 19-22	2.6 2.7	Continued Derivative and Rates of Change
Thursday, Sep. 23, 2021: The National Day Holiday			
5	Sep. 26-30	**2.8** **3.1**	The Derivative as a Function + **Exercise # 64** Derivatives of Polynomials and Exponential Functions
6	Oct. 3-7	**3.2** **3.3**	The Product and Quotient Rules Derivatives of Trigonometric Functions
7	Oct. 10-14	**3.4** **3.5**	The Chain Rule Implicit Differentiation **+ Exercise # 77**
Sunday October 17, 2021: Student Break			
8	Oct. 18-21	**3.6** **3.7**	Derivatives of Logarithmic Functions Rates of Change **(Example 1)**
9	Oct. 24-28	**3.9** **3.10**	Related Rates Linear Approximations and Differentials
10	Oct. 31-Nov .4	**3.10** **3.11**	Continued Hyperbolic Functions (**Examples: 1 and 2)**
11	Nov. 7-11	**4.1** **4.2**	Maximum and Minimum Values The Mean Value Theorem
12	Nov. 14-18	**4.3** **4. 4**	How Derivatives Affect the Shape of a Graph Indeterminate Forms and L'Hospital's Rule
13	Nov. 21-25	**4.4** **4.5**	Continued Summary of Curve Sketching
Midterm Break: Nov. 28-Dec. 2			
14	Dec. 5-9	**4.7** **4.8**	Optimization Problems Newton's Method
15	Dec. 12-16	**4.8** **4.9**	Continued Antiderivatives
16	Dec. 19 Dec. 20	**Review/ Catching up**	**Normal Thursday Class**
Final Exam (Comprehensive, MCQ):			

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	-

Tips on how to enhance your mathematical skills and achieve better grades:

1. First, consult your instructor immediately whenever you need help.
2. Take notes during classes and study your notes and textbook on the same day.
3. Do each homework assignment immediately.
4. Master the examples and homework problems of each section plus the recitation problems.
5. Try solving the recitation problems before coming to class.
6. When practicing some problems, time yourself to finish your solution before reading answers. That is, adapt yourself to the exam environment.
7. Solve some of the review problems at the end of each chapter.
8. Last and most important, study in the library.