

King Fahd University of Petroleum & Minerals

Department of Mathematics

Math 106 Syllabus, Semester 261 (2026-2027)

Coordinator: Dr. Manal Alotaibi (manal.alotibi@kfupm.edu.sa)

Course Code & Title: MATH - 1 06, Calculus for Business.

Course Credit Hours: 3–0–3 (Three lecture hours per week)

Textbook: Introductory Mathematical Analysis for Business, Economics, and the Life and Social Sciences by Haeussler, Ernest F., Richard S. Paul, and Richard J. Wood (13th edition) Pearson, 2014

Course Description: Limits and continuity. The derivative and rules for differentiation of various types of functions. Differentials. Implicit and logarithmic differentiation. Applications to optimization and curve sketching. Definite and indefinite integrals. Techniques of integration. Integration by tables. Area under a curve and between curves. Functions of several variables. Partial derivatives and their applications to optimization.

Prerequisite: One-year preparatory mathematics or its equivalent

Course Objectives: 1. To introduce students to the basic concepts of the derivative of functions of one variable and its applications to business.

2. To introduce students to the concept of integration and its applications.

3. To introduce students to the concept of partial derivatives of functions of several variables and its applications to optimization.

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

1. Compute the derivatives of various types of functions of one variable.

2. Determine the relative and absolute extrema and inflection points of a function of one variable.

3. Evaluate the integral of some algebraic and trigonometric functions.

4. Compute area between curves.

5. Calculate partial derivatives of functions of several variables and find the extreme values of functions of two variables.

6. Apply the concepts and techniques of calculus to solve problems in business and economics.

Grading Policy:

	Date	Time	Place	Material	Points /300
Exam I	TBA	TBA	TBA	Sec. 10.1–12.4	25% (75 points)
Exam II	TBA	TBA	TBA	Sec. 12.5–14.3	25% (75 points)
Final Exam	TBA	TBA	TBA	Comprehensive	35% (105 points)
Class Work	▪ It is based on quizzes, class tests, or other class activities determined by the instructor. ▪ The average (out of 45) of the class work of each section has to be in the interval $[y - 1.5, y + 1.5]$, where $y = \frac{9}{40}(\text{median}(\text{Exam I})\% + \text{median}(\text{Exam II})\%)$.				15% (45 points)
Total					100 % (300 points)

Letter Grades: Final letter grades will be assigned according to a grading curve, which will be determined based on the overall performance of all students enrolled in the course. The exact cutoffs may change from one term to another, depending on how the scores are distributed.

Exam Questions: Exam questions will be similar in style and level of difficulty to the examples and exercises provided in the textbook.

Cheating in Exams: Cheating, or any attempt to cheat using unauthorized methods or fraudulent practices, will result in a grade of DN for the course. The incident will also be reported to the university administration for further disciplinary action. Cheating in exams includes (but is not restricted to):

- Looking at another student's paper.
- Talking to other students.
- Using mobiles, smart watches or any other electronic devices.
- Using AI tools.

Other Exam Issues:

- Students must present a valid physical KFUPM ID, National/Iqama ID, or Driver's License to be admitted into the exam hall/room. No ID, No Exam.
- Mobiles, smart watches, and all electronic devices are not allowed in the exam hall/room.
- Students must sit in their assigned seats during the exam.
- Failure to comply with the above rules will be treated as cheating.
- If you have a medical situation (e. g., being diabetic) that urges you to go to the bathroom, please bring an evidence (e. g., a medical report approved by **Student Affairs**).

Missing an Exam: In case a student misses an exam (Exam I, Exam II, or the Final Exam) for a legitimate reason (such as medical emergencies), the student must submit an official excuse approved by the Deanship of Student Affairs within **seven calendar days** of the missed exam date. Without an approved excuse, the student will receive a score of zero for the missed exam. When the excuse is accepted, the coordinator will arrange a makeup exam for the missed exam.

Attendance: Students are expected to attend all classes regularly and are responsible for any announcements made during class. A DN grade will be given after two warnings if a student reaches 9 unexcused absences (20% of the course) or a total of 15 absences whether excused or not (one-third of the course).

Use of Mobile Devices in Class: The use of mobile phones during class is strictly prohibited. Students who wish to use laptops or tablets for notetaking must first obtain permission from the instructor. Any violation will result in a penalty determined by the instructor.

Academic Integrity: All KFUPM academic integrity policies apply to this course. For details, students should refer to the Undergraduate Bulletin available on the Registrar's website.

Accessibility and Accommodations: Students with documented special needs, approved by the Deanship of Student Affairs, should contact the course coordinator to arrange reasonable accommodation.

Honor code

Students of this course are expected to maintain the highest level of academic integrity and ethics. A KFUPM student does not cheat or tolerate those who do. Every student is expected to submit work that is entirely their own, to properly cite all sources used, and to refrain from any form of academic misconducts.

Plagiarism

Use of another person's ideas, processes, results, or words requires appropriate credit or reference to the author. Use of Generative AI tools is subject to the instructor's authorization. Submitting the same work in more than one course without the instructor's permission is not allowed.

Class Attendance

Students are expected to arrive on time for class, consistent with expectations in professional settings. Recording attendance for another student, signing another student's attendance, or asking another student to record yours will be reported for investigation and may result in severe consequences for both students involved.

Examinations Policies

You are expected to adhere to KFUPM policies for all examinations in this course, including quizzes, major exams, midterms, and final exams. The following policies are enacted in this course during examinations:

- Students are expected to arrive at the examination hall on time with proper University ID.

- Students are seated according to the instructor's seat assignment and may request a seat change only for legitimate reasons.
- Late arrival to the exam may result in the student being denied admission. Once any student has begun finishing the exam, no further admission will be allowed under any circumstance.
- Students are not permitted to leave the examination room to use the restroom during an exam, except in rare cases involving a documented medical condition (e.g., diabetes, kidney disease). Any excused restroom leave will be fully supervised by a same-gender proctor.
- Students must leave all smart devices outside the examination hall, including smartphones, smartwatches, earbuds, and unauthorized calculators. Possession of any unauthorized device will be considered a cheating attempt and will be handled accordingly.
- Cheating attempts will be reported according to KFUPM policy and will result in a DN grade in the course, along with potential further penalties upon investigation.

Suggested Weekly Coverage Plan

Week	Dates (2026)	Section	Topics (32 sections)
1	Aug. 20		An Introductory class: Course Content, Grading Policy,...
2	Aug 23 - 27	10.1	Limits
		10.2	Limits (Continued)
3	Aug 30 -Sep. 3	10.3	Continuity
		11.1	The Derivative
		11.2	Rules for differentiation
4	Sep. 6-10	11.3	The derivative as a rate of change
		11.4	Product & quotient rule
5	Sep. 13-17	11.5	The chain rule & the power rule
		12.1	Derivative of logarithmic functions

		12.2	Derivative of exponential functions
6	Sep. 20- 22	12.4	Implicit differentiation
Wednesday & Thursday, Sep. 23- 24: National Day Holidays			
7	Sep 27 -Oct. 1	12.5	Logarithmic differentiation (Expressing the percentage rate of change in revenue in terms of the percentage rate of change in price using the elasticity of demand is beyond the scope of the course, since Section 12.3 is not included.)
		12.7	Higher order derivative
Exam I: Date (Sep 30); Time (TBA); Material: (10.1–12.4)			
8	Oct. 4-8	13.1	Relative extrema
		13.2	Absolute extrema on a closed interval
		13.3	Concavity
9	Oct. 11-15	13.4	The second derivative test
		13.5	Asymptotes
10	Oct. 18	13.6	Applied maxima and minima
Oct 20-22: Mid-term break			
11	Oct. 25-29	14.1	Differentials
		14.2	The indefinite integral
12	Nov. 1-5	14.3	Integration with initial conditions
		14.4	More integration formulas
13	Nov. 8-12	14.5	Techniques of integration
		14.7	Fundamental theorem of calculus
Exam II: Date (Nov 11); Time (TBA); Material: (12.5–14.3)			
14	Nov. 15-20	14.9	Area between curves
		HO	Handouts: Differentiation and Integration of Trigonometric Functions
Nov. 22-23: Autumn break			
15	Nove. 24-26	15.1	Integration by parts
		15.3	Integration by tables

16	Nov. 29 -Dec. 3	17.1	Partial derivatives
		17.4	Higher order partial derivatives
17	Dec. 6-10	17.6	Maxima and minima A Normal Thursday Class (Review/ Catching up)
Final Exam (MCQ): Comprehensive			

Suggested Practice Problems

Sr. Sec Exercises

1	10.1	4, 8, 17, 23, 36, 42, 44
2	10.2	2, 13, 15, 21, 29, 41, 47, 52, 58
3	10.3	6, 11, 22, 30, 36
4	11.1	12, 15, 18, 20, 25, 27
5	11.2	22, 33, 60, 72, 78, 85
6	11.3	8, 10, 12, 16, 21, 27, 40, 41
7	11.4	9, 15, 28, 37, 57, 66
8	11.5	6, 13, 30, 41, 71, 73
9	12.1	16, 18, 20, 24, 28, 30, 32, 50
10	12.2	10, 14, 16, 22, 28, 30, 38, 39
11	12.4	10, 14, 20, 22, 30, 34
12	12.5	7, 10, 14, 18, 20, 27
13	12.7	2, 8, 14, 30, 33, 35
14	13.1	16, 18, 30, 38, 48, 52
15	13.2	2, 6, 10, 12
16	13.3	12, 28, 40, 42, 60, 68
17	13.4	5, 6, 8, 10, 12
18	13.5	14, 20, 22, 34, 35, 45
19	13.6	4, 15, 18, 22, 26
20	14.1	12, 14, 20, 22, 29
21	14.2	8, 10, 18, 27, 30, 45
22	14.3	5, 7, 11, 14, 15
23	14.4	9, 12, 15, 33, 35, 52
24	14.5	6, 12, 23, 30, 40, 44, 53, 63
25	14.7	16, 36, 42, 44, 48
26	14.9	1, 3, 5, 20, 33, 37, 46, 58
27	15.1	6, 8, 12, 18, 20, 24, 32
28	15.2	1, 5, 6, 7, 8, 17, 31
29	15.3	3, 7, 9, 14, 20, 36, 44, 54
30	17.1	2, 8, 18, 20, 24, 30, 35
31	17.4	6, 8, 12, 18, 20, 21, 23
32	17.6	4, 9, 17, 19, 22, 26, 29