King Fahd University of Petroleum and Minerals

Department of Mathematics

Math 106 Syllabus, Term 252 (2025-2026)

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

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

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

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 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 Learning Outcomes : Upon successful completion of the course, a student 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 the 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:

Exam I (15 MCQ)	**Date: Wednesday February 11, 2026**	**Time: 18:00 – 19:30**	**Place: 59-1003**	25% (75 points)
	Material: Sec. [10.1,12.4]			
Exam II (15 MCQ)	**Date: Wednesday April 8, 2026**	**Time: 19:00 – 20:30**	**Place: 59-1003**	25% (75 points)
	Material: Sec. [12.5,14.3]			
Final Exam (21 MCQ)	**Date: TBA**	**Time: TBA**	**Place: TBA**	35% (105 points)
	Material: Comprehensive			
Class Work	➢ It is based on quizzes, class tests, attendance, or other class activities determined by the instructor. ➢ The average of the CW work of each section has to be in the interval $[y-1, y+1]$ where ➢ $y = \frac{9}{40}(median\ of\ Ex1\% + median\ of\ Ex2\%)$			15% (45 points)
			TOTAL	**100% (300 points)**

Letter Grades: The letter grades will follow a grading curve, which depends on the average of all students enrolled in the course.

Exam Questions: The questions of the exams are similar to the examples 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 DN in the course along with reporting the incident to the higher university administration for further action. Cheating in exams includes (but is not restricted to) :

- Loo king at the papers of other students. Talking to other students.
- Using mobiles, smart watches, or any other electronic devices.
- Using ChatGPT or any AI source.

Other Exam Issues:

- No student will be allowed to take the exam if he/she does not bring his/her KFUPM ID, or National/Iqama ID, or Driver's License with him/her to the exam hall.
- Students are not allowed to have their mobiles, smart watches, or any electronic device in the exam hall. A violation of this will be considered an attempt of cheating.
- A student must sit in the seat assigned to him/her. A violation of this will be considered an attempt of cheating.

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), he/she must bring an official excuse from Students Affairs. Otherwise, he/she will get a score of zero in the missed exam.

Attendance: Students are expected to attend all lectures.

- I f a student misses a class, he/she is responsible for any announcement made in that class.
- After warned **twice** by the instructor, a DN grade will b e awarded to any student who accumulates :
    - 9 un excused absences. (20%)
    - 15 excused and un excused absences. (33%)

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

Academic Integrity: All KFUPM policies regarding ethics apply to this course. See the Undergraduate Bulletin on the Registrar's website.

Coverage Plan

Week	Dates (2026)	Section	Topics (32 sections)
1	Jan 11 – 15	An Introductory class: Course Content, Grading Policy, etc.	
		10.1	Limits
		10.2	Limits (Continued)
		10.3	Continuity
2	Jan 18 – 22	**11.1**	The Derivative
		11.2	Rules for differentiation
		11.3	The derivative as a rate of change
3	Jan 25 – 29	**11.4**	Product & quotient rule
		11.5	The chain rule & the power rule
		12.1	Derivative of logarithmic functions
4	Feb 1 – 5	**12.2**	Derivative of exponential functions
		12.4	Implicit differentiation
Exam I, Wednesday: February 11, 2026, Material: [10.1,12.4]			
5	Feb 8 – 12	**12.5**	Logarithmic differentiation **Note:** 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.
		Catch-up/Revision	
6	Feb 15 – 19	**12.7**	Higher order derivative
		13.1	Relative extrema
7	Feb 23 – 26	**13.2**	Absolute extrema on a closed interval
		13.3	Concavity
Sunday, February 22, 2026: Saudi Founding Day Holiday			
8	March 1 – 5	**13.4**	The second derivative test
		13.5	Asymptotes
9	March 8 – 12	**13.6**	Applied maxima and minima
		14.1	Differentials
March 15 – 26, 2026: Eid Al-Fitr Holidays			
10	March 29 – April 2	**14.2**	The indefinite integral
		14.3	Integration with initial conditions
Exam II, Wednesday: April 8, 2026, Material: [12.5–14.3]			

11	April 5 – 9	**14.4**	More integration formulas
		Catch-up/Revision	
12	April 12 – 16	**14.5**	Techniques of integration
		14.7	Fundamental theorem of calculus
		14.9	Area between curves
13	April 19 – 23	**HO**	Handouts: Differentiation and Integration of Trigonometric Functions
		15.1	Integration by parts
14	April 26 – 30	**15.3**	Integration by tables
		17.1	Partial derivatives
15	May 3 – 7	**17.4**	Higher order partial derivatives
		17.6	Maxima and minima
16	May 10	**Catch-up/Revision**	
Final Exam (MCQ): Comprehensive			

Some tips to enhance your problem-solving skills:

- Practice (but not memorize) more problems than those given in the list below.
- Solve some review exercises available at the end of each chapter.
- Solve the problems on your own before reading the solution or asking for help.
- If you find it difficult to handle a certain type of problem, you should try more problems of the same type.
- Try to make good use of the office hours of your instructor. Always bring your solution trials to discuss them with your instructor.

Suggested 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, 2 0, 25, 27
5	11.2	22, 33, 60, 7 2, 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, 2 4, 28, 30, 32, 50
10	12.2	10, 14, 16, 2 2 , 28, 30, 38, 39
11	12.4	10, 14, 20, 2 2, 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, 3 8, 48, 52
15	13.2	2, 6, 10, 12
16	13.3	12, 28, 40, 4 2 , 60, 68
17	13.4	5, 6, 8, 10, 12
18	13.5	14, 20, 22, 3 4, 35, 45
19	13.6	4, 15, 18, 22 , 26
20	14.1	12, 14, 20, 2 2 , 29
21	14.2	8, 10, 18, 27 , 30, 45
22	14.3	5, 7, 11, 14, 1 5
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, 4 4, 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