KFUPM Computing
Department of Mathematics

King Fahd University of Petroleum & Minerals

Department of Mathematics

Math 201 Syllabus, Semester 261 (2026-2027)

Coordinator: Dr. Azzam Alfarraj (azzam@kfupm.edu.sa)

Course Code and Title: Math 201– Calculus III

Course Credit Hours: 3-0-3

Textbook: Calculus: Early Transcendental Functions, Metric Version, 7th edition, by Ron Larson & Bruce Edwards.

Course Description: Polar coordinates, polar curves, area in polar coordinates. Vectors, lines, planes, and surfaces. Cylindrical and spherical coordinates. Functions of two and three variables, limits, and continuity. Partial derivatives, directional derivatives. Extrema of functions of two variables. Double integrals, double integrals in polar coordinates. Triple integrals, triple integrals in cylindrical and sphericalcoordinates.

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

1. Describe parametric and polar curves in plane and recognize regions and quadric surfaces inspace.
2. Calculate areas, slopes, surface area, arc length for plane curves.
3. Perform vector operations in space and find equations of lines and planes in space.
4. Determine the limits and continuity of multivariable functions.
5. Calculate directional derivatives, equations of tangent planes, and gradient vectors.
6. Find extreme values of multi-variables functions.
7. Evaluate multiple integrals in rectangular, polar, cylindrical, and spherical coordinate systems.

Grading Policy:

	Date	Time	Place	Material	Points /300
Exam I	**29 Sep 2026**	**TBA**	**TBA**	**[10.2–11.4]**	25% (75 points)
Exam II	**3 Nov 2026**	**TBA**	**TBA**	**[11.5–13.6]**	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 $y=\frac{9}{40}(median(Exam\ I)\% + median(Exam\ II)\%)$.				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.

Examination 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 a student has completed the examination and left the examination hall/room, no late student will be admitted.
- 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.

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.

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.

A DN grade will be given after two warnings if a student exceeds 9 unexcused absences (20% of the course) or exceeds 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 misconduct.

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.

Suggested Weekly Coverage Plan

Week	Dates (2026)	Section	Topics (26 sections)
1	Aug. 19–20	**Intro**	Course Content, Grading Policy, Syllabus Overview,…
		10.2	Plane Curves and Parametric Equations
2	Aug. 23–27	**10.2**	Continued
		10.3	Parametric Equations and Calculus
3	Aug 30 – Sep. 3	**10.4**	Polar Coordinates and Polar Graphs
		10.5	Area and Arc Length in Polar Coordinates
4	Sep. 6–10	**11.1**	Vectors in the Plane
		11.2	Space Coordinates and Vectors in Space
5	Sep. 13–17	**11.3**	The Dot Product of Two Vectors
		11.4	The Cross Product of Two Vectors in Space
6	Sep. 20–22	**11.5**	Lines and Planes in Space (**Including skew lines**)
	Wednesday – Thursday, Sept. 23 – 24: National Day Holiday		
7	**Exam I: Tuesday, 29 Sep 2026 [10.2–11.4]**		
	Sep. 27–Oct. 1	**11.6**	Surfaces in Space (Surfaces of Revolution is omitted)
		13.1	Introduction to Functions of Several Variables
8	Oct. 4–8	**13.2**	Limits and Continuity (**Excluding Epsilon-delta definition**)
		13.3	Partial Derivatives
9	Oct. 11–15	**13.4**	Differentials
		13.5	Chain Rules for Functions of Several Variables
10	Oct. 18–19	**13.5**	Continued
	Tuesday – Thursday, Oct. 20 – 22: Midterm Break		
11	Oct. 25 – 29	**13.6**	Directional Derivatives and Gradients
		13.7	Tangent Planes and Normal Lines
12	**Exam II: Tuesday, 3 Nov 2026 [11.5–13.6]**		
	Nov 1–5	**13.8**	Extrema of Functions of Two Variables
		13.9	Applications of Extrema (Only Optimization Problems)
13	Nov 8–12	**13.10**	Lagrange Multipliers
14	Nov 15–19	**14.1**	Iterated Integrals and Area in the Plane
		14.2	Double Integrals and Volume
15	**Sunday – Monday, Nov. 22 – 23: Autumn Break**		
	Nov 24–26	**14.3**	Change of Variables: Polar Coordinates
		14.6	Triple Integrals and Applications
16	Nov 29–Dec 3	**14.6**	Continued
		11.7	Cylindrical and Spherical Coordinates
17	Dec 6 – 10	**14.7**	Triple Integrals in Other Coordinates
Final Exam (MCQ): Comprehensive			

Suggested Practice Problems

Section	Problems
10.2	6, 8, 9, 12, 18, 19, 22, 24, 26, 28, 32, 37, 38, 42, 44, 52, 55, 71,74
10.3	6, 10, 17, 22, 26, 31, 36, 38, 45, 47, 51, 53, 66, 67, 77, **79,** 83, 91
10.4	5, 7, 16, 21, 28, 31, 34, 37, 42, 43, 45, 53, 59, 64, 69, 77, 88, 102
10.5	5, 8, 10, 13, 18, 21, 24, 27, 30, 37, 38, 44, 47, 55, 57, 65, 67, 80
11.1	3, 8, 12, 27, 35, 40, 45, 50, 53, 61, 68, 74
11.2	6, 10, 11, 15, 22, 26, 29, 31, 34, 39, 41, 43, 45, 54, 55, 62, 63, 67, 71, 76, 79, 86, 87, 89, 96
11.3	5, 11, 18, 20, 25, 27, 30, 32, 41, 44, 53, 65
11.4	8, 12, 15, 20, 26, 33, 35, 44, 45, 46
11.5	5, 9, 12, 14, 17, 20, 23, 27, 31, 33, 38, 43, 45, 48, 51, 53, 57, 62, 67, 71, 72, 80, 83, 89, 92, 96, 99 **Section Project (Skew lines):** (a), (b), (c), (d)
11.6	6, 9, 11, 12, 17, 24, 45, 46, 50
13.1	7, 8, 15, 18, 28, 29, 32, 35, 38, 40, 47, 54, 58, 75, 76
13.2	10, 15, 16, 22, 28, 30, 31, 35, 42, 44, 47, 49, 51, 53, 58, 60, 62, 63, 66, 71, 77, 83, 84
13.3	5, 10, 19, 22, 27, 38, 39, 41, 48, 49, 51, 54, 60, 67, 69, 73, 82, 93, 98, 99, 116, 129, 131
13.4	5, 7, 14, 17, 18, 21, 22, 23, 24, 28, 36, 39
13.5	4, 9, 13, 18, 22, 23, 31, 34, 37, 39, 44, 47
13.6	5, 9, 12, 17, 20, 24, 28, 29, 36, 39, 45, 57, 68
13.7	5, 7, 10, 14, 23, 25, 27, 31, 35, 37, 40, 43, 46, 49, 59
13.8	3, 7, 10, 15, 20, 28, 31, 34, 38, 39, 42, 43, 47, 53
13.9	4, 5, 7, 9, 10, 13, 15
13.10	4, 7, 9, 11, 12, 15, 17, 19, 23, 28, 30, 46
14.1	8, 9, 17, 19, 20, 23, 24, 29, 32, 34, 41, 43, 49, 53, 57, 61, 66, 77, 80
14.2	5, 7, 12, 13, 15, 19, 21, 23, 25, 31, 34, 35, 37, 39, 45, 50, 51, 54
14.3	6, 7, 9, 16, 17, 21, 23, 25, 27, 30, 31, 35, 38, 43, 45, 47, 50
14.6	7, 10, 11, 13, 14, 15, 18, 19, 23, 24, 25, 27, 31, 35, 63, 66, 72
11.7	5, 11, 16, 20, 25, 27, 34, 37, 39, 45, 48, 53, 58, 59, 66, 74, 76, 81, 88, 92
14.7	7, 8, 12, 15, 17, 18, 20, 31, 32, 41, 44

Note: Check the True-False Questions in each section.

Tips on how to enhance your problem-solving abilities:

- Practice (but not memorize) more problems than those in the above list.
- Solve review problems 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 problems, you should try more problems of the same type.
- Review the last lecture before each class.
- Practicing homework problems and reviewing the class lectures will make exam problems easier to tackle.
- Visit your instructor in his/her office hours. Always bring partial solutions of the questions that you want to discuss with your instructor.