

King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics
Math 102 – Syllabus (Term 173)
Coordinator: Dr. Said Algarni

Title: Calculus I

Credit: 4-0-4

Textbook: Calculus (Early Transcendental) by J. Stewart, 8th edition.

Description: Definite and indefinite integrals of functions of a single variable. Fundamental Theorem of Calculus. Techniques of integration. Applications of the definite integral to area, volume, arc length and surface of revolution. Improper integrals. Sequences and series: convergence tests, integral, comparison, ratio and root tests. Alternating series. Absolute and conditional convergence. Power series. Taylor and Maclaurin series.

Learning Outcome: Upon completion of this course, students should be able to:

1. Comprehend the concept of definite and indefinite integrals;
2. Comprehend the concept of Fundamental theorem of calculus;
3. Apply various techniques of integrations;
4. Comprehend the concept of finding area, arc length, surface and volume of solid of revolution;
5. Apply improper integrals and techniques to solve improper integrals;
6. Describe infinite sequence, series, different methods to check for convergence and divergence;
7. Comprehend the representation of a function as a power series;
8. Describe Taylor and Maclaurin series representation of functions.

Grading Policy:

1. Exam I A common multiple choice exam	Material: 5.1-6.2 Date: July 9 Time: 7:00 PM Place: TBA	25% (100 ints)
2. Exam II A common multiple choice exam	Material: 6.3–8.1 Date: July 23 Time: 7:00 PM Place: TBA	25% (100 points)
3. Final Exam A comprehensive common multiple choice exam	Material: Comprehensive Date: Time: Place: TBA	35% (140 points)
4. Class Work	i) Online Homework: The online homework is provided through Blackboard.	5% (20 points)
	ii) Class Activities: It is based on quizzes, class tests, or other class activities determined by the instructor. Any quiz or test under class activity should be of written type and not of multiple-choice type. The average \bar{x} (out of 40) of the class work of the sections taught by an instructor must be in the interval [28,30].	10% (40 points)

Passing Grade: A student must score at least 50% (200 points) to pass the course.

Exam Questions: The questions of the common exams are based on the examples, homework problems, recitation problems, and the exercises of the textbook.

Missing Exam I or Exam II: No makeup exam will be given under any circumstance. When a student misses Exam I or Exam II for a legitimate reason (such as medical emergencies), his grade for this exam will be determined based on an existing formula, which depends on his performance in the non-missed exam and in the final exam.

Attendance: Attendance is a University Requirement. A DN grade will be awarded to any student who accumulates 10 unexcused absences (lecture and recitation).

Academic Integrity: All KFUPM policies regarding ethics apply to this course.

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Week	Dates	Sec.	Topics
1	24 June	5.1	Areas and Distances
		5.2*	The Definite Integral
	30 June (normal Monday)	5.3	The Fundamental Theorem of Calculus
		5.4	Indefinite Integrals and the Net Change Theorem
2	1 July	5.5	The Substitution Rule
		6.1	Areas between Curves
		6.2	Volumes
		6.3	Volumes by Cylindrical Shells
		6.5	Average Value of a Function
Exam I: Monday 9th of July at 7:00PM, Material [5.1 – 6.2]			
	8 July	7.1	Integration by Parts
		7.2	Trigonometric Integrals
		7.3	Trigonometric Substitution
4	15 July	7.4	Integration of Rational Functions by Partial Fractions + Exercise 59
		7.5	Strategy for Integration
		7.8	Improper Integrals (up to end of Example 8)
		8.1	Arc Length
		8.2	Area of a surface of revolution
Exam II: Monday 23rd of July at 7:00PM Material [6.3 – 8.1]			
5	22 July	11.1	Sequences
		11.2	Series
		11.3**	The Integral Test and Estimates of Sums
		11.4	The Comparison Tests
6	29 July	11.5	Alternating Series
		11.6	Absolute Convergence and the Ratio and Root Tests
		11.7	Strategy for Testing Series
		11.8	Power Series
7	5 August	11.9	Representation of Functions as Power Series
		11.10***	Taylor and Maclaurin Series
8	12 August		Review (Last day of classes)

Notes:

* Students should know Formulas 5, 6, and 7 on page 381.

** Students should know the “Remainder Estimate for the Integral Test”. Example 5a and Example 6 are excluded.

*** Students should know the Maclaurin Series listed in the table on page 768.

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Recitation and Suggested Homework Problems	Sec	Suggested Homework Problems	Recitation Problems	CAS*
	5.1	2, 7, 14, 21, 24	3, 23, 25	11
	5.2	4, 6, 18, 22, 30, 33, 37, 47, 51, 58, 61, 63,74	1, 9, 17, 23, 34, 40, 42, 48, 52, 57, 73	13, 31
	5.3	2(a,b), 8, 16, 29, 43, 46, 56, 63, 70, 75, 83	13, 44, 48, 57, 74, 76	-
	5.4	14, 18, 38, 46, 60	3, 13, 31, 40, 62	47
	5.5	19, 23, 38, 39, 59, 62, 88, 91	28, 43, 69, 73, 87, 92	76
	6.1	13, 17, 22, 23, 33	4, 12, 29, 35	30
	6.2	4, 16, 17, 33, 42, 49, 54, 58	12, 34, 39, 56, 63	37
	6.3	4, 12, 19, 22, 38, 45	11, 16, 26, 37, 47	36
	6.5	6, 9, 14	4, 13	12
	7.1	8, 12, 18, 30, 39, 42, 54, 62, 66	11, 21, 22, 33, 40, 61	44
	7.2	2, 10, 27, 41, 50, 58, 64	15, 34, 43, 63	51
	7.3	8, 16, 21, 24, 28, 41	11, 27, 30, 34, 43	36
	7.4	6, 16, 20, 28, 36, 45, 49, 53, 62	15, 24, 30, 47, 54, 61	55
	7.5	6, 22, 23, 32, 52, 67, 73	39, 71, 80, 84	-
	7.8	8, 22, 27, 33, 40, 41, 57, 58	1, 2, 7, 30, 34, 42, 59	-
	8.1	8, 14, 18, 41, 45	10, 12, 19	21
	8.2	10, 11, 14, 15, 27	16, 28, 33, 35	24
	11.1	14, 30, 42, 55, 59, 76	37, 44, 62, 74	58
	11.2	15, 20, 25, 30, 41, 44, 52, 62, 67	22, 35, 46, 59, 75	12
	11.3	6, 10, 20, 30, 46	8, 12, 19, 32	-
	11.4	4, 10, 24, 32	6, 13, 27, 45	-
	11.5	6, 10, 12, 23, 34	5, 15, 24, 32	22
	11.6	5, 11, 18, 21, 28, 32, 39	4, 13, 16, 23, 30, 37, 40	-
	11.7	5, 8, 17, 18, 20, 32, 38	14, 23, 24, 31	-
	11.8	8, 17, 24, 28, 30	9, 20, 27, 29	-
	11.9	4, 9, 14, 16, 28, 40(a,b)	8, 17, 32, 40(c)	-
	11.10	12, 20, 33, 35, 41, 54, 63, 67, 73, 74	17, 32, 40, 42, 56, 68, 79	46
<p>*: 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.</p>				

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. Lastly and most importantly, study in a suitable place like the Library.