King Fahd University of Petroleum and Minerals

Department of Mathematics & Statistics

Math 102 Syllabus, Term 183

Coordinator: Dr. Waled Al-Khulaifi

The Course Code and Name: Math 102, Calculus II

The Course Credit Hours: 4-0-4 (Five lectures and two recitation sessions per week.)

The Course Objective: The objective of the course is to introduce students to the concepts of integration, sequences, series and their applications.

The Course Content: 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.

The Course Prerequisite: Math 101.

The Course Learning Outcomes: 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 and series and 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.

The Course Grading Policy:

	Date	**Time**	**Place**	**Materials**	**Percentage**
Exam I (MCQ)	Tuesday, June 25	05:00-06:30 pm	Building 54	5.1 - 6.2	25% (75 pts)
Exam II (MCQ)	Monday, July 8	05:00-06:30 pm	Building 54	6.3 - 8.1	25% (75 pts)
Final Exam (MCQ)	Follow the registrar final schedule on his webpage.			Comprehensive	35% (105 pts)
Homework	The online homework is provided through BlackBoard.				5% (15 pts)
Class Work	▪ It is based on quizzes, class tests, or other class activities determined by the instructor. ▪ Any quiz or test should be of a written type and not of a multiple- choice type. ▪ 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)

The Course Passing Grade: A student must score at least 50% (150/300) to pass the course.

Upgrade Policy: The upgrade policy is applied when 3 points out of 300 are needed to get the next higher grade. For instance, the passing grade (D) starts at 150/300. If a student gets 148/300 or 149/300, then his grade will be automatically upgrade to D. However, if a student gets 147/300, his grade will be upgraded to D only if his final exam score is greater than or equal $105 \times 150 \div 300$ (that is, 52.5/105)

Exams:

Exam Questions: The questions of the exams are based on 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:

Exam I or II: No make-up exam will be given under any circumstances. In case 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 the existing formula which depends of his performance in the non-missed exam and in the final exam.

Final Exam: If a student misses the final exam for a legitimate reason (such as medical emergencies), he will be given a make-up final exam.

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.

(Note: the general rule for DN: 20% unexcused absences of the number of classes, and

33% excused and unexcused absences of the number of classes.)

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

Academic Integrity: All KFUPM policies regarding ethics apply to this course. See the Undergraduate Bulletin.

The Pacing Schedule

Week	Date	Section	Topics
1	June, 9-13	5.1	Areas and Distances
		5.2[(1)]	The Definite Integral
		5.3	The Fundamental Theorem of Calculus
		5.4	Indefinite Integrals and the Net Change Theorem
2	June, 16-20	5.5	The Substitution Rule
		6.1	Areas between Curves
		6.2	Volumes
3	June, 23-27	6.3	Volumes by Cylindrical Shells
		6.5	Average Value of a Function
		7.1	Integration by Parts
		7.2	Trigonometric Integrals
		Exam I	**Tuesday, June, 25, 2019; Time: 5:00-6:30pm Location: Building 54; Material [5.1 – 6.2]**
4	June 30- July 4	7.3	Trigonometric Substitution
		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
5	July, 7-11	8.2	Area of a Surface of Revolution
		11.1	Sequences
		11.2	Series
		11.3[(2)]	The Integral Test and Estimates of Sums
		Exam II	**Monday, July, 8, 2019; Time: 5:00-6:30pm Location: Building 54; Material [6.3 – 8.1]**
6	July, 14-18	11.4	The Comparison Tests
		11.5	Alternating Series
		11.6	Absolute Convergence and the Ratio and Root Tests
		11.7	Strategy for Testing Series
7	July, 21-25	11.8	Power Series
		11.9	Representation of Functions as Power Series
		11.10[(3)]	Taylor and Maclaurin Series
8	July, 28-29		Review- Catch up

Notes:

(1) Students must know Formulas 5, 6, and 7 on page 381.
(2) The "Remainder Estimate for the Integral Test", Example 5a and Example 6 are excluded.
(3) Students must know the Maclaurin Series listed in the table on page 768.

Homework Assignments

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	3, 13, 31, 40, 62	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, 52(b)	30
6.2	4, 16, 17, 33, 42, 49, 54, 58	12, 34, 39, 56	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, 26, 33, 61	44
7.2	2, 10, 27, 41, 50, 58, 64	15, 26, 34, 43	51
7.3	8, 16, 21, 24, 28, 41	11, 27, 30, 34	36
7.4	6, 16, 20, 28, 36, 45, 49,53,62	15, 24, 30, 47, 61	55
7.5	6, 22, 23, 32, 52, 67, 73	39, 71, 80	-
7.8	8, 22, 27, 33, 4041,57,58	1, 2, 7, 30, 34	-
8.1	8, 14, 18, 41, 45	10, 12, 33	21
8.2	10, 11, 14, 15, 27	16, 33	24
11.1	14, 30, 42, 55, 59, 76	37, 44, 74	58
11.2	15, 20, 25, 30, 41, 44, 52, 62, 67	22, 35, 46, 59, 74	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	-
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, 56, 59, 68	46
***: 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.**			

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.