King Fahd University of Petroleum and Minerals

Department of Mathematics

Math 102 Syllabus, Term 213(2021-2022)

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The Course Code and Name: Math 102, Calculus II

The Course Credit Hours: 4-0-4

Textbook: Calculus: Early Transcendentals, 8th edition, by James Stewart, Cengage Learning, 2016.

The Course Objective: The objective of the course is to introduce students to the topics of definite & indefinite integrals, 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 area. 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. Estimate areas and definite integrals using Riemann sums.
2. Apply the Fundamental Theorem of Calculus.
3. Evaluate Integrals using various techniques of integration.
4. Calculate the average value of a function, areas between curves, length of curves, volumes and surface areas of solids of revolutions.
5. Evaluate improper integrals and limits of sequences.
6. Apply convergence tests of series and evaluate the sum of some selected convergent series.
7. Find the interval and radius of convergence of a power series and express a function as a power series (Taylor and Maclaurin).

The Course Grading Policy:

	Date	Time	Place	Materials	Percentage
Exam I (18 MCQ)	TBA	TBA	TBA	5.1- 6.3	22.5% (90 pts)
Exam II (18 MCQ)	TBA	TBA	TBA	6.5- 7.8	22.5% (90 pts)
Final Exam (28 MCQ)	TBA	TBA	TBA	Comprehensive	35% (140 pts)
Homework	In WebAssign through Blackboard.				5% (20 pts)
Recitation					5% (20 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 (out of 40) of the class work of each section should be in the interval [28, 30].				10% (40 pts)
				Total	400 pts

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 **DN** in the course along with reporting the incident to the higher university administration. Cheating in exams includes (but not restricted to)

- Looking at the papers of other students,
- Talking to other students,
- Using mobiles or any other electronic devices.

Note: **Students are not allowed to carry mobile phones and any smart watches to the exam hall**.

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 must bring an official excuse from Students Affairs. Otherwise, he will get zero in the missed 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
  - 9 unexcused absences in lecture and recitation classes. (20%)
  - 15 excused and unexcused absences in lecture and recitation classes. (33%)

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 on the webpage of the Registrar.

The Pacing Schedule

Week	Date (2022)	Section	Topics
1	June 5-9	**5.1** **5.2**$^{(1)}$ **5.2** **5.3**	Areas and Distances The Definite Integral Continued The Fundamental Theorem of Calculus
2	June 12-16	**5.4** **5.5** **6.1**	Indefinite Integrals and the Net Change Theorem The Substitution Rule Areas between Curves
3	June 19-23	**6.2** **6.3** **6.5** **7.1**	Volumes Volumes by Cylindrical Shells Average Value of a Function Integration by Parts
4	June 26-30	**7.2** **7.3** **7.4**	Trigonometric Integrals Trigonometric Substitution Integration of Rational Functions by Partial Fractions+ Exercise 59
Hajj Holidays (June 03-14)			
5	July 17-21	**7.5** **7.8** **8.1** **8.2**	Strategy for Integration Improper Integrals (Up to end of Example 8) Arc Length Area of a Surface of Revolution
6	July 24-28	**11.1** **11.2** **11.2** **11.3**$^{(2)}$ **11.4**	Sequences Series Continued The Integral Test and Estimates of Sums The Comparison Tests
7	July 31-Augest 4	**11.5** **11.6** **11.7** **11.8** **11.9**	Alternating Series Absolute Conv. and the Ratio and Root Tests Strategy for Testing Series Power Series Representation of Functions as Power Series
8	August 7-8	**11.10**$^{(3)}$	Taylor and Maclaurin Series
Final Exam (Comprehensive, MCQ): TBA			

(1) Students must know Formulas 5, 6, and 7 on page 381.
(2) The Remainder Estimates for the Integral Test, Example 5a and Example 6 are excluded.
(3) Students must know the Maclaurin Series listed in Table 1 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	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, 32	-
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

***: CAS problems require the use of a technology tool (e.g., a graphing calculator or a computer.) Students are encouraged to do these problems to enhance their understanding of the concepts involved.**

Tips on how to enhance your problem-solving skills:

1. Make sure you understand the concepts and techniques of each section.
2. Do all the homework assignments on time.
3. Try always first to solve the problems on your own before reading the solution or asking for help.
4. Practice (but not memorize) more problems than those in the above list.
5. If you find it difficult to solve a certain type of problems, you should try more problems of that type.
6. Try the recitation problems before coming to the recitation class.
7. Solve some of the review problems at the end of each chapter.
8. Try to make good use of the office hours of your instructor.
9. Last, but not least, consult your instructor whenever you feel you need help in understanding a concept or solving a problem.