Advanced Calculus I
MATH 341

Instructor Info

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Course Info

Prereq: Math 210 or ICS 253
UTR
12 PM-12.50 PM
Building 6, Room 201

King Fahd University of Petroleum & Minerals
Department of Mathematics
ADVANCED CALCULUS I
MATH 341 – TERM 241

Course Description

The real number system. Continuity and limits. Uniform continuity. Differentiability of functions of one variable. Definition, existence and properties of the Riemann integral. The fundamental theorem of calculus. Sequences and series of real numbers.

Textbook

Introduction to Real Analysis by Robert G. Bartle and Donald R. Sherbert, 4th Ed, Wiley (2011)

Course Learning Outcomes

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

- Identify different classes of real numbers.
- Apply concepts of limit and continuity.
- Distinguish between the concepts of continuity and uniform continuity
- Apply properties of differentiation of functions of one variable.
- Compute Riemann sums and apply them to evaluate integrals.
- Interpret and apply the fundamental theorem of calculus.

Grading Scheme

40%	**2 Major Exams, 20% each**
15%	**Homework**
10%	**Project-Presentation**
35%	**Final Exam**

Final grade is according to the scale:
A+ = 90 -100; A = 80 - 90; B+ = 75 - 80; B = 70 - 75, C+ = 65 - 70 , C= 55-65, D+ = 50 - 55 , D = 45 - 50; F <45.

Attendance

1. Students must adhere to the attendance policy of KFUPM.
2. A DN grade will be given to any student who accumulates 9 unexcused absences or 15 unexcused and excused absences.
3. A DN grade will be given to the eligible student after being warned twice.

Academic Integrity

All KFUPM ethics policies apply in this course

Course Schedule

Week	Topic	HomeWork
Week 1	2.1 Algebraic and Order Properties of R	7, 8, 9, 10, 13, 17 pp. 29-30
Aug. 25- 29	2.2 Absolute Value and the Real Line	2, 4, 5, 7, 8, 12, 15 pp. 34
Week 2	2.3 Completeness Property of R	1, 2, 3, 4, 5, 6, 9, 10 pp. 38
Sept. 1-5	2.4 Applications of the Supremum Property	1, 2, 4, 7, 12, 14, 18 pp. 43-44
Week 3	3.1 Sequences and Their Limits	1, 4, 5(a,c), 7, 8, 9, 10 pp. 59-60
Sept. 08 - 12	3.2 Limit Theorems	1, 6, 7, 9, 12, 16, 17, 19, 20 pp. 67-68
Week 4	3.3 Monotone Sequences	1, 2, 6, 7, 9, 10, 11, 12 pp. 74-75
Sept. 15-19	3.4 Subsequences and Bolzano-Weierstrass Theorem	1, 2, 6, 7, 10, 11, 12, 14 pp.80
Sept. 22- Sept. 23: National Day Holidays		
Week 5	3.5 Cauchy Criterion	1, 2, 4, 5, 7, 9, 10, 12 pp.86
Sept. 24-26	3.6 Properly Divergent Sequences	1, 2, 4, 7, 9, 10 pp.88
Week 6	4.1 Limits of Functions	2, 3, 4, 6, 11, 12, 14 pp. 104
Sept. 29- Oct. 03	4.2 Limit Theorems	1(a,b), 2, 4, 8, 11, 14 pp. 110-111
(WEEK 6) Major Exam I; Material: 2.1-3.6		
Week 7	5.1 Continuous Functions	1, 2, 7, 8, 11, 12, 13, 15 pp.124-125
Oct. 06-10	5.2 Combinations of Continuous Functions	2, 4, 6, 7, 8, 9, 10, 15 pp. 128-129
Week 8	5.3 Continuous Functions on Intervals	1, 2, 4, 8, 11, 13, 14, 17 pp. 135-136
Oct. 13-17	5.4 Uniform Continuity	1, 2, 4, 6, 9, 10, 12 pp. 144-145
Week 9	5.6 Monotone and Inverse Functions	1, 2, 3, 4, 5,10 pp. 155-156.
Oct. 20-24	6.1 The Derivatives	1, 2, 4, 7, 9, 10 pp. 166-167
Week 10	6.2 The Mean Value Theorem	1, 6, 7, 8, 10, 13, 14, 15, 19 pp. 175-176
Oct. 27-31	6.3 L'Hospital's Rules	1, 3, 5, 7, 8, 10 pp. 182-183
Week 11	6.4 Taylor's Theorem	1, 4, 7, 11, 16, 18 pp. 191-192
Nov. 03-07	7.1 Riemann Integral	1, 3, 13, 14, 16, 17 pp. 201-202
(WEEK 11) Major Exam II; Material: 4.1-6.2		
Nov. 10- Nov. 14: Midterm Break		
Week 12	7.2 Riemann Integrable Functions	2, 8, 9, 10, 16, 17, 20 pp. 208-210

Nov. 17-21		
Week 13	7.3 The Fundamental Theorem	5, 6, 8, 10, 13, 14, 15, 17, 18, 21; pp. 217-219
Nov. 24 -28		
Week 14	9.1 Absolute Convergence	1, 6, 7, 8, 9, 10, 11, 13; pp. 256-257
Dec. 01-05	9.2 Tests for Absolute Convergence	1, 3, 6, 8, 10, 11, 15, 17, 18; pp.262-263
Week 15	9.3 Tests for Nonabsolute Convergence	1, 2, 7, 8, 12, 14, 15; pp. 265-266
Dec. 08-12	9.4 Series of Functions	1, 2, 6, 9, 11, 12, 16, 17, 18; pp. 272-273
Week 16	Review	
Dec. 15-16		

Final Exam ; Material: Comprehensive