College of Computing and Mathematics
Department of Mathematics

MATH341 – Advanced Calculus I
SYLLABUS
AY 2022-2023 **(Term 221)**

Instructor: Dr. Khairul Saleh

Course #:	MATH 341
Course Title:	Advanced Calculus I
Textbook:	Introduction to Real Analysis by Robert G. Bartle and Donald R. Sherbert, 4th Ed, Wiley (2011)
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.
Prerequisites:	Math 210 or ICS 253
Course Learning outcomes:	Upon successful completion of this course, a student should be able to: 1. Identify different classes of real numbers. 2. Apply concepts of limit and continuity. 3. Distinguish between the concepts of continuity and uniform continuity. 4. Apply properties of differentiation of functions of one variable. 5. Compute Riemann sums and apply them to evaluate integrals. 6. Interpret and apply the fundamental theorem of calculus.

Week	Date	Topic
1	28 Aug-1 Sep	2.1 Algebraic and Order Properties of R
		2.2 Absolute Value and the Real Line
2	4-8 Sep	2.3 Completeness Property of R
		2.4 Applications of the Supremum Property
3	11-15 Sep	3.1 Sequences and Their Limits
		3.2 Limit Theorems
4	18-21 Sep	3.3 Monotone Sequences
		3.4 Subsequences and the Bolzano-Weierstrass Theorem
September 22, National Day Holiday		
5	25-29 Sep	3.5 Cauchy Criterion
		3.6 Properly Divergent Sequences
Major Exam 1. Material: 2.1-3.6. Date: October 4, 2022. Time: TBA		
6	2-6 Oct	4.1 Limits of Functions
		4.2 Limit Theorems
7	9-13 Oct	5.1 Continuous Functions
		5.2 Combinations of Continuous Functions
8	16-20 Oct	5.3 Continuous Functions on Intervals
		5.4 Uniform Continuity
9	23-27 Oct	5.6 Monotone and Inverse Functions
		6.1 The Derivative
10	30 Oct – 3 Nov	6.2 The Mean Value Theorem
		6.3 L'Hospital's Rules
11	6-10 Nov	6.4 Taylor's Theorem
		7.1 Riemann Integral
Major Exam 2. Material: 4.1-6.2. Date: November 17, 2022. Time: TBA		
12	13-17 Nov	7.2 Riemann Integrable Functions
13	20-24 Nov	7.3 The Fundamental Theorem
27 Nov – 1 Dec Midterm break		
14	4-8 Dec	9.1 Absolute Convergence
		9.2 Tests for Absolute Convergence
15	11-15 Dec	9.3 Tests for Nonabsolute Convergence
		9.4 Series of Functions
Final Exam: Comprehensive. Date: TBD		

Grading Policy:

Major Exam 1:	20%
Major Exam 2:	20%
Homework:	15%
Term Paper:	10%
Final Exam (Comprehensive):	35%

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

Academic Integrity:

All KFUPM ethics policies apply in this course.