Course Title: MAT 431 Introduction To Analysis
Term: Winter 2023
Instructor: TBA
Course Credit: 3
Mode of Instruction: Online

Course Description:

This course emphasizes the study of the real number system, topology of the real line, limits of sequences and functions, continuity, differentiation, and integration. Issues related to sampling, measurement as well as data collection and processing are highlighted. Topics related to inferential statistics will also discussed, such as hypothesis testing, statistical significance, effect size and power analysis. After taking this course, students will be able to understand limits of sequences, series, real and complex functions.

Course Prerequisites:

MAT 320 Foundations of Mathematics

Learning Outcomes:

By the end of the course, the student should be able to:

A. Define the derivative of a function and establish properties of differentiable functions;

B. Use the definitions of convergence as they apply sequences, series, and functions

C. Determine the continuity, differentiability, an integrability of functions defined on subsets of the real line;

D. Demonstrate the ability to use rigorous mathematical thought processes in the following areas: sets functions, sequences, limits, continuity, and derivatives.

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Course Material:

Robert G. Bartle, Donald R. Sherbert, ***Introduction to Real Analysis***, 4th Edition, John Wiley & Sons, 2011.

Evaluation:

- Homework [40%]
- Mid-term Exam [25%]
- Final Exam [35%]

Description of the Evaluation tasks:

Assignment/ Essay/ ... : During the term, students will be required to finish several evaluation tasks within due date. All the tasks are linked with specific course topics/outcomes and will adequately assess students' competence and learning outcomes. Students are encouraged to meet with instructor about these tasks at any point.

Mid-term/ Final Exams/ Quiz/... : There may be periodic quizzes given at the beginning of lecture sessions; the feedback from these quizzes will monitor the progress of the learners and help to set learning priorities. There will be mid-term exam/ final exam for the course. They are the basic criteria for the evaluation of students' learning outcomes and final grade.

Grading Policy:

Students are supposed to finish each online lecture. Prior to each class, students should finish the required readings. During the class time, students are encouraged to make use of all relevant online course resources and communicate with the instructor. Students' grades are accumulated based on the cumulative evaluations.

Students' letter grade will be assigned according to the following scale:

A+ 90-100	A 85-89	A- 80-84
B+ 77-79	B 73-76	B- 70-72
C+ 67-69	C 63-66	C- 60-62
D+ 57-59	D 53-56	D- 50-52
F < 50		

Academic Integrity:

Students must strictly adhere to the university's academic integrity rule; and all essays, exams and any other form of academic assignments must adhere to these rules. Any form of plagiarism, cheating, or misappropriation of materials will be considered a violation of academic integrity and will be punishable by the university.

Withdrawal from the Course(s):

Students will be able to apply for a transfer or withdrawal within 3 days of the starting date of the course. If a withdrawal is applied for within 3 working days, the tuition fee will be fully refunded. After 3 days, the tuition fee will not be refunded. If a withdrawal is applied for in the first two weeks, it will be recorded as W (Withdraw) on the course transcript. After this initial two-week period, the class will be recorded as F (Fail).

Tentative Schedule:

Week 1

1	Preliminaries
2	Sets and Functions
3	Mathematical Induction
4	Finite and Infinite Sets
5	Sequences and Series **Homework#1**

Week 2

6	Sequences and Their Limits
7	Limit Theorems
8	Monotone Sequences
9	Introduction to Series
10	Limits **Homework#2**

Week 3

11	Limits of Functions
12	Continuous Functions
13	**Mid-term Exam**
14	Combinations of Continuous Functions Continuous Functions on Intervals
15	Monotone and Inverse Functions **Homework#3**

Week 4

16	Differentiation
17	The Mean Value Theorem Taylor's Theorem
18	The Riemann Integral
19	Sequences of Functions
20	Interchange of Limits The Exponential and Logarithmic Functions **Homework#4**

Week 5

21	Infinite Series
22	Tests for Absolute and Nonabsolute Convergence
23	The Generalized Riemann Integral
24	A Glimpse Into Topology
25	**Final Exam**