

MA3526: ANALYSIS

Effective Term

Semester A 2024/25

Part I Course Overview

Course Title

Analysis

Subject Code

MA - Mathematics

Course Number

3526

Academic Unit

Mathematics (MA)

College/School

College of Science (SI)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Grade B or above in MA1200 Calculus and Basic Linear Algebra I and approval from MA must be obtained; or
MA1300 Enhanced Calculus and Linear Algebra I; or
MA1508 Calculus (a Sem-A course for SDSC students)

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

MA3524 Analysis

Part II Course Details

Abstract

This course gives rigorous analysis on the real line and higher dimensional Euclidean spaces. It trains students to prove mathematical theorems rigorously.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	explain rigorously concepts of limit and continuity.	40	x	x	x
2	recognize basic properties of metric space.	20	x	x	
3	understand the concepts of uniform continuity and uniform convergence.	30	x	x	x
4	the combination of CILOs 1-3.	10	x	x	x

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Learning through teaching is primarily based on lectures.	1, 2, 3, 4	39 hours in total
2	Take-home assignments	Learning through take-home assignments helps students understand basic concepts and techniques of analysis.	1, 2, 3, 4	after-class
3	Math Help Centre	Learning activities in Math Help Centre provides students extra help.	1, 2, 3, 4	after-class

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Quiz	1, 2	5	Questions are designed for the first part of the course to see how well students have learned concepts about limit.

2	Test/Midterm	1, 2, 3	15	Questions are designed for the second part of the course to see how well students have learned concepts about continuity and sets.
3	Hand-in assignments	1, 2, 3, 4	5	These are skills based assessment to help students understand basic concepts and techniques of analysis.
4	Formative take-home assignments	1, 2, 3, 4	5	The assignments provide students chances to demonstrate their achievements on analysis learned in this course.

Continuous Assessment (%)

30

Examination (%)

70

Examination Duration (Hours)

2

Additional Information for ATs

30% Coursework

70% Examination (Duration: 2 hours, at the end of the semester)

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

Assessment Rubrics (AR)**Assessment Task**

1. Quizzes/Test/Midterm

Criterion

ABILITY to APPLY and EXPLAIN the basic concepts and methodology of analysis

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

2. Hand-in assignments

Criterion

CAPACITY for LEARNING to understand the principles of analysis

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

3. Examination

Criterion

ABILITY to DERIVE mathematical proofs in analysis

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

4. Formative take-home assignments

Criterion

CAPACITY for LEARNING to understand the principles of analysis

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Limit, continuity, least upper bound axiom, open and closed sets, compactness, connectedness, differentiation, uniform convergence and generalization to higher dimensions.

Reading List**Compulsory Readings**

Title	
1	“Understanding Analysis” by Stephen Abbott, 2010.

Additional Readings

Title	
1	Nil