MA4548: ABSTRACT ALGEBRA II

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Abstract Algebra II

Subject Code
MA - Mathematics

Course Number
4548

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
MA3523 Introduction to Abstract Algebra

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

This course is a continuation of MA3523 (Introduction to Abstract Algebra). The purpose of this course is to teach undergraduate student the fundamental concepts in abstract algebra, which are rings, factorization and modules.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the concepts of rings, ideals, homomorphism between rings and quotient rings	33	x	x	
2	Factorization of integers and polynomials	33	x	x	
3	Explain the concepts of modules, generators and application to linear operator	34		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.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Learning through teaching	Learning through teaching is primarily based on lectures	1, 2, 3	39 hours in total
2	Learning through take-home assignments	Learning through take-home assignments helps students understand basic concepts and theories of group, vector space with abstract field, and linear transformations.	1, 2, 3	After-class

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Test	1, 2, 3	30	Questions are designed for the first part of the course to see how well students have learned the concepts and theories of rings and ideals.

2	Formative take-home assignments	1, 2, 3	20	The assignments provide students chances to demonstrate their achievements on abstract algebra learned in this course.

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Additional Information for ATs

50% Coursework
50% 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. Test

Criterion

Capacity to study basic properties of rings, ideals, factorization and modules

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. Formative take-home assignments

Criterion

Ability to understand basic concepts of rings, ideals, factorization and modules

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. Final Examination

Criterion

Ability to solve technical problems relevant to rings, ideals, factorization and modules

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

Rings, ideals, quotient rings, factorization, Gauss's lemma, modules, generators

Reading List

Compulsory Readings

	Title
1	"Algebra" by Michael Artin, Pearson (2rd edition), 2010.

Additional Readings

	Title
1	Nil