

MA4510: INDEPENDENT RESEARCH II

Effective Term

Semester B 2024/25

Part I Course Overview

Course Title

Independent Research II

Subject Code

MA - Mathematics

Course Number

4510

Academic Unit

Mathematics (MA)

College/School

College of Science (SI)

Course Duration

One Semester

Credit Units

6

Level

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

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

MA2503 Linear Algebra
MA2508 Multi-variable Calculus
MA3510 Independent Research I

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course gives students an opportunity to demonstrate innovative abilities and initiative in their independent treatment of problems. Students are trained to develop the ability to integrate and apply mathematical knowledge and analytical skills to practical situations. The course also serves to give students practice in clear and concise written and spoken communication of the results of an independent research.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 app.)		DEC-A2	DEC-A3
1	carry out independent study for problem solving and solution seeking.		x		x
2	apply mathematical knowledge and techniques of various subjects in formulating and analyzing models of real-life problems.			x	x
3	assess critically appropriateness of methods in approaching the problem.		x	x	
4	analyze results mathematically with suggestion of feasible actions.			x	
5	write well-structured report and present methodology and results effectively.			x	
6	the combination of CILOs 1-5		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	Consultation	Learning through consultation helps students identify appropriate themes of the research, acquire knowledge and techniques of specific topics from supervisors as well as improve quality of written work (such as presentation of results in reports).	2, 3, 4, 5	20 hours in total

2	Individual work	Learning through individual work helps students learn independently knowledge and skills required for the completion of the research, and execute the associated work with sufficient diligence.	1, 2, 3, 4, 5, 6	92 hours in total
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Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Research proposal	2, 3	15	Each student is required to submit a research proposal which outlines principal question(s) of investigation, suggested methodology and relevance of the research to various disciplines.
2	Continuous progress	1, 2, 3, 4	20	Student’ s progress is monitored regularly so as to identify any problem encountered in study and ensure he/she is likely to complete the research timely in a satisfactory manner.
3	Report	1, 2, 3, 4, 5	40	It should include student’ s own account of investigations and findings, with a systematic and critical exposition of knowledge in literature. The student is also required to present materials coherently, with all the necessary references stated.
4	Oral presentation	5	25	Each student is also assessed on the ability to communicate the aims of the research, methodology and investigations/findings effectively.

Continuous Assessment (%)

100

Examination (%)

0

Assessment Rubrics (AR)

Assessment Task

Research proposal

Criterion

Ability of formulate research problem

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

Continuous progress

Criterion

Research skills, problem solving skills

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

Report

Criterion

Writing skills, presentation skills, achieve

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

Oral Presentation

Criterion

Oral presentation skills, ability to answer questions, achievement

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

The independent research project must be of an appropriate intellectual level to an honours degree. It should include substantial academic content that requires students to apply their intellect through a wide variety of activities to arrive at a practicable and implementable solution.

Reading List