MA3510: INDEPENDENT RESEARCH I

New Syllabus Proposal

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Independent Research I

Subject Code
MA - Mathematics
Course Number
3510

Academic Unit
Mathematics (MA)

College/School
College of Science (SI)

Course Duration
Two Semesters

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

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Additional Information
Nil

Part II Course Details

Abstract

This course enables students to apply mathematical knowledge and analytical skills to practical/research topics. Students perform the research either individually or in a team. They are trained to develop innovative and problem-solving abilities. They need to give a presentation and submit a report. This provides training to their presentation skill and enhances their report writing ability.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	conduct either independent or group study for problem solving and solution seeking.		x		x
2	apply mathematical knowledge and computing techniques of selected topic(s) to create and analyze models of real-life problems.			x	x
3	evaluate critically appropriateness of methods of analysis.		x	x	
4	complete well-structured report with coherent presentation of methodology and results.			x	x
5	the combination of CILOs 1-4		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.	2, 3, 4	20 hours in total

2	Individual/team work	Individual/team work helps students learn independently or through team cooperation the knowledge and skills required for the completion of the research, and execute the associated work with sufficient diligence.	1, 2, 3, 4, 5	92 hours in total

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	4	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
Evaluation is based on the following points: organization, modelling, method, results and practical significance.

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
The statement of the problem solving; the ability of delivering complex concepts; the ability to answer questions

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 topic must be of an appropriate advanced level in applied mathematics. It should include substantial academic content and require the students to have deep understanding of the topic and make clear written and oral presentation.

Reading List