MSc in MATHEMATICS EDUCATION

2026 HANDBOOK

DEPARTMENT OF MATHEMATICS
FACULTY OF SCIENCE
UNIVERSITY OF COLOMBO

DISCOVER
EXPLORE
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Table of Content

Introduction to the MSc Degree Programme in Mathematics Education

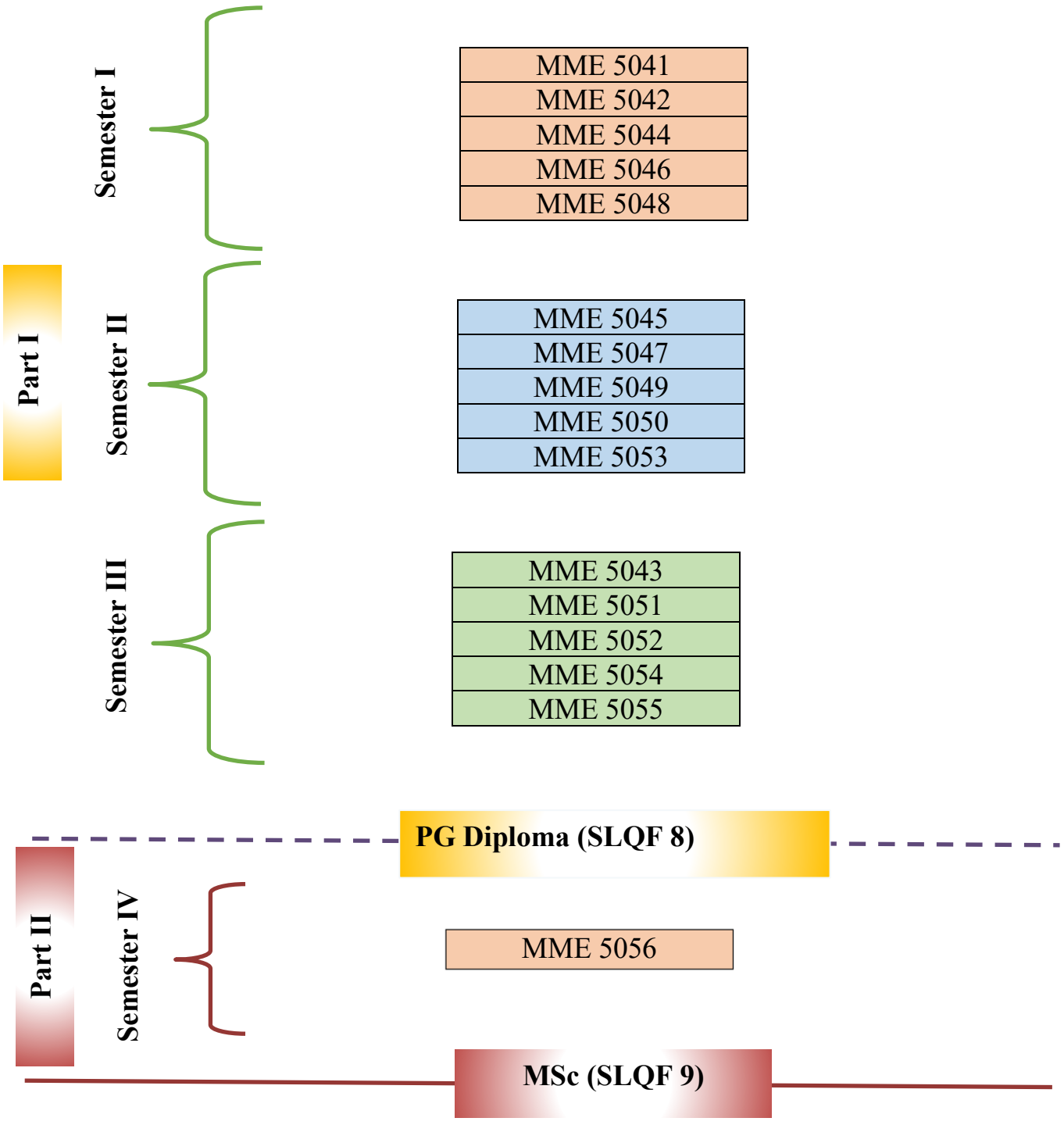
The MSc Degree Programme in Mathematics Education is designed to provide a professional development pathway for educators, curriculum developers, and educational researchers in the field of mathematics. The Programme equips professionals with advanced pedagogical strategies, mathematical content knowledge, and research skills to enhance the teaching and learning of mathematics at various educational levels.

This qualification serves as a valuable professional credential for teachers, education administrators, and policymakers, ensuring they are well-equipped to address contemporary challenges in mathematics education and contribute meaningfully to the field.

Objectives

The MSc Degree Programme in Mathematics Education prepares students to teach mathematics competently at the middle and secondary school levels. It has a strong emphasis on mathematics content in the teaching and learning of mathematics. It is designed to provide necessary skills, including the use of manipulatives, virtual environments and ICT in the classroom, and content and pedagogical knowledge for mathematics teachers who are in service as well as recent graduates who wish to embark on a rewarding career teaching mathematics in Sri Lanka or abroad. It provides opportunities for in-service teachers to reflect on their existing practice and engage in extended academic study to support their practice and their continuing professional development. This Programme also provides an opportunity to others to study mathematics education at the master's level.

Overview of the Programme



The Programme

MSc Programme shall have a minimum of 30 credits from the two components: Part I and Part II.

Part I

Part I shall consist of theory, laboratory, and field work. In total, Part I shall consist of a minimum of 25 credits and is equivalent to Level 8 of the SLQF (Sri Lanka Quality Framework).

Part II

To proceed to Part II students should achieve a minimum GPA of 3.00 in Part I. Part II shall carry a minimum of 5 credits and shall consist of a mini research project, or component(s) equivalent to such. Part II students undertaking a mini research project are required to carry out research at an academic/research/industrial institution where necessary facilities are available and submit a report on the research carried out.

Parts I and II combined containing a minimum of 30 Credits is equivalent to Level 9 of the SLQF (Sri Lanka Qualification Framework).

Duration

The duration of the Programme will be 24 months. **Part I** shall be conducted usually in the first 18 months of the Programme over 3 semesters. **Part II** shall be of 6 - 12 months duration.

The interactive sessions are conducted during Saturdays. However, in carrying out the research project continuous attendance may be necessary during regular working hours of the week.

The maximum period allowed to complete the degree is 04 years from the date of the first registration.

Eligibility Criteria

A Bachelor of Science with Pure Mathematics or Applied Mathematics or Mathematics as a subject

OR

any other equivalent qualification acceptable to the senate of the University of Colombo.

Course Fee and Payments

For Sri Lankan Students

LKR 300,000/- (subject to change)

For International Students

USD 4000

For Sri Lankans coming from a foreign territory

40% discount on USD 4000/-

Application Fee: LKR 2,500/-

Programme Intended Learning Outcomes

At the end of the two years (SLQF Level 9) MSc in Mathematics Education Degree holders should be able to:

PLO I: ***Demonstrate*** deep knowledge of the concepts, principles, techniques, and reasoning methods of mathematics relevant to middle and secondary school mathematics,
PLO II: ***Critically analyse*** problem solving processes in the context of school mathematics,
PLO III: ***Demonstrate*** an enhanced understanding of what it means to learn mathematics and where and how mathematical misconceptions and student confusion can occur in secondary school mathematics,
PLO IV: ***Draw on insights*** from cognitive psychology, learning theories and the philosophy and history of mathematics in order to create meaningful learning experiences,
PLO V: ***Integrate*** mathematics educational theory and research findings, mathematics content and pedagogical content knowledge and professional standards in planning lessons,
PLO VI: ***Use*** computer technology to enhance student learning in mathematics,
PLO VII: ***Acknowledge*** the impact of home life, cultural background, individual learning differences, attitudes and beliefs towards mathematics in learning mathematics and create classroom learning environments that are stimulating and accommodating for diverse student populations,
PLO VIII: ***Demonstrate*** knowledge and understanding of literature and concepts relating to mathematics education research,
PLO IX: ***Reflect*** on their teaching practices and improve and uphold ethical standards in the teaching practice.

Programme Structure

Modules of Part I

Course Code	Course Title	Hours/ Credits	Core/ Elective	Notional hours
Semester I				
MME 5041	Foundation of Education	15L, 1C	Core	50
MME 5042	Mathematics Teaching, Learning and Assessment	15L, 1C	Core	50
MME 5044	Philosophical and Psychological Aspects of Mathematics	30L, 2C	Core	100
MME 5046	History of Mathematics for Pedagogy	30L, 2C	Core	100
MME 5048	The Fundamentals of Abstract Mathematics	30L, 2C	Core	100
Semester II				
MME 5045	ICT for Mathematics Education	5L,20P, 1C	Core	50
MME 5047	Problem Solving in Mathematics	30L, 2C	Core	100
MME 5049	Complex Numbers	15L, 1C	Core	50
MME 5050	Combinatorics, Probability and Statistics	30L, 2C	Core	100
MME 5053	Introduction to Classical Geometries	30L, 2C	Core	100
Semester III				
MME 5043	Mathematics Education Seminar	30P, 1C	Core	50
MME 5051	Introduction to Algebra	30L, 2C	Core	100
MME 5052	Introduction to Analysis	45L, 3C	Core	150
MME 5054	Classical Mechanics	30L, 2C	Core	100
MME 5055	Research Methodology	5L,20P, 1C	Core	50

Modules of Part II

MME 5056	Action Research	150P, 5C	Core	250

Mode of Delivery

Delivery of Lectures

The lectures are conducted via Zoom. The Zoom links for lectures and any other meetings and presentations are provided to the students.

Learning Management System (LMS)

URL: **https://lms.sci.cmb.ac.lk/mschub/lms/**

All the students are given access to the MSc LMS. Students are enrolled to the relevant courses in the LMS each semester. All the lecture materials are uploaded to the LMS.

Student Information System (SIS)

URL: **https://sims.cmb.ac.lk/sci/login**

Registration for the Examination

- Examination registration is available in the MSc SIS.
- Students can apply for the examination courses that are added by the coordinator to the examination events.
- Students will be able to register/ cancel the examination courses until the deadline expires.
- Students can view the details until the examination event is closed by the coordinator.

Provisional Results

- Students will be able to see their results (Grade only) in the MSc SIS when the coordinator releases the provisional results for the courses.
- The system sends automatically generated emails to registered students when releasing results for the examination courses.

Final Results

- Students will be able to see their results (Grade) with GPA in the MSc SIS when the Examination Branch releases the final results and enables the GPA.

For More Information

- Please contact through the email <itsc@sci.cmb.ac.lk>, if you have an issue with logging into the FMS.
- Please contact your MSc Coordinator, if you have an issue in examination registrations, provisional results or your details are wrong in the system.
- More: https://sims.cmb.ac.lk/sci/

Compliances

The SLQF level of the MSc in Mathematics Education degree is Level 9.

The SLQF level of the Post Graduate Diploma in Mathematics Education is Level 8.

Degree Awarding Criteria

Registration

Date of Registration

A person who has been selected as a postgraduate student shall be required to register for the current academic year to follow the particular MSc programme. The date of registration shall be specified by the faculty.

Maintenance of Registration

In order to obtain the MSc degree, registration should be maintained by paying the specified fees.

Postponement of Registration

A student who desires to postpone his/her registration should do so in writing to the Dean, Faculty of Science, giving reasons and stating the duration of the postponement. Each such request shall be considered by the faculty on the recommendation of the Higher Degrees Committee (HDC) and the relevant Department.

Cancellation of Registration

A registration may be cancelled by the faculty on the recommendation of the HDC and the relevant Department for inadequate progress, for violation of rules and regulations of the University, failure to pay prescribed fees by the due dates, or any other reasons as decided by the Faculty.

Leave of Absence

Leave of absence may be granted on medical grounds or any other valid reasons acceptable to the faculty.

Examinations

General Instructions

The end semester final examinations are conducted at the university premises.

Students are required to do the examination registration via the Faculty Management System (FMS) as explained above.

The minimum grade a student should achieve to pass a paper/mini project/research component is B-.

Repeat Examinations

If a candidate obtains a grade below B for a course, he/she may repeat it or the required part at the next first available opportunity. Candidates are allowed to repeat an examination paper only once.

Important Instructions for Students who do the Examinations Out of the University Premises

Students are required to join the zoom session by two devices, switch on the video of both devices and be present throughout the examination. The student and the surrounding should be visible via the camara of one of the devices and the computer screen where the student is doing the examination should be visible via the camera of the other device.

- Students should join the zoom session a minimum of 20 minutes prior to the examination time.
- Those who join the zoom session 15 minutes after the commencement of the exam; won't be allowed to attempt the examination.
- Students should rename their device using their index number as soon as they join the Zoom session (eg: 2024ME01).
- The password to the examination will be provided during the zoom session. Note that sharing this password using any mode will be regarded as an examination offense.
- Microphones should be muted and switched on if it is requested by the supervisor/ invigilators. Make sure that the visibility (webcam) and audibility of Zoom are working properly for this purpose.
- Communication with other candidates is strictly prohibited.
- It is not allowed to wear headphones, headsets, earphones, ear buds etc.
- Breaks are not allowed during the examination for any reason.
- If you leave your computer during the examination, the supervisor/ invigilators will end your session and you will be unable to continue the examination.
- No one is permitted in your work area (in the place/ room you are attempting the examination) for any reason.
- You cannot speak or cover your mouth.
- Your face and surroundings should be clearly visible during the examination.

Students are strongly advised to take all necessary precautionary measures to handle issues such as power failure, connectivity etc.

Scheme of Evaluation

The Grade Point Average (GPA) shall be computed using grades assigned for all courses in Parts I and for Part II, and where applicable in Part III. The minimum grade a student should obtain to pass a paper/mini project/research component is B-. The grades shall be assigned as shown below.

Marks Range	Grade	grade Point
85 - 100	A+	4.00
70 - 84	A	4.00
65 - 69	A-	3.70
60 - 64	B+	3.30
55 - 59	B	3.00
50 - 54	B-	2.70
45 - 49	C+	2.30
40 - 44	C	2.00
35 - 39	C-	1.70
30 - 34	D+	1.00
25 - 29	D	1.00
00 - 24	E	0.00

If the Grade Point Average (GPA) of a student is required for any purpose, it shall be calculated using the following equation:

$$GPA = \sum w_i g_i / \sum w_i$$

where, w_i = number of credit units for the ith course and g_i = grade points for the ith course

The GPA is rounded to the second decimal place.

Any student who has not appeared for the evaluation of a course may be assigned a GPV of 0.00 for the purpose of calculating his/her GPA.

Eligibility

Degree Awarding Criteria – PGD

Students who fail to obtain a GPA of 3.00 but maintain a GPA of not less than 2.70 in Part I will be eligible for the award of the Postgraduate Diploma in Mathematics Education.

Degree Awarding Criteria – MSc

Students who complete Part II and obtain GPA of 3.00 or above for Part II (overall GPA not less than 3) will be eligible for the award of MSc in Mathematics Education.

Awards

Merit Pass

A student shall be eligible for the award of a Merit Pass in the MSc in Mathematics Education Degree programme if

the student obtains an **overall GPA of 3.30 or above (B+ Grade)** for Parts I and II

AND

the student has **not repeated any course unit**

AND

the student obtains a **minimum GPV of 2.70 (B- Grade) in all courses** followed in the programme

AND

the student **completes Part I and Part II within three academic years**

Curriculum

Course Code	**MME 5041**			
Course Name	**Foundations of Education**			
Credit Value	**1**			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	15	None	35	50

Course Aim

Every teacher must know the psychological, sociological and philosophical aspects of learning and teaching. This course explores learning and teaching from psychological, sociological and philosophical perspectives.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1: **Demonstrate** knowledge of an overview of the central issues related to the nature of learning and teaching from psychological, sociological and philosophical perspectives.
- CLO2: **Critically analyse** issues in learning and teaching.

Course Content

Psychological aspects of learning and teaching: Intellectual development, Concept development, Learning theories. Sociological and philosophical aspects of learning and teaching: Education and society, Socio-economic and cultural determinants of education, Education and human development

Teaching /Learning Methods:

- Interactive lecture methods
- Assignments
- Group activities

Assessment Strategy:

- Group Assignments
- Quizzes
- Written examinations

Continuous Assessment 50%	**End Semester Examination 50%**		
Assignments (CLO 1 &2), Mid-semester examination (CLO 1 &2)	Theory (%) 50%	Practical (%) None	Viva (%) None

Recommended Reading:

1. 1. Ellis, A. K. (1986). Introduction to the Foundations of Education. Prentice Hall, 200 Old Japan Rd., Old Japan, NJ07675.
2. Schunk, D. H. (2012). Learning theories an educational perspective sixth edition. Pearson.
3. Jung, C. G. (2015). Psychology and education. Princeton University Press.

Course Code	**MME 5042**			
Course Name	**Mathematics Teaching, Learning and Assessment**			
Credit Value	**1**			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	15	None	35	50

Course Aim

The course unit provides teachers with the knowledge, skills, and strategies required to effectively teach, learn, and assess mathematics by developing a deep understanding of mathematical concepts, promoting innovative teaching approaches, and integrating evidence-based assessment practices to enhance students' mathematical proficiency and critical thinking

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1: Describe the mathematics learning process considering different learning strategies
- CLO2: Apply the appropriate methodologies and techniques of teaching for a given learning teaching situation
- CLO3: Develop assessment tools to measure students' mathematical understanding and critical thinking skills.

Course Content

Meaningful learning, Discovery learning, Advance organization of learning, Problem-based learning, Constructivists learning design, Process- based teaching, Beyond process Mathematics teaching, Various teaching methods, Unit and lesson planning, Evaluation achievement, Formative evaluation, Summative evaluation, Assessing cognitive skills, Assessing attitudes

Teaching /Learning Methods:

- Interactive lecture methods
- Assignments
- Group activities

Assessment Strategy:

- Group Assignments
- Quizzes
- Written examinations

Continuous Assessment 50%	**End Semester Examination 50%**		
Assignments (CLO 3), Mid-semester examination (CLO 1 &2)	Theory (%) 50%	Practical (%) None	Viva (%) None

Recommended Reading:

1. Ormrod, J. E. (2020). *Human learning* (8th ed.). Pearson.
2. Skemp, R. R. (1987). *The psychology of learning mathematics*. Routledge.
3. Brookhart, S. M. (2010). *How to assess higher-order thinking skills in your classroom*. ASCD.

Course Code	**MME 5043**			
Course Name	**Mathematics Education Seminar**			
Credit Value	**1**			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	None	30	20	50

Course Aim

Academic writing, independent learning and oral presentation skills are essential skills for a mathematics educator. This course develops such skills.

Intended Learning Outcomes
At the successful completion of this course students will be able to:

- CLO1**:** ***Research*** topics in mathematics education
- CLO2**:** ***Write*** academic reports
- CLO3**:** ***Orally present*** research findings effectively

Course Content

This course focuses on independent learning, researching in mathematics education, academic writing and oral presentation skills. Students are guided to study a specific topic in the area of mathematics education, write an academic report on the topic and present their work at a seminar.

Teaching /Learning Methods:

- Interactive lecture methods
- Assignments
- Group activities

Assessment Strategy:

- Group Assignments
- Quizzes
- Written examinations

Continuous Assessment 50%	**End Semester Examination 50%**		
Assignments (CLO 3), Mid-semester examination (CLO 1 &2)	Theory (%) 25%	Practical (%) None	Viva (%) 25%

Recommended Reading:

1. Cai, J. (2017). Compendium for Research in Mathematics Education. National Council of Teachers of Mathematics. 1906 Association Drive, Reston, VA 20191.

2. Fitzpatrick, J., Wright, D. J., & Secrist, J. (1998). Secrets for a successful dissertation. Sage.

3. Roberts, C. M. (2010). The dissertation journey: A practical and comprehensive guide to planning, writing, and defending your dissertation. Corwin Press.

Course Code	**MME 5044**			
Course Name	**Philosophical and Psychological Aspects of Mathematics**			
Credit Value	2			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	30	None	70	100

Course Aim

This course is aimed at looking into the philosophical and psychological aspects of mathematics with their individual and societal impact, from which insights are drawn on teaching and learning mathematics.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1: ***Recall*** major learning theories of mathematics
- CLO2: ***Describe*** the difference between inductive and deductive reasoning
- CLO3: ***Create*** learning activities for selected topics using APOS theory

Course Content

Scientific method, inductive and deductive reasoning, evidence-based vs proof-based approaches, scientific and mathematical consensus, conceptions of mathematical truth

Schools of mathematical thought (logicism, formalism, constructivism, platonism etc), mathematical fallibilism and falsificationist methodology in science

Mathematics and society, numeracy, mathematization and social impact, ethnomathematics, critical mathematics pedagogy, pseudomathematics

Cognitive psychology of mathematics, numerical cognition, mathematical anxiety, learning theories of mathematics, APOS theory, relational and instrumental understanding

Teaching /Learning Methods:

- Interactive lecture methods
- Assignments
- Group activities

Assessment Strategy:

Continuous Assessment 40%	**End Semester Examination 60%**

Practical examinations (CLO 3), Assignments (CLO 1,2), Mid-semester examination (CLO 1,2)	Theory (%) 40%	Practical (%) 0	Viva (%) 20%

Recommended Reading:

Lakatos, I., 1978. Mathematics, Science, and Epistemology (Vol. 2). Cambridge University Press.

Rosa, M., Shirley, L., Gavarrete, M.E. and Alangui, W.V. eds., 2017. Ethnomathematics and its Diverse Approaches for Mathematics Education (pp. 3-19). Springer International Publishing.

Skemp, R.R., 1987. The Psychology of Learning Mathematics. Psychology Press.

Course Code	**MME 5045**			
Course Name	**ICT for Mathematics Education**			
Credit Value	1			
Core/Optional	Core			
Prerequisite	MME 5044			
Hourly Breakdown	**Theory (H)**	**Practical (H)**	**Independent Learning (H)**	**Notional (H)**
	5	20	25	50

Course Aim

This course is aimed at providing the students with basic knowledge and skills on integrating digital technology in teaching mathematics.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1: ***Relate*** learning theories of mathematics to concepts in human-computer interaction
- CLO2: ***Integrate*** digital resources such as graphing tools and educational apps into mathematics instruction
- CLO3: ***Review*** the impact of AI on mathematics education

Course Content

Overview of ICT in mathematics education, Digital tools for graph plotting, symbolic computation and data visualisation (Geogebra, Wolfram Alpha, Desmos, Sympy etc.), Usage of digital whiteboards and interactive simulations, Integrating LMS systems in the classroom (Google classroom, zoom, Moodle etc.)

Benefits and challenges in using AI for mathematics education, Computational thinking and digital humanities, Role of cognitive psychology of mathematics in Human-computer interaction in the classroom

Teaching /Learning Methods: Classroom discussions and assignments

Assessment Strategy:

Continuous Assessment 40%	**End Semester Examination 60%**		
Practical examinations (CLO 1), Assignments (CLO 2), Mid-semester examination (CLO 1,2,3)	Theory (%) None	Practical (%) 20%	Viva (%) 40%

Recommended Reading:

Pepin, B., Gueudet, G. and Choppin, J. eds., 2024. Handbook of Digital Resources in Mathematics Education. Springer.

Oldknow, A. and Knights, C. eds., 2011. Mathematics Education with Digital Technology. Bloomsbury.

Kanematsu, H. and Barry, D.M., 2016. STEM and ICT Education in Intelligent Environments. Springer.

Course Code	**MME 5046**			
Course Name	**History of Mathematics for Pedagogy**			
Credit Value	2			
Core/Optional	Core			
Prerequisite	None			
	Theory (H)	**Practical**	**Independent Learning (H)**	**Notional (H)**
	30	None	70	100

Course Aim

This course is aimed at providing a basic understanding of the historical development of mathematical thought, focusing on the positions of key school-level mathematical concepts in the timeline of mathematics.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1: ***Relate*** key mathematical concepts in school curriculum to approximate time periods in history
- CLO2: ***Analyse*** the cultural and historical factors behind the development of mathematical thought
- CLO3: ***Create*** learning activities classroom based on historical milestones of mathematics

Course Content

Number symbolism and of stages of mathematical notation (rhetorical, synocated and symbolic), early numeral systems, number bases and Napierian logarithms, Pythagorean legends and discovery of irrationals, Hellenistic geometry, Aristotalean logic, Visual representations of logic (Hetucakra, Euler, Carroll and Venn's diagrams), 'Laws of thought' by Boole

Early footprints of combinatorics in Sanskrit prosody, medieval variants of Pascal's triangle and binomial theorem, Fibonacci and De Moivre's works on combinatorics

Rhind and Moscow papyri with linear equations, Bakhshali Manuscript, Babylonian root finding method, Khayyam's method, Tartaglia's solution to depressed cubic equation, method of false position, Development of 'algorithm' concept, 'Nine chapters' and linear system solving

Descartes's philosophy and the coordinate system, Fermat's and higher dimensions Hamilton's works on quaternions and introduction of vector products, Cardano and Bombelli's encounters with complex numbers and Euler's symbolisation

Early (Hellenistic and Indian) and medival (Arabic and European) works in trigonometry - from cosine tables (Al-Khwarizmi) to sum & product formula (Yunus), Zeno's paradoxes and

<table>
<tr><td colspan="4">infinitesimals, Kerala school of mathematics and the development of calculus in East and West in medieval and renaissance periods</td></tr>
<tr><td colspan="4">Teaching /Learning Methods:

Classroom discussions, Case-studies, Student presentations and other assignments</td></tr>
<tr><td colspan="4">Assessment Strategy:</td></tr>
<tr><td>Continuous Assessment
40%</td><td colspan="3">End Semester Examination
60%</td></tr>
<tr><td rowspan="2">Practical examinations (CLO 1), Assignments (CLO 1,3), Mid-semester examination (CLO 1,2,3)</td><td>Theory (%)

40%</td><td>Practical (%)

0</td><td>Viva (%)

20%</td></tr>
<tr><td colspan="3">Recommended Reading:

• Katz, V.J., 2000. Using History to Teach Mathematics: An International Perspective (Vol. 51). Cambridge University Press.

• Boyer, C.B. and Merzbach, U.C., 2011. A History of Mathematics. John Wiley & Sons.

• Joseph, G.G., 2011. The Crest of the Peacock: Non-European Roots of Mathematics. Princeton University Press.</td></tr>
</table>

Course Code	**MME 5047**			
Course Name	**Problem Solving in Mathematics**			
Credit Value	2			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	30	None	70	100

Course Aim:

The aim of this course is to empower teachers with problem-solving strategies to enhance their ability to guide students through mathematical challenges, fostering critical thinking and understanding of mathematical concepts.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1: ***Determine*** effective approaches to solve mathematical problems in school curriculum and use them to enhance problem solving ability of students
- CLO2: ***Apply*** the knowledge and experience of problem solving to create meaningful mathematical tasks in the classroom.

Course Content

The focus will be to introduce mathematical problem solving through actual engagement of solving problems of varying difficulty starting from elementary problems. Topics selected from existing literature on the nature of problem solving such as the work of George Polya and Alan Schoenfeld will be used to enhance the understanding of the nature of problem solving. The following are some problem-solving heuristics that will be explored

Problem Solving Heuristics: Trial and Error, draw a diagram, look for pattern, Consider Cases, Work backward, Try a simpler problem, Use symmetry, Find an invariant, Think inductively, Analogy, Auxiliary problems, Specialization, Generalization

Teaching /Learning Methods: Classroom discussions, Quizzes, Take home assignments, LMS based independent learning activities, Interactive videos

Assessment Strategy:

Continuous Assessment 30%	**End Semester Examination 70%**		
Quizzes (CLO 1,2), Mid-semester examination (CLO 1,2)	Theory (%) 70%	Practical (%) None	Viva (%) None

Recommended Reading:

- L. Larsen, Problem Solving through Problems, Springer Verlag, Berlin, 1983.
- G. Polya, How to Solve It, Princeton University Press, Princeton, 1988.
- G. Polya, Mathematics and Plausible Reasoning, in two volumes, Princeton University Press, Princeton, 1954.
- G. Polya, Mathematical Discovery, On Understanding, Learning and Teaching Problem Solving, John Wiley and Sons, 1981
- A. Schoenfeld, Mathematical Problem Solving, Academic Press, New York 1985.

Course Code	**MME 5048**			
Course Name	**Fundamentals of Abstract Mathematics**			
Credit Value	2			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	30	None	70	100

Course Aim:

To teach mathematics effectively a teacher should have a solid understanding of methods of proof and fundamental concepts in abstract mathematics. The aim of this course is to give students a working knowledge of logic, methods of proof, sets, relations, and functions.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1**:** ***Explain*** basic concepts in logic, set theory, relations and functions
- CLO2: ***Use*** appropriate methods of proof to ***prove/disprove*** statements
- *CLO3*: ***Apply*** concepts in sets, relations and functions to solve problems

Course Content

Logic: statements, logical connectives, truth tables, tautologies and contradictions, logical equivalence, arguments, predicates and quantifiers

Methods of Proof: direct proof, proof by contradiction, proof by cases, proof by contraposition, proof by mathematical induction, proof by strong mathematical induction, proof by well ordering principle, disproof by counterexample

Sets: Sets and set operations, algebra of sets, power set, partition of a set, arbitrary unions and intersections, cartesian products

Relations: definition and notations, equivalence relations and equivalence classes

Functions: definition and notations, domain, range, image and preimage; injective, surjective and bijective functions, operations on functions, composition of functions, inverse functions

Teaching /Learning Methods: Classroom discussions, Quizzes, Take home assignments, LMS based independent learning activities, Interactive videos

<table>
<tr><td colspan="4">Assessment Strategy:</td></tr>
<tr><td>Continuous Assessment
30%</td><td colspan="3">End Semester Examination
70%</td></tr>
<tr><td rowspan="2">Quizzes (CLO 1,2,3), Mid-semester examination (CLO 1,2,3)</td><td>Theory (%)</td><td>Practical (%)</td><td>Viva (%)</td></tr>
<tr><td>70%</td><td>None</td><td>None</td></tr>
<tr><td colspan="4">Recommended Reading:
Krantz, S. G. (2017). The elements of advanced mathematics. CRC Press.
Watkin, M.J., Meyer, J. L. (2012). Passage to Abstract Mathematics. Addison-Wesley</td></tr>
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Course Code	**MME 5049**			
Course Name	**Complex Numbers**			
Credit Value	1			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	15	None	35	50

Course Aim:

Complex numbers is a topic in school curriculum with many misconceptions. This course aims to provide a clear understanding of complex numbers.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1**:** ***Construct*** complex numbers and ***describe*** their main properties
- CLO2: ***Solve*** problems about complex numbers

Course Content

Construction of Complex Numbers, The set of complex numbers as a field, Conjugate, Modulus, Geometric interpretations of operations, Polar form, De Moivre's Theorem, nth roots, Solving complex equations, application of complex numbers to solve geometry problems, elementary functions

Teaching /Learning Methods: Classroom discussions, Quizzes, Take home assignments, LMS based independent learning activities, Interactive videos

Assessment Strategy:

Continuous Assessment 30%	**End Semester Examination 70%**		
Quizzes (CLO 1,2), Mid-semester examination (CLO 1,2)	Theory (%) 70%	Practical (%) None	Viva (%) None

Recommended Reading:

1. T. Andreescu, D. Andrica, Complex numbers from A to Z, Birkhauser 2006
2. J.E. Marsden, T.J. Hoffman, Basic Complex Analysis (3rd edition), W.H. Freeman, 1999

Course Code	**MME 5050**			
Course Name	**Combinatorics, Probability and Statistics**			
Credit Value	2			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	30	None	70	100

Course Aim

Combinatorics, Probability and Statistics are topics in the school curriculum. This course aims to introduce basic concepts and provide a clear understanding in combinatorics, probability and statistics with applications.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1: ***Demonstrate*** knowledge of fundamental probability and statistical concepts.
- CLO 2: ***Apply*** discrete and continuous probability distributions.
- CLO 3: ***Design*** classroom activities for teaching permutations and combinations

Course Content

Basic Counting Principles: multiplication and addition principles with examples and classroom activities, Using visual aids and real-world examples to demonstrate basic counting problems, pigeonhole principle

Permutations and factorials: recursive definitions, factorial, definition of permutations and formula for permutations of n distinct objects, circular permutations, permutations with repetition, group activities to illustrate seating arrangements for events etc

Combinations and binomial coefficients: definition of combinations, applications of combinations: selecting teams, subsets, etc. with activities, Pascal's Triangle, binomial coefficients, recurrence relation for binomial coefficients, binomial theorem and its applications

Principle of inclusion and exclusion: Solving counting problems involving overlapping sets, real-world applications of inclusion-exclusion

Probability: Sample space, events, outcome, and axioms of probability. Addition and multiplication rules. The law of total probability, conditional probability, independence, Bayes Theorem

Random variables: Discrete and continuous random variables. Probability mass function, probability density function and cumulative distribution function. Expectation, variance and moments

Discrete and continuous probability distributions: Bernoulli trials, binomial, geometric, Poisson, uniform, exponential, normal

Teaching /Learning Methods:

- Interactive lecture methods
- Assignments
- Group activities

Assessment Strategy:

- Group Assignments
- Quizzes
- Written examinations

Continuous Assessment 40%	**End Semester Examination 60%**		
Group Assignments (CLO 1,2,3), Quizzes (CLO 1,2), Mid-semester examination (CLO 1,2)	Theory (%) 60%	Practical (%) None	Viva (%) None

Recommended Reading:

- Milton, J.S. and Arnold J.C., 2003. Introduction to Probability and Statistics: Principles and Applications for Engineering and the Computing Sciences. McGraw Hill.
- Hogg, R.V., McKean, J. Craig, A. T., 2013. Introduction to Mathematical Statistics. Pearson.
- Johnsonbaugh, R., 1996. Discrete Mathematics. Prentice Hall.

Course Code	**MME 5051**			
Course Name	**Introduction to Algebra**			
Credit Value	2			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	30	None	70	100

Course Aim

Algebra is an important area of mathematics that is taught initially in junior secondary classes. A significant part of the secondary school curriculum is dedicated to algebra. Therefore, mathematics teachers need to have a sound understanding of algebraic structures. This course introduces students to some important algebraic structures and their properties.

Intended Learning Outcomes
At the successful completion of this course, students will be able to:

- CLO1: ***Apply*** divisibility properties of integers to solve problems.
- CLO2: ***Define*** abstract algebraic structures (e.g., groups, vector spaces, rings), their substructures and structure preserving mappings.
- CLO3: ***Apply*** the properties of abstract algebraic structures when working with standard examples.

Course Content

Divisibility Theory in the Integers: The Division Algorithm, The Greatest Common Divisor, The Euclidean Algorithm, The Fundamental Theorem of Arithmetic, The Theory of Congruences

Linear Algebra: Matrices, Determinants, System of Linear Equations

Algebraic Structures: Groups, Rings, Vector Spaces; Definitions, Examples, Substructures and Mappings that preserve the Structure

Teaching /Learning Methods: Interactive lecture methods, Assignments, Quizzes, Group activities

Assessment Strategy:

Continuous Assessment 30%	**End Semester Examination 70%**		
Mid-semester examination (CLO 1,2,3)	Theory (%) 70%	Practical (%) None	Viva (%) None

Recommended Reading:

- Burton D.M. (1997). Elementary Number Theory. McGraw Hill.
- Lay D.C., Lay, S.R. and Mc Donald J. (2011). Linear Algebra and its applications. Harlow: Pearson Education Ltd.
- Fraleigh J.B. (1994). A First Course in Abstract Algebra. Addison Wesley.

Course Code	**MME 5052**			
Course Name	**Introduction to Analysis**			
Credit Value	3			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	45	None	105	150

Course Aim:

Calculus is a central part in the school mathematics curriculum and to teach it effectively a teacher needs to have a clear understanding of underlying infinite processes. This course aims to provide a good understanding of infinite series, derivatives and integrals based on a sound understanding of real numbers and various limit concepts.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1**:** ***Explain*** basic concepts of real analysis such as limits, continuity, convergence, derivatives and integrals
- CLO2: ***Construct*** proofs of limit laws, differentiation rules and integration rules
- CLO3: ***Explain*** the connection between differentiation and integration via the fundamental theorem of Calculus
- CLO4: ***Solve*** problems using concepts and results in real analysis

Course Content

Properties of Real Numbers: Rational and Irrational numbers, Absolute value, Bounded sets, Supremum and Infimum, Archimedean property, Intervals

Sequences: Sequences of real numbers, limit of a sequence, convergence of monotone bounded sequences

Series: Convergence of a series, Absolute and Conditional Convergence, Basic convergence tests

Functions of a real variable: Limits and continuity, Theorems on continuous functions defined on closed intervals, Intermediate value theorem, Extreme value theorem

Differentiable functions: Concept of the derivative and its basic properties, Mean Value theorem, the relationship between the derivative and maxima and minima and increasing and decreasing functions

The Riemann integral: Partitions and the concept of integral, Basic properties, Antiderivative

Fundamental theorem of calculus. Integration by parts and change of variable rule

Teaching /Learning Methods: Classroom discussions, Quizzes, Take home assignments, , LMS based independent learning activities, Interactive videos

<table>
<tr><td colspan="4">Assessment Strategy:</td></tr>
<tr><td>Continuous Assessment
30%</td><td colspan="3">End Semester Examination
70%</td></tr>
<tr><td rowspan="2">Quizzes (CLO 1,2,3,4), Mid-semester examination (CLO 1,2,3,4)</td><td>Theory (%)</td><td>Practical (%)</td><td>Viva (%)</td></tr>
<tr><td>70%</td><td>None</td><td>None</td></tr>
<tr><td colspan="4">Recommended Reading:
• Abbott, S. (2001). Understanding analysis (2nd edition), Springer-Verlag, New York
• 2. Fitzpatrick, P. (2009). Advanced calculus (5th Edition). American Mathematical Society</td></tr>
</table>

Course Code	**MME 5053**			
Course Name	**Foundations of Geometry**			
Credit Value	2			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	30	None	70	100

Course Aim:

Euclidean Geometry is a main branch of the school mathematics curriculum. This course is an invitation for a teacher to explore foundations of geometry and view Euclidean geometry from a broader perspective.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1: ***Derive*** main theorems and constructions of Euclidean geometry from axioms
- CLO2: ***Compare*** and ***contrast*** the concept of parallel lines in Euclidean and non-Euclidean geometries and analyse consequences of the parallel postulate.
- CLO3: ***Describe*** congruences of geometric figures in terms of isometries
- CLO4: ***Discuss*** notions of angle, length and area in different geometries

Course Content

Euclidean Geometry: Straightedge and compass constructions, Euclid's axioms, parallel axiom, congruence axioms, theory of area, angles, construction of n-gons, Hilbert's axioms for Euclidean Geometry, Coordinates, Isometries

Projective Geometry: Perspective, projective plane axioms and their models, homogeneous coordinates, linear fractional functions, cross ratios, Pappus and Desargues theorems

Transformations: Isometries of the plane, transformations of the projective line, Spherical Geometry

Hyperbolic Geometry: Introduction to hyperbolic plane, Poincare model

Teaching /Learning Methods: Classroom discussions, Quizzes, Take home assignments, , LMS based independent learning activities, Interactive videos

Assessment Strategy:

Continuous Assessment 30%	**End Semester Examination 70%**		
Quizzes (CLO 1,2,3,4) Mid-semester examination (CLO 1,2,3,4)	Theory (%) 70%	Practical (%) None	Viva (%) None

Recommended Reading:

- John Stillwell, The four pillars of Geometry, Springer
- Robin Hartshorne, Geometry: Euclid and beyond, Springer

Course Code	**MME 5054**			
Course Name	**Classical Mechanics**			
Credit Value	2			
Core/Optional	Core			
Prerequisite	None			
Hourly Breakdown	**Theory (H)**	**Practical**	**Independent Learning (H)**	**Notional (H)**
	30	None	70	100

Course Aim:

A significant part of advanced level combined mathematics curriculum consists of classical mechanics. Therefore, it is important for teachers to have a solid understanding of it. This course introduces classical mechanics from a broader perspective.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1: ***Explain*** fundamental concepts in Newtonian and Lagrangian mechanics
- CLO2: ***Apply*** principles of Newtonian and Lagrangian mechanics to describe motions
- CLO3: ***Solve*** motion related problems.

Course Content

Revision on Vectors: Vectors, Properties of vectors, Cartesian and Cylindrical coordinate systems, the use of vectors in physics, Vector product (cross product)

Newton's Laws of Motion: Force and Quantity of matter, Newton's first law, Momentum, Newton's Second Law and Third Law, Applications of Newton's Second Law

Lagrangian Mechanics: Generalized coordinates; Preliminary notions, Generalized velocities, Virtual work and generalized forces, Derivation of Lagrange's equations for a holonomic system, Case of conservative forces, Equilibrium configuration for conservative holonomic dynamical systems, Theory of small oscillations of conservative holonomic dynamical systems

Teaching /Learning Methods: Interactive lectures

Assessment Strategy: Mid semester examinations

Continuous Assessment 30%	**End Semester Examination 70%**		
Mid-semester examination (CLO 1,2,3)	Theory (%) 70%	Practical (%) None	Viva (%) None

Recommended Reading:

- Chorlton, F. (1983). Textbook of dynamics. Halsted Press.
- Goldstein, H., Poole, C., & Safko, J. (2002). Classical mechanics.

Course Code	**MME 5055**			
Course Name	**Research Methodology**			
Credit Value	1			
Core/Optional	Core			
Prerequisite	MME 5044			
Hourly Breakdown	**Theory (H)**	**Practical (H)**	**Independent Learning (H)**	**Notional (H)**
	5	20	25	50

Course Aim:

The primary goal of this course is preparing the candidates for the classroom-based action research.

Intended Learning Outcomes

At the successful completion of this course students will be able to:

- CLO1: ***Relate*** positivist and interpretivist paradigms to deductive and inductive approaches
- CLO2: ***Draw*** conclusion by interpreting and visualising data
- CLO3: ***Design*** intervention strategies to address the issues related to learning mathematics in classroom

Course Content

Research paradigms: Scientific method, pseudoscience, psuedomathematics, positivism vs interpretivism

Research design: Types of research, analysis of experiment, classroom-based research, data collection, analysis visualisation and interpretation, model building and model validation, research ethics

Research reporting: Research repositories, academic databases, scientific writing, formatting tools, publication ethics, oral research presentations

Teaching /Learning Methods: Classroom discussions, Case studies

Assessment Strategy: Practical Examinations, Assignments

Continuous Assessment 100%	**End Semester Examination 0%**		
Case studies (CLO 2), Practical examinations (CLO 1,3), Assignments (CLO 1,2,3)	Theory (%) None	Practical (%) None	Viva (%) None

Recommended Reading:

Howell, K.E., 2012. An Introduction to the Philosophy of Methodology. Sage

Kelly, A.E. and Lesh, R.A., 2012. Handbook of Research Design in Mathematics and Science Education. Routledge.

Course Code	**MME 5056**			
Course Name	**Action Research**			
Credit Value	5			
Core/Optional	Cote			
Prerequisite	MME 5055			
Hourly Breakdown	**Theory**	**Practical (H)**	**Independent Learning (H)**	**Notional (H)**
	None	150	350	500

Course Aim

Through critical reflection, teachers can explore the sense-making process of mathematics learning via researching action in the mathematics classroom. In this course mathematics education research is to be explored with the focus being drawn on the discussion of teacher-as-researcher movement.

Intended Learning Outcomes

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

- CLO1: ***Define*** the characteristics of action research,
- CLO2: ***Compare*** and contrast action research with other types of research, and
- CLO3: ***Relate*** action research to current teaching practices.

Course Content

Each student will undertake a guided action research study on a pedagogical issue in teaching practice In the given period of six months students are to conduct the four seminars on proposal, literature review, methodology and basic results

Teaching /Learning Methods: Independent learning

Assessment Strategy:

Continuous Assessment 30%	**End Semester Examination 70%**		
Viva (CLO 1,2,3), Reports (CLO 1,2,3)	Theory (%) 20%	Practical (%) 30%	Viva (%) 20%

Recommended Reading:

- Krainer, K. (2006). Action research and mathematics teacher education. Journal of Mathematics Teacher Education, 9(3), 213-219.
- Segal, S. U. (2009). Action research in mathematics education: a study of a master's Programme for teachers (Doctoral dissertation, Montana State University-Bozeman, College of Letters & Science).

- Van Eerde, H. A. A. (2013). Design research: Looking into the heart of mathematics education. In Proceedings van de 1st South-East Asian Design Research conference 2-23 April 2013, UNSRI, Palembang (pp. 1-11).
- Arcavi, A. (2000). Problem-driven research in mathematics education. The Journal of Mathematical Behavior, 19(2), 141- 173.
- Darragh, L. (2016). Identity research in mathematics education. Educational Studies in Mathematics, 93(1), 19-33.
- Roberts, C. M. (2010). The dissertation journey: A practical and comprehensive guide to planning, writing, and defending your dissertation. Corwin Press.

Courses vs Programme Learning Outcomes (PLOs) Map

Course Code	Course Title	PLO (i)	PLO (ii)	PLO (iii)	PLO (iv)	PLO (v)	PLO (vi)	PLO (vii)	PLO (viii)	PLO (ix)
MME 5041	Foundations of Education	L	L	L	L	M	L	L	L	L
MME 5042	Mathematics Teaching, Learning and Assessment	L	L	M	M	M	L	L	L	L
MME 5043	Mathematics Education Seminar	L	L	M	M	M	M	H	H	H
MME 5044	Philosophical and psychological aspects of mathematics	H	H	H	H	H	L	H	M	H
MME 5045	ICT for Mathematics Education	H	H	H	M	M	H	L	H	H
MME 5046	History of Mathematics for Pedagogy	H	M	M	H	H	L	M	H	H
MME 5047	Problem Solving in Mathematics	H	H	H	M	M	L	M	M	H
MME 5048	Fundamentals of Abstract Mathematics	H	H	H	M	M	L	L	H	H
MME 5049	Complex Numbers	H	H	H	M	M	L	L	L	H
MME 5050	Combinatorics, Probability and Statistics	H	H	H	M	M	L	L	L	H
MME 5051	Introduction to Algebra	H	H	H	M	M	L	L	L	H
MME 5052	Introduction to Analysis	H	H	H	M	M	L	L	L	H
MME 5053	Foundations of Geometry	H	H	H	M	M	L	L	L	H
MME 5054	Classical Mechanics	H	H	H	M	M	L	L	L	H
MME 5055	Research Methodology	L	L	L	L	M	M	M	M	H
MME 5056	Action Research	H	H	H	H	H	H	H	H	H

H	Highly correlated
M	Moderately correlated
L	Correlated

Map of SLQF outcome

SLQF Outcomes/ Programme ILOs (PLO) Vs Courses

SLQF Outcome	Subject/Theoretical Knowledge	Practical Knowledge and Application	Communication	Teamwork and Leadership	Creativity and Problem Solving	Managerial and Entrepreneurship	Information Usage and Management	Networking and Social Skills	Adaptability and Flexibility	Attitudes, Values and Professionalism	Vision for Life	Update Self/Lifelong Learning
Programme ILOs	**(i) (iii) (iv) (vi) (viii)**	**(i) (iii) (iv) (v) (vi) (viii)**	**(i) (iv) (v)**	**(iv) (ix)**	**(ii) (iii)**	**(v) (vii)**	**(iv) (v) (vi) (viii)**	**(ix)**	**(v) (vi) (vii) (ix)**	**(v) (vii) (ix)**	**(vii) (ix)**	**(vii) (ix)**
MME 5041	H	M	H	H	L	L	L	M	M	M	L	H
MME 5042	H	M	M	L	L	L	L	M	M	M	M	H
MME 5043	M	M	H	L	L	L	H	L	M	M	M	H
MME 5044	H	H	H	M	M	L	H	L	M	M	H	H
MME 5045	M	H	H	H	M	H	H	H	H	M	M	H
MME 5046	H	M	M	M	M	M	H	M	M	H	H	H
MME 5047	H	H	H	M	H	L	H	L	M	H	M	H
MME 5048	H	H	H	L	H	L	H	L	M	H	M	H
MME 5049	H	H	H	L	H	L	H	L	M	H	M	H
MME 5050	H	M	L	L	H	L	L	L	M	L	M	M
MME 5051	H	M	H	L	H	L	H	L	M	H	M	H
MME 5052	H	H	H	L	H	L	H	L	M	H	M	H
MME 5053	H	H	H	L	H	L	H	L	M	H	M	H
MME 5054	H	M	M	L	H	L	L	L	M	M	M	H
MME 5055	M	H	H	H	H	L	H	M	M	H	H	H
MME 5056	H	H	H	H	H	H	H	H	H	H	H	H

H	Highly correlated
M	Moderately correlated
L	Correlated

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Request Forms

Students can use the following request forms to make requests.

- Student Request Form – MSc/PG Diploma in Mathematics Education
- Rescrutiny Form
- Application for Fallback Option

Student Request Form – MSc/PG Diploma in Mathematics Education can be used for general requests.

Rescrutiny Form can be used to request re-corrections after the provisional results are released.

Student Request Form – MSc/PG Diploma in Mathematics Education

Name of student	Reg. No.	Signature
	Email:	Mobile:
Name of Programme:		Department:
Date of Reg.	Reg. No.	Date of Request:

Nature of Request (Tick as appropriate)

	Deferment of Registration
	Medical (for examinations) Course: ……..
	Overseas Leave
	Repeat Examination Course: ……..
	Fallback option PG Dip.: …… MSc: ……..
	Extension (beyond the permitted period) Period: ……..
	Other

Observation of Coordinator:

Name of Coordinator	Name of Head
Signature: Date:	Signature: Date:

Annexure 13
Rescrutiny Form

Request for re-scrutiny of marking of answer scripts

Index No:			
Academic Year		Semester	

Number and Title of the Course	Present Grade Obtained	Expected Grade	Justification

…… ……

Signature Date

For office use only

Subject Code	Before Re-scrutiny		After Re-scrutiny		Comments
	Marks	Grade	Marks	Grade	

…… …… …….

Examiner(s) Signature Date

…… …… …….

Coordinator Signature Date

APPLICATION FOR FALLBACK OPTION

POSTGRADUATE DIPLOMA

To: DR/SAR/AR Examination

1.	Name of the Student		
2.	Name of the Postgraduate Degree Programme		
3.	Department		
4.	Registration No.		
5.	Date of Registration		
6.	Email		
7.	Contact No.	Mobile:	Home:
8.	I hereby request the Postgraduate Diploma in ……..... …….. Signature of the Applicant		…… Date
9.	Observations of the Coordinator		
10.	Name of the Coordinator:		
		……. …… Signature: Date	
11.	Recommendation of the Head of the Department Recommended/Not Recommended	……. …… Signature: Date	
12.	Recommendation of the Dean/ Faculty of Science Recommended/Not Recommended	……. …… Signature: Date	