PERIYAR UNIVERSITY

(NAAC 'A++' Grade with CGPA 3.61 (Cycle - 3)

State University - NIRF Rank 56 - State Public University Rank 25

SALEM - 636 011

CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)

M.Sc. MATHEMATICS

[SEMESTER PATTERN]

(2024-25 Onwards)

PROGRAMME PROJECT REPORT (PPR)

(Effective from the academic year 2024 – 2025)

Programme Project Report (PPR)

I. Programme's Mission and Objectives

Programme Mission:

The mission of the M.Sc. (Master of Science) programme in Mathematics aims to provide advanced mathematical training and develop a deep understanding of mathematical theories, methods, and applications.

Objectives:

a. To provide students with a thorough understanding of core mathematical areas such as algebra, analysis, geometry, and applied mathematics, ensuring a solid foundation in both theoretical and practical aspects.
b. To enable students to contribute original ideas and solutions to complex mathematical problems.
c. To create a platform for higher studies and research in mathematics, computing and inter-disciplinary areas.
d. To equip students to qualify for various national and international competitive examinations.
e. To develop a global perspective on mathematical sciences, encouraging students to engage with international research communities and understand global challenges and opportunities.

II. Relevance of the program with HEI'S mission and vision

To produce graduates who are well-prepared to advance the field of mathematics and apply their skills to solve real-world problems, contributing to the scientific, technological, and economic development of society.

III. Nature of prospective target group of learners

The target groups of learners include students qualifying undergraduate programme in mathematics, and mathematics related programmes.

IV. Appropriateness of Programme to be Conducted in Open and Distance Learning Mode to Acquire Specific Skills and Competence

Programme Outcomes (POs)

PO1: Problem Solving Skill

Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context.

PO2: Decision Making Skill

Foster analytical and critical thinking abilities for data-based decision-making.

PO3: Ethical Value

Ability to incorporate quality, ethical legal and value-based perspectives to all organizational activities.

PO4: Communication Skill

Ability to develop communication, managerial and interpersonal skills.

PO5: Individual and Team Leadership Skill

Capability to lead themselves and the team to achieve organizational goals.

PO6: Employability Skill

Inculcate contemporary business practices to enhance employability skills in the competitive environment.

PO7: Entrepreneurial Skill

Equip with skills and competencies to become an entrepreneur.

PO8: Contribution to Society

Succeed in career endeavors and contribute significantly to society.

PO9: Multicultural competence

Possess knowledge on values and beliefs of multiple cultures and also in global perspective.

PO10: Moral and ethical awareness/reasoning

Ability to embrace moral/ethical values in one's life.

Programme Educational Outcomes (PEOs)

PEO1 – Placement

To prepare the students who will demonstrate respectful engagement with others' ideas, behaviors, beliefs and apply diverse frames of reference to decisions and actions.

PEO2 - Entrepreneur

To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.

PEO3 – Research and Development

Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development.

PEO4 – Contribution to Business World

To produce employable, ethical and innovative professionals to sustain in the dynamic business world.

PEO5 – Contribution to the Society

To contribute to the development of the society by collaborating with stakeholders for mutual benefit.

Programme Specific Outcomes:

PSO1: Acquire sound knowledge to solve specific theoretical & applied problems in different areas of mathematics & statistics.

PSO2: Understand, formulate, develop mathematical arguments, logically and use quantitative models to address issues arising in social sciences, business and other related context /fields.

PSO3: To prepare the students who will demonstrate respectful engagement with other's ideas, behaviors, and beliefs and apply diverse frames of references to take decisions and actions.

V. Instructional design

Curriculum Design

The curriculum is designed with Choice Based Credit System (CBCS), Learning Outcomes Based Curriculum Framework (LOCF), Guideline Based Credits and Hours Distribution system.

S. No	COURSE CODE	CATEGORY	TITLE OF THE COURSE	Hours per week	CREDITS	MARKS (CIA = 25 + Ext =75)
SEMESTER - I						
1.	24DPMA01	Core I	Algebraic Structures	5	5	100
2.	24DPMA02	Core II	Real Analysis I	5	5	100
3.	24DPMA03	Core III	Ordinary Differential Equations	5	5	100
4.		Elective-I	One from Group A	5	3	100
5.		Elective-II	One from Group B	5	3	100
SEMESTER - II						
6.	24DPMA04	Core IV	Advanced Algebra	5	5	100
7.	24DPMA05	Core V	Real Analysis – II	5	5	100
8.	24DPMA06	Core VI	Topology	5	5	100
9.		Elective-III	One from Group C	5	3	100
10.		Elective-IV	One from Group D	5	3	100

SEMESTER - III						
11.	24DPMA07	Core VII	Complex Analysis	5	5	100
12.	24DPMA08	Core VIII	Functional Analysis	5	5	100
13.	24DPMA09	Core IX	Partial Differential Equations	5	5	100
14.		Elective V	One from Group E	5	3	100
15.		Elective VI	One from Group F	5	3	100
		NME	**TO BE INCLUDED**	3	2	100
SEMESTER - IV						
16.	24DPMA10	Core X	Measure Theory & Integration	5	5	100
17.	24DPMA11	Core XI	Differential Geometry	5	5	100
18.	24DPMA12	Core XII	Probability Theory	5	5	100
19.		Project	Project with viva voce	5	6	100
20.		Elective-VII	One from Group G	5	3	100
21.		Elective-VIII	One from Group H	5	3	100
TOTAL				**--**	**92**	**2200**

ELECTIVE COURSES OFFERED

Courses are grouped (Group A to Group F) so as to include topics from Pure Mathematics (PM), Applied Mathematics (AM), Industrial Components (IC) and IT Oriented courses (ITC) for flexibility of choice by the stakeholders / institutions.

SEMESTER	COURSE CODE	TITLE OF THE COURSE	CREDITS
I	**GROUP - A**		
	24DPMAE01	Number Theory and Cryptography	3
	24DPMAE02	Graph Theory and Applications	3
	GROUP - B		
	24DPMAE03	Discrete Mathematics	3
	24DPMAE04	Mathematical Programming	3
II	**GROUP – C**		
	24DPMAE05	Mathematical Modeling	3
	24DPMAE06	Mathematical Statistics	3
	GROUP – D		
	24DPMAE07	Difference Equations	3

	24DPMAE08	Mechanics	3
III	**GROUP – E**		
	24DPMAE09	Mathematical Biology	3
	24DPMAE10	Methods of Applied Mathematics	3
	GROUP – F		
	24DPMAE11	Mathematical Python – Practical	3
	24DPMAE12	Mathematical Documentation using LATEX - Practical	3
IV	**GROUP – G**		
	24DPMAE13	Numerical Analysis	3
	24DPMAE14	Financial Mathematics	3
	GROUP – H		
	24DPMAE15	Research Tools and Techniques	3
	24DPMAE16	Industrial Mathematics	3

Faculty and Support Staff:

The University has appointed the necessary faculty and support staff specifically for ODL mode, in compliance with UGC requirements. The course materials developed by the CDOE faculty meet the standards set by the 2020 regulations.

Staff Category	Required
Professor	1
Assistant Professor	1
Supportive Staff	1
Total	**3**

Delivery Mechanism:

CDOE ODL employs a modern ICT (Information & Communication Technology) enabled approach for instruction, distinct from conventional or regular programs. This methodology is more learner-oriented, with the learner actively participating in the teaching-learning process. The academic delivery system of CDOE ODL includes:

Print Material:

The printed material of the programme supplied to the students will be unit wise for every course.

Counselling Sessions:

There will be 6 counseling/ Personal contact classes in face to face mode of two hours each for a course of 4 credits. The counseling sessions / Personal Contact Programme (PCP) classes will be held on the campus of the University on Saturdays and Sundays.

Medium of Instruction:

The medium of course instruction and examination will be in English.

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VI. Procedure for admission, curriculum transaction and evaluation for M.Sc. Mathematics programme

Admission Procedure:

Admission to the M.Sc. Mathematics programme will be based on evaluating candidates' eligibility. Admission is not guaranteed, and Periyar University CDOE reserves the right to cancel any admission at any time if any irregularities are discovered in the admission process or eligibility criteria.

Duration of the Programme:

The maximum duration for M.Sc. Mathematics programme is N (Course duration) + 5 years. If a student does not complete the program within seven years, they must apply for special exams to complete their programme.

Eligibility:

A candidate who has passed 10, +2, +3 is eligible to apply for M.Sc. Mathematics.

Fee Structure:

Name of the Programme	Degree	Duration	Year	Fee (in Rs.)
Master of Science in Mathematics	PG	N (Course duration) + 5 years	1	5,710
			2	4,850

Credit System:

Periyar University, CDOE plans to implement the 'Credit System' for most of its programs. Each credit corresponds to 30 hours of study, encompassing all learning activities. Therefore, an 8-credit course requires 240 hours, a 6-credit course requires 180 hours, a 4-credit course requires 120 hours, and a 2-credit course requires 60 hours of study. This system helps students gauge the academic effort needed to complete a course. To finish an academic program, students must successfully complete both the assignments and the term-end examinations for each course in the program.

Evaluation:

(a) Assessment:

Theory Courses: There shall be internal assessment for three internal tests, one seminar and one assignment, and external examination at the end of each semester. The distribution of marks for internal evaluation and End Semester Examination shall be 25 marks and 75 marks, respectively. Further, distribution of internal marks shall be 10 marks for test, 5 marks for seminar, 5 marks for assignment, and 5 marks for Attendance respectively. Best mark out of the first two internal tests and one model examination shall be taken for Internal Assessment.

Computer Laboratory Courses: There shall be three tests in Laboratory part. The average of the best two can be treated as the CIA for a maximum of 40 marks. The duration of each test shall be two hours.

Courses	Marks			No. of Courses	Total Marks	Credits
	External	Internal	Total			
Core	75	25	100	12	1200	60
Elective	75	25	100	07	700	21
Practical (Elective)	60	40	100	01	100	03
Project + Viva Voce*	25+25	25+25	100	01	100	06
NME	75	25	100	01	100	02
	Grand Total			**22**	**2200**	**92**

*Dissertation: **100** (Internal Valuation 25 + External Valuation 25) and Joint Viva Voce 25 + 25 Marks

Note: There is no improvement for CIA of both theory and laboratory, and, also for University End Semester Examination.

b) Question Paper Pattern for Semester Examination

(i) Question Paper Pattern for Theory Examination

Maximum: 75 Marks **Passing Minimum: 50% (i.e. 38 marks) out of 75 marks** **Duration : 3 Hours**
Part –A (10 x 2 = 20 Marks) Answer ALL questions **Two questions from each Unit**
Part – B (3 x 5 = 15 Marks) **Three out of five one question from each Unit**
Part-C (5x 8 = 40 Marks) **Two questions from each Unit with internal choice (either-or type)**

(ii) Question paper pattern for Practical Examination

Time: **3** Hours Maximum: **100**Marks (Internal: 40 + External: 60)

The components of 40 marks are

Periodical assessment	- 20 marks
Test (best 2 out of 3)	- 10 marks
Record	- 10 marks

The components of 60 marks are

Experiments	- 40 marks
Viva-voce	- 10 marks
Record	- 10 marks

Passing Minimum: **30 Marks** (Aggregate of Experiments, Viva-voce and Record)

(No passing minimum for records)

There will be one question with or without subsections to be asked for the practical examination. Every question should be chosen from the question bank prepared by the examiner(s). A question may be used for at most three students in a batch.

(c) Passing Minimum

Passing Minimum in the end semester examination shall be 50% out of 75 marks (i.e., 38 marks).

There shall be no passing minimum for internal marks. A candidate who has secured a minimum of 50% marks in all the courses (including practical) prescribed in the programme and earned a minimum of **92 credits** will be considered to qualify the Master's programme.

For the Practical paper, a minimum of 30 marks out of 60 marks in the University examination and marks for the record notebook taken together is necessary for a pass. There is no passing minimum for the record notebook. However submission of record notebook is a mandatory.

For the Project work and viva-voce, a candidate should secure 50% of the marks for pass. The candidate should attend viva-voce examination to secure pass in the Project.

Classification of Result

Marks	Grade Point	CGPA	Letter Grade	Description
96 and above	10	9.51 and above	S+	First Class –
91-95	9.5	9.01-9.50	S	Exemplary
86-90	9.0	8.51-9.00	D++	First Class
81-85	8.5	8.01-8.50	D+ D	Distinction
76-80	8.0	7.51-8.00		
71-75	7.5	7.01-7.50	A++	
66-70	7.0	6.51-7.00	A+	First Class

Passing Minimum 50% P: Pass, ESE: End Semester Examination, CIA: Continuous Internal Assessment

$$\mathbf{GPA} = \frac{\Sigma\ \mathbf{(CDT \times GPT)}}{\Sigma\ \mathbf{CDT}}$$

Where: CDT – No. of credits of core, optional and elective courses

GPT= Grade Point (obtained by dividing the percentage of marks scored by 10)

VII. Requirement of Laboratory and Library Resources:

The University has well equipped computer labs with high configured desktops with good internet/wi-fi connectivity. It also has more than 6000 books and access to 100 e-books at post graduate and research levels.

The Central Library is one of the important central facilities of Periyar University. It has Text book, reference books, conference proceedings, back volumes, standards, and non-book material such as CD-ROMs and audios. The central library procured several e- books in different areas.

All routine functions of the library are automated with the help of an integrated library software package, developed and distributed by UGC INFLIBNET. The database the entire collection has been created and available through online Public Access Catalogue (OPAC) to the users via campus network.

The Centre for Distance and Online Education (CDOE) at Periyar University has begun establishing a dedicated library for the ODL program and is in the process of acquiring printed books and e-books for this purpose.

VII. Cost Estimate of the Programme and the Provisions:

The University has already incurred initial expenses for infrastructure, manpower, SLM preparation, and other necessities. The University plans to allocate expenses from the total fee collection, based on admission of students as follows:

- ✓ SLM Printing and Delivery – 20%
- ✓ Salary and Administrative Expenses – 60%
- ✓ Software Development & Maintenance – 10%
- ✓ Future Developments – 10%

IX. Quality assurance mechanism

The CIQA will oversee and ensure the quality of the ODL programs. The CIQA of Periyar University's Centre for Online and Distance Education includes the Vice-Chancellor as the Chairperson, three senior teachers from Higher Educational Institutions, Heads of three departments or schools offering recognized programs in Open and Distance Learning and Online modes, two External Experts in Open and Distance Learning and/or online education, Officials from the Administration and Finance departments, and the Director of the Centre for Internal Quality Assurance as the Member Secretary.

The objective of the CIQA is to develop and implement a comprehensive and dynamic internal quality assurance system. This system will ensure that the higher education programs offered in the Open and Distance Learning (ODL) and Online modes by the Higher Educational Institution are of acceptable quality and are continuously improved.

The Board of Studies (BoS) comprises of expert faculties from the Department of Mathematics who review the course curriculum once in every 2 to 3 years. The BoS benchmarks the course curriculum with the requirement by the industry and feedback from stakeholders. Consequently, the course curriculum and study materials will be revised in tune with the academy

and industry requirements. The feedback from students on teaching will be collected every semester using appropriate feedback mechanism.

The expected programme outcomes are:

- Attainment of knowledge about learning through innovative teaching methods.
- Applying the principles and concepts of broad range of fundamental and advanced area of mathematics in teaching-learning process,
- Realizing the importance of ICT based teaching process.