PERIYAR UNIVERSITY

PERIYAR PALKALAI NAGAR
SALEM - 11

M.Phil. Mathematics

(SEMESTER PATTERN)

(Under Choice Based Credit System)
(For Periyar University Department)

REGULATIONS AND SYLLABUS

(Candidates admitted from 2012-2013 onwards)

PERIYAR UNIVERSITY, PERIYAR PALKALAI NAGAR, SALEM –11

M.Phil., MATHEMATICS - CHOICE BASED CREDIT SYSTEM (CBCS)

REGULATIONS AND SYLLABUS

(For the candidates admitted from 2012-2013 onwards)

1. Duration of the course:

The duration of the M.Phil. Programme shall be one year consist of two semesters under Choice Based Credit System.

2. Eligibility for Admission:

A Master degree in Mathematics of Periyar University or any other university recognized by the Syndicate as equivalent thereto, provided that those who have qualified for the Master's degree prior to 1st January 1991 must have secured a minimum of 50 percent of marks and those who have qualified for the Master's degree on or after 1st January 1991 must have secured a minimum of 55 percent of marks. For SC / ST candidates who have qualified on or after 1st January 1991 a concession of 5 percent of marks shall be given in the minimum eligibility marks.

3. Distribution of Credit points

The minimum credit requirement for one year M.Phil, programme shall be 24 Credits. The break-up of credits for the programme is as follows:

PART – I

- Core Course : 4 credits
- Core Course : 4 credits
- Elective Course : 4 credits

PART – II

- Dissertation : 8 credits
- Viva Voce : 4 credits

4. Course of Study:

The courses of study for the M.Phil. Degree shall be in Mathematics (Choice Based Credit System) with internal assessment according to syllabi prescribed from time to time. The **Internal Assessment** is distributed to **Tests, Seminar** and **Attendance** as **10**, **10** and **05** marks, respectively.

There are Three Courses under Part-I for Semester I and Dissertation & Viva Voce under Part-II for Semester II. The Third Course in the first semester shall be specialization related to the dissertation. The student in cosultation with the research supervisor must select the third course and the research supervisor should frame the syllabus.

Total Number of Marks : **500**
For Each Paper : **100** (Int. 25 + Ext. 75)

Dissertation : **200** [Internal Valuation 75 + External Valuation 75
Joint Viva Voce 25 + 25]

5. Structure of the Programme:

Course Code	Title of the Course	Core/Elective	Credits			
			L	T	P	C
I SEMESTER (Part-I)						
12URMAT0C01	Research Methodology	C	3	1	0	4
12URMAT0C02	Algebra and Design Theory	C	3	1	0	4
*12URMAT0E01	Specialization Course	E	3	1	0	4
II SEMESTER (Part-II)						
12URMAT0D01	Dissertation	C	-	-	-	8
	Viva Voce	C	-	-	-	4

*12URMAT0E01- Guide Paper

- L – Lecture, T – Tutorial, P – Practical, C – Credits

6. Scheme of Examinations:

Part-I Written Examination:

The examination for the courses I, II and III under Part-I shall be held at the end of the first semester. Each course carries a maximum of 100 marks of which 75 allotted for external and 25 for internal. The **internal assessment** mark is distributed to 3 components viz **tests**, **seminar** and **attendance** as **10, 10** and **05** marks respectively.

The examiners will be appointed from the panel of four names of each course (I, II and III) submitted by the department concerned. If one examiner awards a pass mark and the other fail mark, the paper will be valued by a third examiner whose award of marks will be final.

Part-II – Dissertation:

The exact title of the dissertation shall be intimated within one month after the registration of the Programme. Candidates shall submit the dissertation to the university through the supervisor and Head of the Department at the end of the year from the commencement of the programme which shall be valued by internal examiner (supervisor) and one external examiner appointed by the university from a panel of four names sent by the supervisor through the Head of the Department at the time of submitting the dissertation.

The examiners who value the dissertation shall report the merit of candidates as "**Highly Commended**" (75% and above) or "**Commended**" (50% and above and below 75%) or **"Not Commended"** (below 50%).

If one examiner commends the dissertation and the other examiner, does not commend, the dissertation will be referred to the third examiner and the third valuation shall be final.

Submission or resubmission of the dissertation will be allowed twice a year subject to the University rules.

7. Question Paper Pattern:

Time: Three Hours Maximum: 75 Marks

Part - A (5x 5 = 25 Marks)

Answer **ALL** questions

(Two questions from each unit with internal choice)

Part - B (5 x 10 = 50 Marks)

Answer **ALL** questions

(Two questions from each unit with internal choice)

8. Dissertation:

(a) Topic:

The topic of the dissertation shall be assigned to the candidate within one month (based on paper III) after registration and a copy of the same should be submitted to the university for approval.

(b) Number of copies of dissertation:

The students should prepare two copies of dissertation and submit the same to the university for the evaluation.

Format to be followed:

The format of the dissertation to be submitted by the students is given below:

Format for the preparation of project work:

(a) Title page
(b) Bonafide Certificate
(c) Acknowledgement
(d) Table of contents

CONTENTS

Format of the Title Page:

TITLE OF THE DISSERTATION

Dissertation Submitted in partial fulfilment of the requirement for the award of Degree of Master of Philosophy in **MATHEMATICS** to the Periyar University, Periyar Palkalai Nagar, Salem – 636 011.

By

Student's Name :
Register Number :
Department/College :
Month and Year :

Format of the Certificate:

CERTIFICATE

This is to certify that the dissertation entitled ...(Title)....submitted by ……(Candidate Name)……. to the Periyar University,Periyar Palkalai Nagar, Salem in partial fulfilment of the requirement for the award of Degree of Master of Philosophy in **MATHEMATICS** is a bonafide record of work carried out by the candidate during ..... in the Department and that no part of the dissertation has been submitted for the award of any Degree / Diploma / Associateship / Fellowship or other similar titles that the dissertation represents independent work on part of the candidate under my guidance.

Date:

Place:

Signature of the Guide

Signature of the Head of the Department

9. Passing Minimum:

A candidate shall be declared to have passed Part-I of the examination if he/she secures not less than 50% of the marks in each course.

A candidate shall be declared to have passed Part-II of the examination if his/her dissertation is atleast commended.

A candidate who has passed all the examinations under both parts and earned a minimum of 24 credits shall be considered to have passed the M.Phil programme.

10. Restriction in number of chances:

No candidate shall be permitted to reappear for the written examination in any paper for more than two occasions or to resubmit a Dissertation more than once. Candidates shall have to qualify for the degree passing all the written papers and dissertation within a period of two years from the date of joining the course.

11. Commencement of this regulation:

These regulation and syllabi shall take effect from the academic year 2012 –2013 that is, for those admitted to the Programme during the academic year 2012 – 2013 and thereafter.

I SEMESTER (Part I)

PAPER I

12URMAT0C01 RESEARCH METHODOLOGY

L + T + P = C

3 + 1 + 0 = 4

Unit-I Basic Elements

Thesis Elements – Paper Elements – Order of Thesis and Paper Elements – Concluding Remarks – Identification of the Author and His Writing: Author's Name and Affiliation - Joint Authorship of a Paper: Genuine Authorship and Order of Authors. Identification of Writing: Title, Keywords, Synopsis, Preface and Abstract – Typical Examples. Chapters and Sections: Introductory Chapters and Section – Core Chapters and Sections. Text-support materials: Figures and Tables – Mathematical Expressions – References – Appendixes and Annexure – Listing of Materials, Numbering of Elements: Pagination – Numbering of Chapters, Sections and Subsections – Numbering of Figures and Tables – Equation Numbering – Appendix Numbering – Reference Numbering.

Unit-II Abstract Integration

Abstract integration – The concept of measurability – arithmetic in $[0\ \infty]$ - simple functions – Elementary properties of measures – Integration of positive functions – The role played by sets of measure zero – L^p spaces – Convex functions and Inequalities.

Unit-III Fourier Transform

Fourier Transform – Formal Properties – The Inversion Theorem – The Plancheral Theorem- The Banach algebra L^1 – The Holomorphic Fourier transform – Two theorems of Paley and Wiener – Quasi analytic class – The Denjoy – Carleman Theorem.

Unit-IV Bounded Linear Operators

Uniformly Continuous Semigroups of Bounded Linear Operators – Strongly Continuous Semigroups of Bounded Linear Operators – The Hille-Yosida theorem – Lumer Phillips Theorem.

Unit-V Infinitesimal Generators and Semigroups

The Characterization of the Infinitesimal Generators of C_0 Semigroups – Groups of Bounded Operators – The Inversion of the Laplace Transform – Two Exponential Formulas.

Text Books:

1. **B.N. Basu,** "Technical Writing", PHI, Pvt., ltd., New Delhi, 2007.
   (Chapters: 4, 5, 6, 7, 8)
2. **Walter Rudin,** "Real and Complex Analysis", McGraw Hill International Edition, New Delhi, 1987
   (Chapters 1, 3, 9 and 19).
3. **A. Pazy,** "Semigroups of Linear Operators and Applications to Partial Differential Equations" Springer – Verlag, New York, Berlin Heidelberg Tokyo, 1983.
   (Chapter 1: Sections 1.1 to 1.8)

Reference Books:

1. Anderson, Durston, Poole, 'Thesis and Assignment Writing', Wiley Eastern University Edition, 1970.
2. Donald H. McBurney, 'Research Methods', Thomson Asia Pvt., Ltd., 2002.
3. T.Hawkins, 'Lebesgue Theory of Integration', University of Wisconsin Press, Madison, 1970.
4. N. Wiener, 'The Fourier Integral and Certain of its Applications', Dover Publ. Inc. New York.
5. W. Coppel, 'Stability and Asymptotic Behavior of Differential Equations', Heath Boston,1965.
6. P.Bailey, L. Shampine and P. Waltman, 'Nonlinear Two Point Boundary Value Problems', Academic Press, New York, 1968.

PAPER II

12URMAT0C02 ALGEBRA AND DESIGN THEORY

L + T + P = C

3 + 1 + 0 = 4

Unit-I Modules:

Modules – free modules – exact sequences – homomorphisms – tensor product of modules – direct and inverse limits – pull back and push out.

(Chapter: I of [1])

Unit-II Categoriies and Functors:

Catogories – functors – the functors Hom and Tensor.

(Chapter: II of [1])

Unit-III Projective and Injective Modules:

Projective Modules – Injective Modules – Bear's Criterion – an embedding theorem.

(Chapter: III of [1])

Unit-IV Designs

Block designs – resolvability- Latin squares-pair wise balanced designs- systems of distinct representatives – finite fields – exercises.

(Chapter: I of [2])

Unit-V Orthogonal Latin Squares

Early results – orthogonal arrays – using pair wise balanced designs – the collapse of the Euler conjecture – transversal designs – transversal designs and orthogonal arrays – group divisible designs – exercises.

(Chapter: IV of [2])

Text Books:

1. **L.R.Vermani**, Elementary Approach to Homological Algebra, Chapman and Hall / CRC Monographs and Surveys in Pure and Applied Mathematics, Volume 130, CRC Press LLC, Florida, 2003.
2. **Ian Anderson**, Content and Treatment as in **'**Combinatorial Designs and Tournaments', Clarendon press, Oxford.

Reference Books:

1. T.Y. Lam, Lectures on Modules and Rings, GTM Vol.189, Springer-Verlag, New York., Inc., 1999.

2. F.W. Anderson and K.R. Fuller, Rings and Categories of Modules, GTM Vol.13, Springar-Verlag, New York, Inc., 1992.
3. L.H. Rowen, Ring Theory, Academic Press, Inc., Sam Diego, CA.
3. Yury J.Ionin and Mohan S, Shrikande, 'Combinatorics of Symmetric Designs, Cambridge University press.
4. Charles C. Lindner, C.A. Rodger, 'Design Theory' CRC Press, 2009.
5. W.D Wallis, 'Introduction to Combinatorial Designs, Second Edition, Chapman & Hall/CRC, 2007.

PAPER III

12URMAT0E01 **SPECIALIZATION COURSE**

L + T + P = C

3 + 1 + 0 = 4

The students must select the course from advanced research areas in Mathematics and the syllabus should be framed by the respective research supervisor. The syllabus along with two different sets of question papers may be communicated to the controller of examinations. The semester examination for Specialization Course will be conducted by the controller of examinations along with core courses.

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*II SEMESTER (*Part II*)*

12URMAT0D01 **DISSERTATION**

Dissertation: 08 Credits

Viva Voce: 04 Credits

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