

ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ



# University of Mysore

(Estd.1916)

## Ph. D. in MATHEMATICS



UNIVERSITY OF MYSORE  
Department of Studies in Mathematics  
Manasagangotri, Mysuru-570 006

Regulations and Syllabus  
Ph. D. in MATHEMATICS

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**UNIVERSITY OF MYSORE  
GUIDELINES AND REGULATIONS  
LEADING TO  
PH. D. IN MATHEMATICS**

**Programme Details**

Name of the Department	: Department of MATHEMATICS
Subject	: MATHEMATICS
Faculty	: SCIENCE
Name of the Programme	: PH.D.

**PROGRAMME OUTCOME:**

The students who complete this programme will be able to:

- justify the area of research chosen by them,
- identify and apply the concepts, theories, models, research techniques and other facets required for their ensuing research area,
- identify the literature and databases suitable for their research work,
- envisage and appreciate the possible challenges in their area of research, and
- Come out with research proposal with suitable research design.

**PEDAGOGY**

- Conducting literature survey under the direction of the supervisor is a primary module in the research methodology.
- Participatory learning on surveys and conducting experiments under the supervision of teachers are adopted.
- Practical orientation on Sample survey data organisation and interpretation through statistical techniques is yet another major method of approach in the pedagogy.
- Evolving proper conclusions and propose possible recommendations for furtherance of knowledge in the subject and field of specialisation chosen by the research scholar.

**PH. D. COURSE WORK MATHEMATICS**

**COURSE-I : RESEARCH METHODOLOGY**

**COURSE OUTCOME**

After completing this course, the student will be able to:

- Understand some basic concepts of research and its methodologies.
- Identify appropriate research topics.
- Select and define appropriate research problems.
- Prepare a project proposal to undertake a project.
- Write a research report and thesis.
- Write a research proposal for grants.

**COURSE CONTENT:**

**UNIT-I : INTRODUCTION**

Meaning of research, Objectives of research, Motivation in research, Types of research, Research Approaches, Significance of research, Research methods versus methodology, Research and

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Scientific method, Importance of knowing how research is done, Research process, criteria of good research.

#### **UNIT-II : MATHEMATICAL ANALYSIS**

Elementary Calculus, Limits and Continuity (Both in Real and Complex number system), Sequence, Series and Products (Both in Real and Complex number system), Differential Calculus, Integral Calculus (in Real number system), Sequences of Functions (Both in Real and Complex number system), Fourier Series, Convex Functions, Conformal Mappings, Functions of the Unit Disc, Growth Conditions, Analytic and Meromorphic Functions, Complex Integrals, Zeros and Singularities, Harmonic Functions, Residue Theory, Integrals along the Real Axis.

#### **UNIT-III : ALGEBRA**

Examples of Groups and General Theory, Homomorphisms and Subgroups, Cyclic Groups, Normality, Quotients and Homomorphisms,  $S_n$ ,  $A_n$ ,  $D_n$ , ..., Direct Products, Free Groups, Generators and Relations, Finite Groups, Rings and Their Homomorphisms, Ideals, Polynomials, Fields and Their Extensions, Elementary Number Theory, Vector Spaces, Rank and Determinants, System of Equations, Linear Transformations, Eigen values and Eigen vectors, Canonical Forms, Similarity, Bilinear, Quadratic Forms and Product Spaces, General Theory of Matrices.

#### **UNIT 4. METRIC SPACES**

Topology of  $\mathbb{R}^n$ , General Theory, Fixed Point Theorem.

#### **BOOKS FOR REFERENCE:**

1. C. R. Kothari, *Research Methodology*, New Age International Publishers.
2. Paulo Ney de Souza and Jorge-Nuno Silva, *Berkeley Problems in Mathematics*, Third Ed., Springer – Verlag

#### **COURSE-II: LITERATURE REVIEW**

##### **Course Outcomes**

**After completing the course students will be able to get:**

- An overview of the subject, issue, or theory under consideration
- An explanation of how each work is similar to and how it varies from the others,
- Conclusions as to which pieces are best considered in their argument,
- Make the greatest contribution to the understanding and development of their area of research.

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