M. Phil (Mathematics)

1. **Eligibility:** M.Sc. in mathematics/ Applied Mathematics/ Computer Science.

2. **Duration:** Two Semesters

3. **Course Structure:**

   **Semester-1**

   Paper 1<sup>st</sup>: Research Methodology in Mathematical Science.

   Paper 2<sup>nd</sup>: Optional (one of the following):

   (i) Bio fluid Dynamics

   (ii) Mathematical Ecology

   (iii) Bio Heat Transfer

   (iv) Mathematical Epidemiology

   (v) Atmospheric Pollution Modelling,

   (vi) Generalized Hyper geometric function

   **Semester-2**


   Dissertation

   The detailed course contents are given in the annexure.
Semester 1

Paper 1 (compulsory)

**Title- RESEARCH METHODOLOGY IN MATHEMATICAL SCIENCES**

Theory 80, internal assessment 20

**Theory contents:**


Tutorials/ Seminars: Problem formulation, Solution and Interpretation on the following topics.


**Books Recommended:**

Research Methodology for scientists and Engineers by J. N. Kapur. Published by Mathematical Sciences trust, New Delhi.

**Paper 2nd (Optional)**

Theory 80, internal assessment 20

(i) **Bio fluid Dynamics**

(a) Circulatory Bio Fluid Mechanics.

(b) Blood Rheology: Properties of flowing blood.
(c) Models of Bio fluid flows

Books Recommended: Bio Fluid Mechanics by J. N. Mazumdar, Published by world Scientific.

(ii) Mathematical Ecology

(a) Continuous population Models for Single species.
(b) Discrete population Models for a single species.
(c) Continuous Models for Interacting population.
(d) Discrete Growth Models for Interacting population

Books Recommended: Mathematical Biology by J. D. Murray, Springer Verlag.

(iii) Bio Heat Transfer

(a) Heat regulation in Human body under different Atmospheric conditions.
(b) Heat regulation in skin and subcutaneous Tissues.
(c) Application of an exact and finite element methods.

Books Recommended: Departmental lecture notes.

(iv) Mathematical Epidemiology

(a) Epidemic Models and the Dynamics of Infectious diseases. Modelling Veneral diseases.
(b) Geographic spread of epidemics, simple models for the spatial spread of an epidemic.

Books Recommended: Mathematical Biology by J. D. Murray, Published by Springer Verlag.
(v) Atmospheric Pollution Modelling.

(a) Vertical Pollution
(b) Spread of Pollutants in plane Region.
(c) Transient Pollution problems.
(d) Industrial pollution

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(vi) Generalized Hyper geometric function

(a) Generalized Hyper geometric function up to $E_-$ function
(b) Functions defined by Barnes type integrals (G- Function, H- Function and $I_-$ Function)
(c) Basic Hypergeometric functions
(d) Elliptic and Theta functions

Books Recommended: 1. $H_-$ function by S. P. Goyal and H. C. Gupta (2) Special function by E. D. Rainville (3) q- Hyper geometric function by Exton, (4) Lecture notes by Mathai and Saxena.

Semester 2$^{nd}$

Paper 3$^{rd}$ (Theory 80, internal assessment 20)

TITLE: ADVANCED NUMERICAL AND STATISTICAL TECHNIQUES USING MATHEMATICAL SOFTWARE

Matlab Environment Control Flow, Matlab Application, Polynomials in Matlab, Evaluating Polynomials, Plotting Polynomials, Roots of Polynomials, Curve
In second semester the candidate is also required to submit a M. Phil dissertation allotted to the candidate by the M. Phil Committee. Three copies of the dissertation (printed or type written) shall be submitted to the university by the candidate through the supervisor.

In external evaluation the dissertation shall either be accepted or rejected, no marks shall be awarded (qualitative evaluation).

**Text Book:** MATLAB Programming for engg. Stephen J. Chapman
Programming in Matlab: Marce E. Herniter.

**Dissertation:** (External Evaluation of dissertation (no marks))

In second semester the candidate is also required to submit a M. Phil dissertation allotted to the candidate by the M. Phil Committee. Three copies of the dissertation (printed or type written) shall be submitted to the university by the candidate through the supervisor.

In external evaluation the dissertation shall either be accepted or rejected, no marks shall be awarded (qualitative evaluation).