Pt.Ravishankar Shukla University Raipur

Syllabus

Ph.D. Course Work

Session: 2022-23 & onwards

Approved by

Board of Studies in Mathematics

(Meeting on 21 April 2022)

Pt. Ravishankar Shukla University, Raipur
Ph.D. Course Work (Mathematics)

2022-23 & Onward

Scheme of Examination

There shall one paper and one project work. Each of 100 marks.

S.No.	Particulars		Max. Marks	
1	Research Methodology, Quantitative techniques and Computers			100
2	Project Work	Dissertation/Project Script	50	100
		Seminar	20	
		Viva Voce	30	
Grand Total				200

Note: In addition to above paper and project work every candidate has to complete a two-credit course on Research and Publication Ethics

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Details of Syllabus

Paper I
Research Methodology, Quantitative techniques and Computers

M.M. 100

Learning Outcomes: At the end of the course, the students will be able to :

1. Understand fundamental knowledge of research methods and design used in research, selected research problem.
2. Understand importance of scientific writing, importance of word selection, journals and their abbreviations.
3. Understand mathematics subject classification and mathematical review and mathscinet, structure of mathematical research paper.
4. Use Latex for mathematical typesetting, making bibliography and slides .
5. Use MATLAB for scientific computing, plotting curves and surfaces, interpolation and curve fitting.

Unit I – Research Methodology:
Introduction to research methodology, Meaning, objectives, types, significance of Research. Identification, Selection of Research problem, Formulation of research objectives, Research design, components, importance and typology; Quantitative and qualitative methodology, hypotheses. Research ethics.

Unit II - Scientific Writing : Importance of Science Writing , Meaning and nature of Scientific Style , Writing effective scientific prose, Effective word selection in Science writing, Common mathematical functions and their abbreviations, Symbols, Operators Commonly used in Mathematics, Greek, Roman letters used in mathematics, Mathematical Theorems and properties, Mathematics Journals and their abbreviations.

Unit III - Style and Usage for Mathematics :
Review : Mathematics Subject Classifications (MSC). Mathematical Review, MathSciNet and other E-Resources.
Manuscript Preparation :
Structure of a Standard Mathematics Paper (in brief), Other Forms of Mathematics Manuscripts.
Usage : Mathematical Expressions, Alphabets used in Mathematical Expressions, Bracketing, Limits, Fractions, Multiplication, Vectors, Tensors, and n-forms, Summations, Products, Unions, and Integrals.

Unit IV - Typesetting Mathematical Text with LATEX :
Sample Document, Type Style, Environments, Lists, Centering, Tables, Verbatim, Vertical and Horizontal Spacing. Equation Environments, Fonts, Hats, and Underlining, Braces, Arrays and Matrices, Customized Commands, Theorem-like Environments, Math Styles, Document Classes and the Overall Structure, Titles for

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Documents, Sectioning Commands, Packages, Inputting Files, Inputting Pictures, Making a Bibliography, Making an Index, Slides.

Unit V - MATLAB :
Arithmetic Operations, built-in-MATH functions, scalar variables, Creating Arrays, built-in-functions for handling arrays, Mathematical Operations with Arrays, Script Files, Two dimensional plots, programming in MATLAB, Polynomial, curve fitting, and interpolation, Three-dimensional plots.

Books recommended :

1. C.R.Kothari, Research Methodology, New Age International Publishers (2004)
2. Michael Davis : Ethics and the University. Routledge (1999)
3. Harold Rabinowitz, Suzanne Vogel : The Manual of Scientific Style. Academic Press (2009)
4. Laslie Lamport : LATEX. Addison Wesley Publication Company (1994)
5. David F. Griffiths, Desmond J. Higham : Learning LATEX. Society for Industrial and Applied Mathematics, Philadelphia (1997)
6. Amos Gilat : MATLAB : An Introduction with Applications. John Wiley & Sons, INC (2004)

Paper II
Project Work

M.M. 100

This paper will consist of three components

(i)	Dissertation/Project work leading to Ph.D. Work	50
(ii)	Seminars (two)	20
(iii)	Viva-Voce on Dissertation	30

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