math

Pt.Ravishankar Shukla University Raipur

Syllabus

Ph.D. Course Work

Session: 2024-25

Approved by:	Board of Studies	Academic Council
Date:	10 MAY 2024	

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

2024-25

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 each candidate has to complete a two-credit course on Research and Publication Ethics

Dr. B.S. Thakur (Dr. Dipti Thakur) Dinesh Kumar Dr G.P. S (Dr. Nidhi Dewangan)

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 - The Study and Practice of Modern Mathematics

How to Learn Mathematics, Why learn mathematics, Studying mathematics, Inspiration, How to Write Mathematics, The goal of mathematical writing, General principles of mathematical writing, Writing mathematical sentences, Avoiding errors, Writing mathematical solutions and proofs, Writing longer mathematical works, The revision process, How to Research Mathematics, What is mathematical research?, Finding a research topic, General advice, Taking basic steps, Fixing common problems, Using computer, Practicing good mathematical judgment, How to Present Mathematics, Why give a presentation of mathematics, Preparing your talk, DOs and DON'Ts, Using technology, Answering questions, Publishing your research

Unit III - Mathematical Writing, Aids and Resources for Writing and Research

Dictionaries and Thesauruses, Usage and Style Guides, Technical Writing Guides, What is a Theorem, Proofs, The Role of Examples, Definitions, Notation, Words versus Symbols, Displaying Equations, Parallelism, Dos and Don'ts of Mathematical Writing. Internet Resources, Library Classification Schemes, Review, Abstract and Citation Services, Mathematics Subject Classifications (MSC). Mathematical Review, MathSciNet and other E-Resources, Text Editors, Spelling Checking, Filters and Pipes, Style Checkers.

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 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. Donald Bindner and Martin Erickson: A student's guide to the study, practice, and tools of modern mathematics, CRC Press, (2011)
4. Nicholas J. Higham: Handbook of writing for the Mathematical Sciences, Society for Industrial and Applied Mathematics; 2nd edition (1998)
5. Harold Rabinowitz, Suzanne Vogel : The Manual of Scientific Style. Academic Press (2009)
6. Laslie Lamport : LATEX. Addison Wesley Publication Company (1994)
7. David F. Griffiths, Desmond J. Higham : Learning LATEX. Society for Industrial and Applied Mathematics, Philadelphia (1997)
8. 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