

10 YEARS
OF UNIVERSITY
RECOGNITION
20 YEARS OF
ACADEMIC
EXCELLENCE



REVA
UNIVERSITY

Bengaluru, India



Research Methodology

Rukmini Knowledge Park,
Kattigenahalli, Yelahanka, Bengaluru - 560 064

www.reva.edu.in




Research
Methodology:
4 Credits

Course outcomes for Ph.D courses including Research Methodologies, Research Ethics and Subject specific courses

1. Students after completing the six month course will have in depth knowledge of disciplines related to the topic of research-
2. Students will be able to apply mathematical skills to formulate problems in the field of research
3. Students will have knowledge of various simulation and hardware tools and utilize their knowledge of using instruments and simulation techniques in their research pursuit.
4. Students will develop the skills of critical judgment of previous works and identification of research gaps
5. Students will develop skills to access information/data from vast sources and present the information in scientific manner
6. Students will abstain from plagiarism and be aware of standard protocols of conducting quality research
7. Students will be able to write articles as per the standard format.

B. Sivakumar
6/6/2020




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Annexure -3 – Syllabus of Research methodologies

COURSE-1: Advanced Research Methodology for Engineering, Science & Technology streams

Course objective:

To prepare scholars for research work and equip them to carry out individual or team research work according to scientific/technology requirements.

Learning Outcomes:

At the end of the course the scholar should be able to:

- i) Identify and describe researchable ideas, projects and themes;
- ii) design and specify methods for carrying out a scientific research and demonstrate possession of skills and attitudes to conduct such research ;
- iii) be able to analyze data using scientific methodologies; and
- iv) present research results in a systematic and objective way

Course Content:

Unit- 1: Research and Types of research: Meaning of Research- Objectives of Research- Motivation in Research. Research methods vs Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical. Research Process. Criteria of good Research. 2 hours

Research Formulation – Defining and formulating the research problem - Selecting the problem - Necessity of defining the problem - Importance of literature review in defining a problem – Literature

review – Primary and secondary sources – reviews, treatise, monographs-patents – web as a source – searching the web - Critical literature review – Identifying gap areas from literature review - Development of working hypothesis. 6 hours

Research design and methods – Research design – Basic Principles- Need of research design — Features of good design – Important concepts relating to research design – Observation and Facts, Laws and Theories, Prediction and explanation, Induction, Deduction, Development of Models. Developing a research plan - Exploration, Description, Diagnosis, Experimentation. Determining experimental and sample designs. 7 hours

Unit-2: Data Collection and analysis - I: Execution of the research - Observation and Collection of data - Methods of data collection – Modeling, Mathematical Models for research, Sampling Methods- Data Processing and Analysis strategies. Data Analysis with Statistical Packages – Hypothesis-testing, Generalization-and-Interpretation. 8 hours

Reporting and thesis writing – Structure and components of scientific reports - Types of report – Technical reports and thesis – Significance –Different steps in the preparation – Layout, structure and Language of typical reports – Illustrations and tables - Bibliography, referencing and footnotes - Oral presentation – Planning – Preparation – Practice – Making presentation – Use of visual aids - Importance of effective communication. 4 hours

Application of results and ethics - Environmental impacts - Ethical issues - ethical committees - Commercialization – Copy right – royalty - Intellectual property rights and patent law – Trade Related aspects of Intellectual Property Rights – Reproduction of published material – Plagiarism - Citation and acknowledgement - Reproducibility and accountability. 3 hours

Post Midterm Test:

Session on :

LATEX: Introduction to LATEX and it's usage in documentation, preparation of thesis, technical papers and articles 9 hours

Literature Review : Visit to the Library and do necessary preparation to come up with Literature Review Report and submit the same

21 hrs

Reference Books:



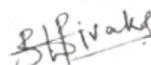
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2. Kothari, C.R., 1990. *Research Methodology: Methods and Techniques*. New Age International. 418p.
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Research and Publication Ethics (RPE) – 2 Credits

ANNEXURE

Course Title:

- **Research and Publication Ethics (RPE)**-Course for awareness about the publication ethics and publication misconducts.

Course Level:

- 2 Credit course (30 hrs.)

Eligibility:

- M.Phil., Ph.D. students and interested faculty members (It will be made available to post graduate students at later date)

Fees:

- As per University Rules

Faculty:

- Interdisciplinary Studies

Qualifications of faculty members of the course:

- Ph.D. in relevant subject areas having more than 10 years' of teaching experience

About the course

Course Code: CPE- RPE

Overview

- This course has total 6 units focusing on basics of philosophy of science and ethics, research integrity, publication ethics. Hands-on-sessions are designed to identify research misconduct and predatory publications. Indexing and citation databases, open access publications, research metrics (citations, h-index, Impact Factor, etc.) and plagiarism tools will be introduced in this course.

Pedagogy:

- Class room teaching, guest lectures, group discussions, and practical sessions.

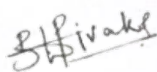
Evaluation

- Continuous assessment will be done through tutorials, assignments, quizzes, and group discussions. Weightage will be given for active participation. Final written examination will be conducted at the end of the course.



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Course structure

- The course comprises of six modules listed in table below. Each module has 4-5 units.

Modules	Unit title	Teaching hours
Theory		
RPE 01	Philosophy and Ethics	4
RPE 02	Scientific Conduct	4
RPE 03	Publication Ethics	7
Practice		
RPE 04	Open Access Publishing	4
RPE 05	Publication Misconduct	4
RPE 06	Databases and Research Metrics	7
	Total	30

Syllabus in detail

THEORY

- RPE 01: PHILOSOPHY AND ETHICS (3 hrs.)**

- Introduction to philosophy: definition, nature and scope, concept, branches
- Ethics: definition, moral philosophy, nature of moral judgements and reactions

- RPE 02: SCIENTIFIC CONDUCT (5hrs.)**

- Ethics with respect to science and research
- Intellectual honesty and research integrity
- Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP)
- Redundant publications: duplicate and overlapping publications, salami slicing
- Selective reporting and misrepresentation of data

- RPE 03: PUBLICATION ETHICS (7 hrs.)**

- Publication ethics: definition, introduction and importance
- Best practices / standards setting initiatives and guidelines: COPE, WAME, etc.
- Conflicts of interest
- Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types
- Violation of publication ethics, authorship and contributorship
- Identification of publication misconduct, complaints and appeals
- Predatory publishers and journals

PRACTICE

- RPE 04: OPEN ACCESS PUBLISHING(4 hrs.)**

- Open access publications and initiatives

SHivak



2. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies
3. Software tool to identify predatory publications developed by SPPU
4. Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

• **RPE 05: PUBLICATION MISCONDUCT (4hrs.)**

A. Group Discussions (2 hrs.)

1. Subject specific ethical issues, FFP, authorship
2. Conflicts of interest
3. Complaints and appeals: examples and fraud from India and abroad

B. Software tools (2 hrs.)

Use of plagiarism software like Turnitin, Urkund and other open source software tools

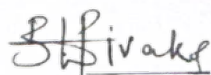
• **RPE 06: DATABASES AND RESEARCH METRICS (7hrs.)**

A. Databases (4 hrs.)

1. Indexing databases
2. Citation databases: Web of Science, Scopus, etc.

B. Research Metrics (3 hrs.)

1. Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
2. Metrics: h-index, g index, i10 index, altmetrics



Dr. B.P Divakar
Director
Research and Development Cell





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