Ph.D., Geology

SYLLABUS

(With effect from June 2024 Onwards)

Centre for Applied Geology
Gandhigram Rural Institute (Deemed to be University)
Gandhigram – 624 302 Tamilnadu

CENTRE FOR APPLIED GEOLOGY

Ph.D., Geology Course Work Syllabus

Paper Code	Title of the Paper	Credits	Total
24GEOR0101	Research Methodology	4	14
24GEOR0102	Basic Concepts and Theory in the Subject Area: Geospatial Technology and Its Applications	4	
24GEOR0103	Specific area of research / Area of Specialization	4	
24GEOR0104	Research and Publication Ethics	2	

Eligibility:

M.**Sc**., Applied Geology and Geomatics/ Geology/ Applied Geology/ Geoinformatics/ Remote Sensing/ Marine Geology/ Oceanography/ Petroleum Geology/ Environmental Science/ Water Resources and Environmental Management or its equivalent and interdisciplinary.

M.Tech., Geological Remote Sensing / Geographic Information System/ Water Resources Engineering Or its equivalent.

24GEOR0101	RESEARCH METHODOLOGY	Credits – 4

Learning Objectives: To understand Geology's research methods and develop skills in Geoscientific Writing for the research publications and thesis.

Learning Outcomes: The scholar will be exposed to pertinent geological research methodologies and scientific scripting for the research publications and thesis.

UNIT – I

Concept and Definition of Research: Meaning, Objectives, Motivation, Utility. Theory and philosophy of Research Methodology in context to Earth Sciences, empiricism, deductive and inductive theory. **Research Types**: Academic Research, Basic Research, Fundamental Research, Applied Research, Theoretical Research, Conventional Research and Experimental Research. **Concepts and Needs of Research Hypothesis**

UNIT – II

Objective Processes and Steps in Research Methodology: Research proposal and concepts, Problem formulation and statement of research aim, objectives and methodology. **Collection of Literature Review via electronic Media**: Science Direct, Google Scholar Web of Science, Scopus Index, Indian Citation Index. **Bibliography Formats and Citing Methods**: APA, Chicago, Harvard, Vancouver, IEEE. Citation network analyses.

UNIT – III

Use of tools/techniques for Research: Reference Management Software, Software for detection of Plagiarism and writing app, application software used in geology (for bivariant, multivariant, log-probability plots, plotting geochemical, structural and hydrogeological data; Preparation of litholog and correlation. **Pre-field preparations:** Prepare maps and survey the study area through satellite imagery and Google Earth: field mapping and Documentation.

UNIT – IV

Types of data: primary and secondary data. Source and authenticity of secondary data. **Methods of sampling,** Concept of sampling, Sampling techniques- concept, types (random, purposive, stratified random, probability and non-probability); Survey and Mapping; Tools and techniques of data collection for qualitative and quantitative research-

observation **and analytical techniques**: Collection of air, water, soil and rock samples, Preparation of samples for microscopic examination and chemical analysis,

UNIT – V

Geoscientific Writing; organizing the documents- Organizing the materials – Basic Elements. **Illustrating for designing:** Tables, Figures, Graphs, Charts, Photographs, Geoscientific Maps and General Guidelines for Illustrations. **Documentation Sources:** Citation Methods – Parenthetical References, List of References, Notes. Presentation Methods.

REFERENCE BOOKS:

1. Freedman. P., (1960). The Principles of Scientific Research, Pergamon Press, ISBN-9780080092874. 227 p.
2. Jonathan Anderson., (2002). Thesis and Assignment Writing, Wiley Eastern Ltd., New Delhi, ISBN: 9780471421818, 192 P.
3. Kothari C.R. (2019). Research Methodology: Methods and Techniques, New Age International Publishers; Fourth edition, ISBN-13: 978-9386649225, 480 p.
4. Srinivasa Rao Koneru., (2010). Geo scientific writing: A guide to language and composition styles, GSI-Bangalore. ISBN- 9788185867632, 270p.
5. Arnold Luwang Usham., (2013). Research methodology in Geology. Maxford books, Harmain office press, ISBN-9788181162014, 291p
6. Statistics and Data Analysis in Geology 2002, - J. C. Davis, Wiley India

24GEOR0102	**BASIC CONCEPTS AND THEORY IN THE SUBJECT AREA** *(The Doctoral Committee will prepare the syllabus)*	**Credits – 4**

24GEOR0103	**SPECIFIC AREA OF RESEARCH / AREA OF SPECIALIZATION** *(The Doctoral Committee will prepare the syllabus)*	**Credits – 4**

The course on Basic Concepts and Theory in the Subject Area and Area of Specialization of the candidate shall be decided by the Doctoral Committee meeting as per Ph.D. regulation.

24GEOR0104	RESEARCH AND PUBLICATION ETHICS	Credits – 4

Learning Objectives: To understand the Research and Publication ethics process like Publish in open access journals, presentation of research, making a document without plagiarism

Learning Outcomes: The scholar will be exposed to the ethics of research activities and publication processes, such as publishing in open-access journals, presenting research, and making a document without plagiarism.

THEORY

REP 01

PHILOSOPHY AND ETHICS: Introduction to Philosophy: definition, nature and scope, concept, branches – Ethics: definition, moral philosophy, nature of moral judgments and reactions.

REP 02

SCIENTIFIC CONDUCT: 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.

REP 03

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

PRACTICE

REP 04

OPEN ACCESS PUBLISHING: Open access publications and initiatives – SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies – Software tool to identify predatory publications developed by SPPU – Journal finder/ journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

REP 05

A. Group Discussion (2hrs.)

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

B. Software tools (2hrs.)

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

REP 06

DATABASES AND RESEARCH METRICS

A. Databases (4hrs.)

Indexing databases – Citation databases: Web of Science, Scopus, etc.

B. Research Metrics (3hrs.)

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

REFERENCE BOOKS

1. Bird, A. (2006). *Philosophy of Science.* Rout ledge.
2. Macintyre, Alasdair (1967) *A Short History of Ethics.* London.
3. P.Chaddah, (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN: 978-9387480865
4. National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009). *On Being a Scientist: A Guide to Responsible Conduct in Research: Third Edition.* National Academies Press.