DEPARTMENT OF GEOLOGY
KURUKSHETRA UNIVERSITY, KURUKSHETRA

(Established by the State Legislature Act-XII of 1956)
("A+" Grade, NAAC Accredited)

Scheme of Ph.D. Coursework:

Paper-I Research Methodology: **4 credits (100 Marks)**

Paper-II Subject Elective: **4 credits (100 Marks)**

Paper-III (a) Research and Publication Ethics: **2 credits (50 Marks)**

Paper-III (b) Seminar in the thrust area/ Research Assignment/ Literature/Survey etc. **2 credits (50 Marks)**

Paper-I

Research Methodology

Unit --1

Techniques of sampling, thin section preparation, modal analysis and photography. Introduction to principles and geological applications of various instruments used in analytical observations. Techniques used in sedimentary petrology and their interpretation vis- a- vis the provenance and environments of sedimentation.

Unit – 2

Sample preparation techniques for organic walled and mineral walled fossils/ microfossils analyses. Biostratigraphic Zonation and correlation of strata. Palaeo-environment interpretation through geological history. Techniques of Mega and Microscopic studies of Ore Minerals. Conceptual understanding of Origin, Migration and occurrence of oil and gas. Processes of coalification, methods of pellet preparation (coal/lignite). Atomic minerals as source of energy, methods of prospecting.

Unit – 3

Various field and laboratory tests carried out to determine the engineering properties of rocks in engineering geological studies. Geomechanical Classifications of rocks (Rock Mass classifications. Slope Mass classification. Stereographic projection. Natural Hazards: causes and mitigation. Concepts of artificial recharge of Groundwater.

Unit – 4

Study of Satellite images/aerial photographs for geological studies. Commonly used softwares in geological studies. Applications of Global Positioning System (GPS) and Geographical Information System (GIS) in geological studies. Geological mapping.

Paper-II

Subject Elective

Unit -1

Rock forming minerals. Geochemical data interpretation and its graphical representation. Sedimentary facies. Texture and structure of Igneous, Sedimentary and metamorphic rock. Metamorphic facies. Landforms

Unit – 2

Basic criterion of stratigraphic classification and relationship among various schemes of classification. Biotic communities and palaeo-geographic reconstruction, Palaeoecological deduction through geological history. Palynofacies analysis and thermal alteration index studies for hydrocarbon source rock evaluation. Macerals characterization in coal and lignite. Preparation of mine plans. Marine mineral resources.

Unit – 3

Geotechnical Criterion for designing and constructions of engineering structures (dam, tunnel, road and highways). Hydrological properties of water bearing formation for groundwater exploration. Ground water quality parameters and causes of ground water pollution. Orogeny. Stresses (direction of principal stresses) in normal, reverse and strike-slip faults. Joints and their significance engineering geology. Mass wasting.

Unit – 4

Introduction to computers and its applications to present data for geological interpretation (tables, figures, frequency charts, geological maps and lithologs). Resistivity surveys for groundwater exploration. Mitigation of pollution and environmental hazards.

Paper-III (a)
Research and Publication Ethics

(2 Credits)
Maximum Marks – 50
Time: 3 hrs

Objective:

This course has total 4 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.

Unit-I

PHILOSOPHY AND ETHICS

1. Introduction to philosophy: definition, nature and scope, concept, branches
2. Ethics: Definition, moral philosophy, nature of moral judgments and reactions

SCIENTIFIC CONDUCT

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

Unit-II

PUBLICATION ETHICS

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

Unit-III

OPEN ACCESS PUBLISHING

1. Open access publications and initiatives
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.

Unit-IV

PUBLICATION MISCONDUCT

A. Group discussions

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

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

DATABASES AND RESEARCH METRICS

A. Databases

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

B. Research Metrics

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

Readings:-

Bird, A. (2006). Philosophy of Science. Routledge.

MacIntyre, Alasdair (1967) A Short History of Ethics. London.

P. Chaddah, (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN:978-9387480865

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.*

Resnik, D. B. (2011). What is ethics in research & why is it important. *National Institute of Environmental Health Sciences, 1-10.* Retrieved from https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm

Beall, J. (2012). Predatory publishers are corrupting open access. Nature, 489(7415), 179-179. http://doi.org/10.1038/489179a

Indian National Science Academy (INSA), Ethics in Science Education, Research and Governance (2019), ISBN: 978-81-939482-1-7. http://www.insaindia.res.in/pdf/Ethics_Book.pdf

Paper-III (b)

Seminar in the thrust area/ Research Assignment/ Literature/Survey etc.

1. Stratigraphy, Biostratigraphy and Sequence stratigraphy.
2. Fuel Geology
3. Palaeontology
4. Geochemistry
5. Igneous Petrology
6. Metamorphic Petrology
7. Sedimentology
8. Structural Geology and Tectonics
9. Engineering Geology
10. Geohydrology
11. Geomorphology
12. Remote Sensing and GIS
13. Environmental Geosciences
14. Economic Geology
15. Geoexploration
16. Mining Geology
17. Computational Geoscience
18. Marine Geology