

**Ph.D. COURSE WORK SYLLABUS**  
**IN**  
**GEOLOGY**



**Department of Geology**  
**Utkal University**  
**Bhubaneswar -751004**

### Course Structure

<b>Paper No.</b>	<b>Title of the Course</b>	<b>Marks</b>
Paper- I	Research Methodology	100
Paper-II	Computer and statistical Application in Geology	100
Paper-III	Literature Review	100
Paper-IV	Seminar Presentation	100
Paper-V	Research and Publication Ethics	100

## **COURSES OF STUDIES FOR Ph. D. COURSE WORK 2023**

There shall be five papers. Full Marks of each paper is 100 marks. Paper I and II will have five units each, each unit carries 20 marks. Paper III is Review of literature and paper IV will cover two seminar presentations and Paper V is Research and Publication Ethics.

### **Paper-I: Research Methodology**

**Unit-I** Study of ore textures and their uses in interpretation of ore genesis and in terms of mineral processing, mineral liberation and optimum grinding size in mineral upgradation. Rock deformation,  $\pi$ - Pole and  $\beta$ -diagrams; their construction and application.

**Unit-II** Groundwater management; Groundwater pollution and mitigation; Groundwater resource estimation. Estimation of Ca, Mg, Na, K, CO, HCO<sub>3</sub>, SO<sub>4</sub>, Cl, Fe and F in water samples.

**Unit-III** Application of coal petrography in carbonization and hydrogenation. Estimation of moisture, ash, volatile matter, fixed carbon, C, H, N and S of coal. Crossing Point Temperature of coal, Preparation of thin and polished sections of coal sample.

**Unit-IV** Application of micropaleontology in different fields of oil exploration, climate study and stratigraphy; Boundary currents in ocean. Stratigraphic problems with special reference to Odisha. Sequence stratigraphy, chrono and magnetic stratigraphy.

**Unit-V** Petrographic calculation: Norm, Osam, Niggli, Principles and applications of spectrophotometer. Flame photometer and AAS, XRF, XRD, SEM, ICP-MS, DTA- TG.

### **Paper-II-Computer and Statistical Application in Geology**

#### **Unit-I Statistical application in Geology**

Computation of 1st and 2 degree equations of bivariate data and test of their statistical significances, computation and test of significance of correlation coefficient, cluster analysis. Dendograms and their significance.  $\chi^2$ , F and t tests of geological data.

#### **Unit-II Environmental Geology:**

Environmental impacts by mining. Groundwater extraction. Environmental impact assessment. Remote sensing and GIS: their application in various fields, GPS.

#### **Unit-III Ore Genesis:**

Sedimentary exhalation, bacteriogenesis, volcanogenic massive sulphides, depositional environments of oxides and sulphides. Ore minerals under reflected microscope, Preparation of polished section and thin sections.

#### **Unit-IV Computer application in Geology**

Application of Computer: M.S. Office, Drawing of Pie chart, Histograms from geological data, Statistical application of geological data by computer. Corel draw. Photoshop, Surfer.

#### **Unit- V Mineral exploration:**

Geological, geophysical, geochemical prospecting. Plate tectonics and ore deposits. Prospecting of various mineral deposits of India.

#### **Paper-III: Literature Review**

#### **Paper-IV: Seminar Presentation**

#### **Paper-V: Research and Publication Ethics**

#### **Syllabus in detail**

##### **THEORY**

- **RPE 01: PHILOSOPHY AND ETHICS (3 hrs.)**
  1. Introduction to philosophy: definition, nature and scope, concept, branches
  2. Ethics: definition, moral philosophy, nature of moral judgements and reactions
  
- **RPE 02: SCIENTIFIC CONDUCT (5hrs.)**
  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
  
- **RPE 03: PUBLICATION ETHICS (7 hrs.)**
  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 behavior 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

## PRACTICE

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

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, Journal Suggester, etc. Springer

- **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, and Cite Score
2. Metrics: h-index, g index, i10 index, altmetrics

## REFERENCES

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.nichs.nih.gov/research/resources/bioethics/whatis/index.cfm>

Beall, J. (2012). Predatory publishers are corrupting open access. *Nature*, 489 (7415), 179-179. <https://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>