

**MANGALORE UNIVERSITY**  
**DEPT. OF MARINE GEOLOGY**

**SYLLABUS – Ph.D. IN MARINE GEOLOGY**

**Programme outcome:** Will be Ph.D. Degree in Marine Geology and Geoinformatics. Ph.D. studies can go for Post – Doctoral research in various Universities, research & development institutions, CSIR Labs, private institution, multinational corporations and overseas labs/universities. They can join universities as teaches.

**Programme Specific outcomes:** will be Doctorate degree in specific subject/area like

- petrology Geochemistry,
- meteorology/climatology,
- Oceanography,
- CZMS,
- Remote Sensing &
- GIS.

| Papers       | Particulars             | Hours of instruction per week | Duration of exam hours | Marks      |        |       | Credits   |
|--------------|-------------------------|-------------------------------|------------------------|------------|--------|-------|-----------|
|              |                         |                               |                        | IA         | THEORY | TOTAL |           |
| 1.           | Research Methodology    | 4                             | 3                      | 30         | 70     | 100   | 4         |
| 2.           | Reviewing of Literature | 4                             | -                      | -          | -      |       | 6         |
|              | Review Report           |                               | -                      | -          | -      | 150   |           |
|              | Viva                    |                               | -                      | -          | -      | 50    | 2         |
| <b>Total</b> |                         |                               |                        | <b>200</b> |        |       | <b>12</b> |

## **PAPER - I: RESEARCH METHODOLOGY**

### **Course Outcome:**

CO1: Knowing the research methodology, scope and objectives of research in earth, atmospheric and ocean science, collection of research data, laboratory investigations, computation, analysis and interpretation

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

- Unit – 1: Introduction –Scope and objectives of research in Earth,Atmospheric and Ocean Science. Principals, tools and techniques of climatology, paleoclimatology and Paleocenography.
- Unit – 2: Research Data: Types of data/information and their sources.Primary,Secondary and Tertiary data.Methods of collection of Primary data. Field observations and measurements. Questionnaire and interviews.Methods of sampling, labeling and packing/storage and transportation to the lab. Equipments, tools and techniques used in offshore sampling. Field survey- Compass, Theodolite, Total station, GPS, Spectro-radiometer, Resistivity meter etc. Types of maps/illustrations used to represent various spatial and non-spatial information.
- Unit - 3: Laboratory Investigations: Methods of sample preparation for physico-chemical, magnetic and geochemicalanalyses of various earth materials. Principles and Methods of Instrumental Analysis – pH, EC, DO, Spectrophotometer, Flourimeter, Magnetic instruments, AAS, X-RD, XRF, ICP-AES & ICP-MS.
- Unit - 4: Computation,Analysis and Interpretation: Tools & Techniques used in computation, analysis and interpretation of spatial & non-spatial data.Statistical and computer techniques, remote sensing and GIS applications. Fundamentals of RS – Electromagnetic spectrum. Platforms – airborne and space borne sensors. RS data acquisition and analysis. Multispectral, optical, thermal, microwave and hypersopecturl sensors. Important RS satellites. Data analysis - visual and digital image analysis. Principles of Geographical Information Systems. Theory of GIS supported by extensive practical exercises. Geographic Information and spatial data types. Hardware and software; Raster and Vector GIS. Data base management system. DEM and its applications. RS and GIS applications in geology, geomorphology, water resources, land use / land cover, oceanography, meteorology etc.

### **Books for Reference:**

1. Field Geology – F.H. Lahee – CBS Publications
2. Surveying and Fieldwork - Williamson, J – Constable and Co.
3. Handbook of Applied Geo-statisticalOre Reserve Estimation – M. David – Elsevier
4. Prospecting and Exploration of Mineral Deposits – M. Kuzvart and M. Bohmer – Elsevier
5. Principles of Geochemical Prospecting – Ginzberg, I.I. - Pergamon Press

6. Geographical Information System: A Guide to Technology – John C. Antenucci – Van Norstrand Reinhold Publications
7. Computers: Concepts and Uses - Mary Summer - Prentice Hall
8. Remote Sensing and Image Interpretation – T.M. Lillesand and R.W. Kiefer – John Wiley and Sons
9. Analytical Chemistry – Vogel I and II Editions



## **PAPER – II: REVIEW OF LITERATURE AND REVIEW REPORT**

### **Course outcome:**

CO1: related to review of literature and review report pertaining to Ph.D. programme

Unit-1: Sources of literature: Reference work in the library, browsing Internet & e-journals, books and websites. Methods and importance of citation and impact factor of research publications.

Review of literature: Material available from the scholar websites, subject sites conference/workshop/seminar proceedings.

Selection of the research topic: Format & method of writing research synopsis, thesis, and research papers.

Unit-2: Literature survey: Reference books/volumes/edition, journals, seminar, conference volumes, technical manuals and reports. Protocols in followed in research publication.

Planning of the proposed areas of research: Selection of hypothesis. Definition of the concept and objectives. Review of previous work. Logistics and technology to be followed in research.

Unit-3: Research Data: Generation of primary data via sampling and analytical techniques. Ancillary data and data to be extracted from literature. Data storage, analysis and interpretation.

Unit-4: Research Publications: Types of research publication including the peer reviewed journals. Preparation prior to the submission of research publication for having background knowledge including theoretical and scientific with regard to the chosen area of research.