

ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ



# University of Mysore


(Estd.1916)

**Ph.D in ENVIRONMENTAL SCIENCE**



UNIVERSITY OF MYSORE  
Department of Studies in Environmental Science  
Manasagangothri, Mysuru-570 006

Regulations and Syllabus  
Ph.D. in ENVIRONMENTAL SCIENCE

  
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## UNIVERSIT OF MYSORE

### GUIDELINES AND REGULATIONS LEADING TO PH.D. IN ENVIRONMENTAL SCIENCE

#### Programme Details

Name of the Department	:	Department of Studies in Environmental Science
Subject	:	Environmental Science
Faculty	:	Science and Technology
Name of the Programme	:	Ph.D.

#### PH.D. IN ENVIRONMENTAL SCIENCE

##### COURSE-I: RESEARCH METHODOLOGY

##### Course Outcome:

**On successful completion of this programme, each student will be able to:**

- Gain knowledge of research processes( reading , evaluating and developing )
- Perform literature reviews using print and online databases.
- Compare and contrast qualitative and quantitative research paradigms.
- Define and explain various fundamentals of qualitative and quantitative analysis.
- Able to discuss the term, principle, instrumentation, operation and application of analytical instruments.
- Able to conduct sampling of plant communities through various methods.
- Determine the density, abundance and frequencies of plant species in any selected sampling sites.
- Gain knowledge about the microscopic examination and staining techniques for the identification of microorganisms.
- Get expertise in screening of potential isolates of bacteria and fungi for the abatement of pollutants.
- Able to explain and discuss the isolation and characterization of microorganisms by morphological, biochemical, enzymatic, spectrophotometry, flourimetry, molecular, PCR and HPLC methods.
- Gain knowledge about the applications of GIS for environment management.
- Able to prepare micro slides using different staining techniques. (Giemsa's, Mallory triple Haematoxylin and Eosin, PAS, Histochemical and Histopathological).
- Gain knowledge about microtome.

##### Pedagogy

- Seminar
- Group discussion



- Lecture and presentations

## **COURSE CONTENT**

**Unit – 1** Identification of research problems: Methods of review of literature, data collection, preservation and analysis, methods of writing research papers, project reports and thesis.

**Unit – 2** Instrumental methods of Analysis: Introduction, electromagnetic radiation and its interaction with matter. Principles, instrumentation, working and applications of UV-visible, Infrared, Atomic Absorption spectrophotometry, Flame emission spectrophotometry, Nephelometry, Turbidimetry, Thermogravimetry, Radio analytical techniques, Conductometry, Potentiometry, Polarography, Gas chromatography, HPLC and Ion-exchange chromatography.

**Unit– 3** Biological analysis: Current practices, selection of sampling sites, collection of samples, handling and preservation, Nygaard's indices, quantitative analysis of plant communities, quadrat method, transect method, loop method, point or point method, kinds of quadrats, determination of density and frequency of species in a given area.

**Unit – 4** Soil analysis : Determination of particle size distribution and their bulk density, determination of nutrients in soil. Waste water treatment using advanced techniques – catalytic treatment, membrane treatment.

Mapping of an area using remote sensing, evaluation of satellite image. Application of GIS for environmental management. Field study for identifying the contour and drainage systems.

**Unit – 5** Microbial & Bio-technological Methods : Microscopic examination and staining techniques for identification of Microorganisms. Isolation and characterization of microorganisms by Morphological, biochemical, Enzymatic techniques, Spectrophotometric, fluorimetric methods and molecular methods: PCR and HPLC methods. Advanced methods for maintenance of pure culture. Screening of potential isolates of bacteria and fungi for the abatement of pollutants.

**Unit – 6** Techniques in Toxicology : Toxicity tests, types of toxicity testing. Microtome-preparation of samples, fixation, embedding and preparation of blocks. Microslide preparation, staining techniques using Giemsa's, Mallory's triple, Haematoxylin and eosin, PAS. Histochemical and Histopathological procedures.

