

Syllabus for Ph.D. Coursework in Botany



(w.e.f. the session 2020-21)

**POST GRADUATE DEPARTMENT OF BOTANY
UTKAL UNIVERSITY
BHUBANESWAR-751004**

Ph.D. COURSEWORK in BOTANY

P.G. Department of Botany, Utkal University, Vani Vihar, Bhubaneswar

To be effective from the session 2020-2021

Eligibility

Any student who has passed Master degree in Botany/Life Science/ Biotechnology/ Agricultural Science and having minimum of 50% marks in Masters Level.

Admission

The candidates are to take admission after qualifying in an entrance test as per university guidelines. The merit list will be prepared after recommendation of DRC. The admission will be strictly as per the merit list in each category as per university norms.

Course and Regulation:

1. The course is of six months duration with one semester for two theory paper, one review paper presentation and one seminar presentation.
2. Each paper carries 100 marks and six credit points.
3. The semester system of examination will have internal system of evaluation as suggested and approved by Teacher's council.
4. In order to pass a semester examination a candidate must have to secure a minimum of 70% marks in aggregate and a minimum 60% mark is essential to pass in each paper.
5. Attendance in the semester shall be strictly adhered to University Rules.

Details of the Syllabus:

Paper	Title	Marks allotted	Credit
I.	Research Methodology	100	06
	Core Paper-Botany	100	06
III.	Review Paper Presentation	100	06
IV.	Seminar Presentation	100	06
	Total	400	24

Detailed syllabus for Paper -I

Research Methodology

P. G. Dept. of Botany, Utkal University

Credits: 06 FM: 100

Course Objective

- To get introduced to the fields of various instruments used in Botany including the basic principle - application and working.
- To get idea on basic computational analysis and its applications
- The course is designed to train the students in statistics, bioinstrumentation, molecular tools and techniques essential for the understanding of life sciences and Botany.

Unit I

General Analytical Techniques: Concept of p1-1 and buffer, Chromatography: techniques & application, Electrophoresis: techniques & principle, microscopy. *Spectroscopic Techniques:* UV-Visible spectrophotometry, Atomic absorption spectrophotometry, Plant Efficiency Analyser.

Unit II

Statistical Methods: Measures of Central tendency of data, t- and χ^2 -test, F-test, correlation and regression analysis.

Unit III

Computer Application: MS office, Internetworking concept, bioinformatics application, Fundamental of Remote Sensing and Geographical Information System (GIS) and its application in various areas.

Unit IV

Review and Research article: Differences between review and original research article, types of review articles, writing research article and thesis, reference/bibliography formats.

Unit V

Research ethics: Philosophy and ethics, scientific conduct; publication ethics; open access; publishing, publication misconduct, databases & research metrics.

Course outcome:

- The students will develop the capability to carry out experiments involving several instrumentation applications.
- The student will be aware with a basic knowledge of modern molecular biology and genomics
- The students will learn to approach a research problem logically and will be able to do statistical analyses in research.
- The course aware about research ethics in dealing with the biological research.

Detailed syllabus Paper-II

Core Paper- BOTANY **P. G. Dept. of Botany, Utkal University**

Credits: 06 FM: 100

Course Objectives

- The course explains the application of plants in environment and their role in ecological balance.
- To get introduced to the taxonomic identification, tissue culture and recombinant r-DNA technology.
- This will also cater use of microbes as vectors for several recombinant DNA techniques.

Unit I

Plant Taxonomy: Herbarium technology, Modern Taxonomy, ICBN (Principles, Rules and Recommendations of Nomenclature).

Unit-II

Fundamental of Ecology and Environment: Concept of ecology and environmental science, Ecosystem, ecosystem energetic, Ecosystem productivity, community ecology.

Unit-III

Natural Resources and Management: Mineral Resources of India and Odisha in particular. Environmental impacts of mineral exploitation and environmental management plans. Biodiversity conservation, Alternate Energy resources.

Unit IV

Basic techniques: Methods for isolation, purification, preservation of microbes, Sterilization techniques, Media preparation, staining techniques for bacteria & fungi, Generation time and growth curve, Synchronous and diauxic growth of microbes, factors affecting growth of microbes.

Unit V

Genetic engineering: Cloning vectors and construction and transport of recombinant DNA into bacteria, selection and identification of recombinant clones, Ti and Ri plasmids of *Agrobacterium*, mechanism of T-DNA transfer to plants.

Course outcome:

- The students will know about the principles and techniques underpinning the application of biosciences to the environment.
- The students will develop the capability to carry out experiments and future research involving several recombinant DNA techniques.
- It will help students to have an idea on genetic engineering of microbes for plant improvement as well as other cutting edge research in Plant Science.

Paper-III: Review paper Presentation

Credits: 06 FM: 100

The candidate has to present a complete review paper pertaining to his/her probable research topic and also to submit a hardcopy of the same not exceeding 2000 words.

Paper-IV: Seminar Presentation

Credits: 06 FM: 100

The candidate has to present a paper pertaining to his/her topic of interest in the relevant subject and also to submit a hardcopy of the same not exceeding 1000 words.