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University of Mysore

(Estd.1916)

Ph. D. in BOTANY

UNIVERSITY OF MYSORE
Department of Studies in Botany
Manasagangotri, Mysuru-570 006

Regulations and Syllabus
Ph. D. in Botany

Chairman
Board of Studies in Botany
University of Mysore
Manasagangotri
MYSORE-570 006

UNIVERSITY OF MYSORE
GUIDELINES AND REGULATIONS
LEADING TO
PH. D. IN BOTANY

Programme Details

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

PH. D. PROGRAMME IN BOTANY

LEARNING OBJECTIVE:

- To expose the registered candidate to full round experience of science investigation, various basic and applied and advanced techniques.
- Individual skill development of performing, reporting and writing experimental outcomes, discussions and preparation of thesis.
- Successful defending of one's research work before learned professors to validate the work for publication and publication of data generated

PROGRAM OUTCOME:

The registered student pursues his/her Ph. D. thesis work for a period of two to five years under the supervision of the guide / supervisor and prepares his thesis for the award of Ph. D. degree with published work. After successful defending he/she will qualify for the award of Ph. D. degree in Botany.

COURSE-I : ADVANCE RESEARCH METHODOLOGY

COURSE OUTCOME:

After the course completion students will be able to;

- Review the literature related to the topic of research studies for carrying out research as it helps in problem formulation, hypothesis construction and selection of appropriate research designs.
- Explain and apply scientific methodologies, as well as techniques for scientific writing, and research methodology to prepare the writing of a scientific report, as well as a degree project.

- Understand biochemical and bio analytical techniques and its applications of the instruments that are routinely used for the characterization of molecules.
- Explain wide variety of statistical and graphical techniques, classical statistical tests including databases used in bioinformatics.
- Study various developmental aspects of model organism by understanding their gene expression and Regulation of genes involved in metabolic process.
- Emphasize the need and importance of innovation. Encourage and protect innovation in the form of intellectual property rights
- Understand the Modules on analytical techniques, plant tissue culture and phytochemistry to make them obtain skills in doing research
- Significantly enhance the employability of the candidates in different discipline of Life science both in Government as well as in corporate sector

PEDOGOGY

The registered candidate will undertake rigorous research work (5 years) and prepare for submission with valid publications and appear before the Pre Thesis submission Colloquium for approval.

COURSE CONTENTS:

Unit 1: Scientific Writing- Approach to scientific research; basic and applied research; essential steps in research; literature collection; review of literature; review process and bibliography; research reading; consulting source material; literature citation; sequence system; alphabet; number system; Research report- Components of research report-title, authors, and affiliations, abstract, summary, synopsis, key words, introduction, materials and methods, results, discussion, summary, conclusions, acknowledgements, appendices, references. Research Report- tables, research figures, components-research report-formatting and typing; Impact factor; Citation index; Submission of research articles, Organizing supplementing data; Audio Visual Presentation- Slide, Poster and oral. Intellectual property rights.

Unit 2: Experimental Designs and Techniques: Histological and Biochemical Techniques-Microscopy; Microtomy and staining techniques; Buffers; proteins, enzymes, and antibiotics, preparations of solutions- normal and molar solutions; Principles, types and applications of chromatography, Centrifugation, Electrophoresis and Spectrometry, PCR; Biostatistics- Populations, samples, sampling technique, data compilation and presentation, parameters and statistic; Measures of central tendency, dispersions, Hypothesis testing, Z-score, T-test, ANOVA, LSD, Multiple range test, chi-square test, regression and correlation, data transformation, experimental design, use of statistic packages- ex. SPSS. Bioinformatics- Computer network, online control using computers, Use of database, NCBI, EMBL, DDBJ, protein structural data bank, sequence analysis of proteins and nucleic acids, structure prediction, molecular

modelling, data mining methods, primer designing, web based tools for sequence searches, BLAST and FASTA.

Unit 3: Biodiversity and Conservation- Scope, concept and significance of Biodiversity; In situ and Ex-situ conservation methods and their importance; Molecular taxonomy- Scope, methods in molecular taxonomy and systematics. Embryology in relation to taxonomy; Palynology in taxonomy, experimental and applied embryology. Plant cell culture techniques: In vitro culture techniques; Meristem culture, Embryo culture, Anther culture, root tip culture, somatic embryogenesis and their applications.

Unit 4: Plant molecular biology- Plant as genetic tools in molecular biology (Zea mays, *Nicotiana tabaccum*, *Arabidopsis thaliana*); Regulation of genes involved in photosynthesis and nitrogen fixation; Biology and genetics of *Agrobacterium tumefaciens*; Medicinal plants and phytochemistry-methods of plant analysis, Phenolic compounds, the terpenoids, organic acids, lipids and related compounds, sugars and their derivatives.

Unit5: Plant-Microbe interactions- Studies on Plant-microbe interaction at the cellular, biochemical and molecular levels; Microbes for crop productivity and crop protection- NPV, Pseudomonas sp.,

Rhizobium sp., Mycorrhizae, Trichoderma sp. ; Innovative disease management strategies-Engineering resistance to viral, bacterial, fungal and insect diseases of crop plants. Potential of plant derived genes in the genetic manipulation of crops for insect resistance and control of viral diseases.

COURSE II: REVIEW OF LITERATURE

COURSE OUTCOME:

- Review of literature in the area of research (Seminar presentation and seminar report)
- Develop foundational skills to complete the literature review.
- Develop skills for search strategies, synthesizing sources, and constructing paragraphs for the literature review.