Syllabus for Ph.D. Course Work

Department of Botany & Forestry

Vidyasagar University

2016

Course Structure

Course	Subject	Full Marks	Unit	Distribution of Marks	Credit Hours
Course I:	**Research Methodology**	**50**	**I**	**Written: 40 (Exam Hours: 2)**	**16**
			II	**Assignment writing on any one (Practical): 10 Marks**	
Course II:	**Computer Application and Statistical Methods**	**50**	**I**	**Written: 20**	**16**
			II	**Written: 20 (I+II, Exam Hours: 2)**	
			III	**Assignment writing on any one (Practical):10 marks**	
Course III:	**Advanced Botany**	**50**	**-**	**Written (Exam Hours: 2)**	**20**
Course IV:	**Special Topics in Botany**	**50**	**-**	**Assignment to be Submitted*** [****A Literature Review or data generated on the related research topic be submitted by each scholar duly signed and recommended by the Supervisor***]	**-**

Course I: Research Methodology

Credit Hours: 16

Marks: 50
[Written: 40 (Exam Hours: 2) +
One Assignment: 10]

Unit I [Marks 40]

- Research: Definition, importance, meaning and characteristics.
- Steps in Research. Research problem: identification, selection and formulation.
- Data: definition, types, sources, data collection methods.
- Review of literature and Bibliography.
- Research report: types, contents, styles and steps in drafting.
- Editing the final draft, way of writing papers and Thesis writing.
- Significance of Impact factor, citation index, science citation index, IST, SCOPUS etc.

Unit II: Assignment writing on any one (Practical) – 10 marks

- Review of articles
- Research proposal
- Sample design
- Data analysis

Course II: Computer Application and Statistical Methods

Credit Hours: 16

Marks: 50 [Written: 40 (Exam Hours: 2) + One Assignment: 10]

Unit: I [Marks: 20]

- Operating system such as DOS, WINDOWS, UNIX.
- Internet: data uploading and downloading, e-mail and e-journal.
- Office management: MS-Word, MS-Excel, MS-Power Point.
- Programming: C, C++.
- Software Packages: MATLAB, SPSS.

Unit: II [Marks: 20]

- Normal probability distribution.
- Test for goodness for fit for a proposed distribution.
- Correlation of coefficient: simple linear, multiple linear, and partial.
- Regression; simple, multiple and stepwise.
- Experimental design. Analysis of variance: its model, one or two way ANOVA. Multiple comparison tests.

Unit III: Assignment writing on any one (Practical) – 10 marks

- Power point presentation on a research topic.
- Analysis of data using MS-Excel.
- Analysis of data on given statistical methods.

Course III: Advanced Botany

Credit Hours: 20

Marks: 50 [Written (Exam Hours: 2)]

1. Definition, aspects and prospects of Molecular plant systematic
2. cp DNA (rbcL); mt DNA; n DNA (ITS)
3. Molecular Methods (AFLP, RAPD); DNA Bar-coding;
4. Wetlands; their significance; Ramsar site.
5. Invasive species, climate change and biodiversity. Global negotiation on climate change. Environmental Diary: Chipko Movement (1970-80), Ramsar Convention (1971), Montreal Protocol (1987), Kyoto Protocol (1997).
6. Electron Microscopy (SEM and TEM); Chromatography (including HPLC, GC and TLC); Methods of sterilization and mode of action. Plant-microbe relationship.
7. Mode of action of amylases and proteases; fermentation technology; fermentor and its operation.
8. Biological interactions: Positive and negative interactions, commensalism, mutualism and co-operation.
9. Role of mycorrhiza in ecosystem, plantation and bioremediation: Benefits to plants, food for animals, value to people.
10. Types of plant fossils according to their mode of preservation; Preparation of fossil slides through peeling technique.
11. Spore-pollen symmetry, polarity, apertural pattern, exine stratification and sculpturing; Applied aspects of palynology; Melissopalynology.
12. Introduction: Aim and branches of Bioinformatics, Application of Bioinformatics, Bioinformatics Resources: NCBI, EBI.
13. Sequence databases: Nucleic acid sequence databases: GenBank; Protein sequence databases: Uniprot-KB: SWISS-PROT; Structure Databases: PDB.

14. Basic concepts of sequence alignment: Measurement of sequence similarity; Similarity and homology. Pairwise sequence alignment; Homology Modeling.
15. Base number, Haploid number and polyploidy number of chromosome and their significance
16. Karyotype (symmetric & asymmetric including bimodal); RFLP, AFLP, DNA finger printing
17. Gene transfer techniques: Biolistic method/ Gene gun , Ti plasmid structure
18. Plant cell culture: Callus culture, Micropropagation (Principle, outline methods and application).

Course IV: Special Topics in Botany

Marks: 50

Assignment to be submitted

[A Literature Review or data generated on the related research topic be submitted by each scholar duly signed and recommended by the Supervisor]