

# SEMESTER SYSTEM OF M.PHIL BOTANY

## Paper – 611: Recent Topics in Botany

### Unit-A

Credits- 01, Lectures 8-10

#### Advances in Taxonomy

Identification, Nomenclature, Rules of nomenclature, Biomatrix, Numerical taxonomy: Concepts, Characters and attributes OUTS, Coding, Cluster analysis, Cladistics, Angiospermic phylogeny group (APG) Classification.

### Unit-B

Credits- 01, Lectures 10-12

#### Applied Microbiology and Mycology

Economic importance of viruses with reference to vaccine production, role of viruses in research, medicine and diagnostics, in plant diseases. Economic importance of bacteria with reference to their role in agriculture and industry (fermentation and medicine). Role of fungi in Biotechnology; food industry (Flavour & texture, Fermentation, Baking, Organic acids, Enzymes, Mycoproteins); Secondary metabolites (Pharmaceutical preparations); Agriculture (Biofertilizers); Mycotoxins; Biological control (Mycofungicides, Mycoherbicides, Mycoinsecticides, Myconematicides); Medicine.

### Unit-C

Credits- 01, Lectures 12-14

#### Recent Trends in Genetics and Molecular Biology

Neo-genetics: Variation Molecular basis of Mutations; Mutagens – physical and chemical (Base analogs, deaminating, alkylating and intercalating agents); Detection of mutations: CIB method. Role of Transposons in mutation. DNA repair mechanisms, Fine structure of gene, Cis-Trans complementation test for functional allelism; Structure of Phage T4, rII Locus. Molecular Biology; Genomics, Structural genomics, Genome sequencing techniques, Functional genomics, Comparative Genomics, Proteomics: Classification, Identification of Proteins, Data mining in proteomics. Biological Database: Primary, Secondary and composite databases, nucleotide sequence databases, Protein sequence and structural databases, NCBI, BLAST.

### Unit-D

Credits- 01, Lectures 10-12

#### Biological stress and Resource Management

Environmental Factors: Water stress; Salinity stress, High light stress; Temperature stress; Hypersensitive reaction; Pathogenesis-related (PR) proteins; Systemic acquired resistance; Mediation of insect and disease resistance by jasmonates. Stress sensing mechanisms in plants: Role of nitric oxide, Calcium modulation, Phospholipids signaling, Reactive oxygen species–Production and scavenging mechanisms, Acclimation and adaptation. Biodiversity threats; Management strategies; National Biodiversity Action Plan, Forests management and its significance, Contemporary practices in resource management; GIS, Waste management.

#### Reference books:

1. Agrios, G.N. 1997 Plant Pathology, 4th edition, Academic Press, U.K.
2. Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, John Wiley & Sons (Asia) Singapore. 4<sup>th</sup> edition.
3. Gardner, E.J., Simmons, M.J., Snustad, D.P. (1991). Principles of Genetics, John Wiley & sons, India. 8<sup>th</sup> edition.
4. Griffiths, A.J.F., Wessler, S.R., Carroll, S.B., Doebley, J. (2010). Introduction to Genetic Analysis. W. H. Freeman and Co., U.S.A. 10<sup>th</sup> edition.
5. Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. Benjamin Cummings, U.S.A. 10<sup>th</sup> edition.
6. Kormondy, E.J. (1996). Concepts of Ecology. Prentice Hall, U.S.A. 4<sup>th</sup> edition.

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7. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West Press, Delhi.
8. Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4<sup>th</sup> edition.
9. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata McGraw-Hill Co, New Delhi.
10. Prescott, L.M., Harley J.P., Klein D. A. (2005). Microbiology, McGraw Hill, India. 6<sup>th</sup> edition.
11. R.B. (2008). Biology, Pearson Benjamin Cummings, USA. 8<sup>th</sup> edition.
12. Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.
13. Sahoo, D. (2000). Farming the ocean: seaweeds cultivation and utilization. Aravali International, New Delhi.
14. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi and Their Allies, Macmillan Publishers India Ltd.
15. Sharma, P.D. (2010) Ecology and Environment. Rastogi Publications, Meerut, India. 8<sup>th</sup> edition.
16. Sharma, P.D. (2011). Plant Pathology, Rastogi Publication, Meerut, India.
17. Simpson, M.G. (2006). *Plant Systematics*. Elsevier Academic Press, San Diego, CA, U.S.A.
18. Singh, G. (2012). *Plant Systematics: Theory and Practice*. Oxford & IBH Pvt. Ltd., New Delhi. 3<sup>rd</sup> edition.
19. Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi.
20. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics, John Wiley & Sons Inc., India. 5<sup>th</sup> edition.
21. Vasudevan, N. (2006). Essentials of Environmental Science. Narosa Publishing House, New Delhi
22. Webster, J. and Weber, R. (2007). Introduction to Fungi, Cambridge University Press, Cambridge. 3<sup>rd</sup> edition.

# SEMESTER SYSTEM OF M.PHIL BOTANY

## PAPER-612

### RESEARCH METHODOLOGY-I

Units	Course	Lectures	Credits
Unit-I	Scope of Research and Ethics	8-10	1
	i) Introduction and Scope		
	ii) Research problem: Identification, Selection, Formulation of research objectives		
	iii) Research design: Components, Types and Importance		
	iv) Research ethics, Institutional ethics committee		
	v) Plagiarism-Pitfall		
Unit-II	Technical Writing	8-10	1
	Types of technical documents; Full length research paper, Short/Brief communications, Letters to editor, Book chapter, Review, Conference report, Project proposal		
	Components of a full length research paper; Title/Topic statement, Abstract/key words, Aims and objectives, Hypothesis building, Rationale of the paper, Work plan, Materials and methodology, Results and discussion, Key issues and arguments, Acknowledgement, Conflict of interest statement, bibliography, Technical Resumes and Cover Letters		
	Components of a research proposal; Project summary Key words, Origin of the proposal, Major objectives Methodology, Instrument facility available in the PI's department, Overview of status of Research and Development in the subject, Importance of the proposed project in the context of current status, Bibliography		
Unit-III	Scientometrics	10-12	1
	How to cite and how to do referencing		
	Literature search technique, using SCOPUS, Google Scholar, PUBMED, Web of science, Indian Citation Index, and RG		
	Styles of referencing; APA, MLA, Oxford, Harvard, Chicago		
	Annotated bibliography		
	Tools for citing and referencing, Grammarly, Endnote etc		
Unit-IV	Presentation and Communication Skills	10-12	1
	Tables, Figures and Pictures using Excel		
	Power point slide preparation		
	Preparation of Posters		
	Electronic submission of manuscripts		
	Communication skills, oral and poster		

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## PAPER-613

### RESEARCH METHODOLOGY-II

Units	COURSE	Lectures	Credits
<b>Unit-I</b>	<b>IPR and Cyber Law.</b>	8-10	1
	i) Patents		
	ii) Patent laws, process of patenting a research finding		
	iii) Intellectual property (IP), Intellectual property right (IPR)		
	iv) Copyright, Trademarks, GI		
	v) Cyber laws		
	vi) COPE		
<b>Unit-II</b>	<b>Quantitative Data Analysis</b>	10-12	1
	i) Types of Data, Data Collection – Methods and Tools		
	ii) Hypothesis testing		
	iii) Normal and Binomial distributions and their property		
	iv) Tests of significance: Student <i>t</i> - test, <i>F</i> - test, <i>Chi-square</i> test		
	v) Correlation and Regression		
	vi) ANOVA – One-way and Two-way, Multiple-range test		
<b>Unit-III</b>	<b>Computer Fundamentals</b>	10-12	1
	i) Introduction to MS-Office software: MS-Word(Track change)		
	ii) MS-Excel		
	iii) MS-Power Point		
	iv) MS-Access		
	v) Features for Statistical Data Analysis Tool Pack, SPSS		
<b>Unit-IV</b>	<b>Advanced Tools &amp; Techniques (Subject specific)</b>	8-10	1
	i) Microscopic techniques - Compound Microscopy, Fluorescence Microscopy and Electron Microscopy		
	ii) Spectrophotometry		
	iii) Principle, protocol and application of Chromatography-GLC & HPLC, Electrophoresis and its application		
	iv) PCR, Real Time PCR, DNA Microarray, DNA Sequencing, DNA Finger Print, Recombinational DNA Technology, DNA molecular markers, Hybridomal MAB, Immunotechniques		

#### Recommended Books

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|--------------------------|--|
| 1. Al Vogel              | Analytical Chemistry   |
| 2. B K. Sharma           | Instrumental methods of analysis   |
| 3. Buranen L and Roy AM  | Perspective on Plagiarism and Intellectual Property in a Post-Modern World   |
| 4. Campbell RC           | Statistics for biologists  |
| 5. Cassel P et. al       | Inside Microsoft Office Professional   |
| 6. Chatwal and Chatwal   | Instrumentation  |
| 7. Coleman P and Dyson P | Mastering Internets  |
| 8. CR Kothari            | Research Methodology: Methods & techniques, 2008                             |
| 9. Gilmore B             | Plagiarism: Why it happens, How to prevent it?                               |
| 10. Gralla P             | How the Internets Works  |
| 11. Habraken J           | Mocrosoft® Office 2003 All in One, Mocrosoft® Office 2003 in Depth Cyber Law |
| 12. R. Pannerselvam      | Research Methodology   |

**SEMESTER SYSTEM OF M.PHIL BOTANY**

**Paper – 614**  
**Marks – 100 (4 CH)**

**TEACHING ASSIGNMENT**

**SEMESTER – II**

**Paper – 621**  
**Marks – 150 + 25+25 (8 CH)**

**DISSERTATION**

**(Thesis + Seminar Presentation of the Thesis + Viva – Voce)**