

**ADIKAVI NANNAYA UNIVERSITY**  
**Department of Botany, Syllabus for Pre Ph.D. course**  
**Paper: I Resent Advances in Plant Sciences and Research Methodology (w.e.f 2019)**

**Unit-I**

Recent trends in the classification of Algae. Thallus organisation and life histories in algae. Economic importance of algae. Fungi as partners of plants. Microbes – Nitrogen fixation cycle. Transmission of plant viruses.

**Unit-II**

Advancements in plant embryological research with the application of modern techniques. Ultra structure and biochemical aspects of pollen and embryo sac. Significance of anatomical characters in phylogeny. Modern concepts on fertilization in angiosperms. Comparative morphology and taxonomy: role of anatomy, embryology, palynology and phytochemistry. Recent achievements in tissue culture with specific examples. Applications of tissue culture in agriculture and forestry.

**Unit-III**

Vegetational types of India. Ecology and human welfare, conservation and management of natural resources. water and air pollution. Growth hormones and their role in plant systems. Minerals and their role in growth and development. Photosynthetic productivity in field crops in relation to carbon dioxide fixation mechanism.

**Unit-IV**

Plant genome: molecular genome concept of nucleosome type, extent and organization of repeated DNA sequences. Structure and organization and expression of chloroplast and mitochondrial genome. Modern concepts of genome: historical account, complementation and genetic resolution, fine structure analysis in plants. Biology of cell cycle: determination of mitotic and meiotic cycle duration, metabolic aspects of mitotic and meiotic cycles, experimental control. Somatic cell hybridization: protoplast culture, transformation, fusion, somatic hybrids and transgenic plants. Genetic engineering: general concepts of recombinant DNA technology and applications. Conservation of plant genetic resources: necessity, cryopreservation, gene banks and significance.

**Unit-V**

Biostatistical methods: Basic concepts of parametric and non parametric methods; - Graphical representation, measures of central tendency and dispersion; Probability distribution (Binomial, Poisson and Normal distribution); types of error, levels of significance, t-test, X<sup>2</sup>-test, ANOVA. Biophysical techniques: Working principles of microscopy, chromatography, and centrifugation. Spectroscopic techniques: principles and applications of UV-Visible, ESR, NMR.

**References**

1. Fritsch EB. The structure and reproduction of algae. Vol I and II. Cambridge university press. 1935, 1945
2. Venkaaraman, CS, Gopal SK, Kaushik OD and Ray Choudary: algae: form and function. Today and tomorrow. 1974.
3. Chapman VL and Chapman DJ. Seaweeds and their uses. Mothuon. 1981.
4. Ainsworth GD and Sussman AS. The fungi- an advanced treatise Vol I-IV. Academic Press. 1972.

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5. Landockeer EM. Fundamentals of the fungi – an advanced approach. Blackwell scientific. 1979.
6. Carpenter P. Microbiology. W.O. Saunders, 1977.
7. Lynch JM and N J Polo. Microbial Ecology- A conceptual approach. Blackwell scientific. 1979.
8. Mathews REF. Plant virology. Academic press. 1970.
9. Davis PH and VH Heywood. Principles of Angiosperms Taxonomy. Oliver and Boyd, 1963.
10. Naik VN. Taxonomy of angiosperms . Tata McGraw Hill Book Company, 1984.
11. Annadurai pillai. A text book of biostatistics. New age International publishers. 2007
12. Seymour Lipschuz and John J Schiller. Schaum's outline: Introduction to Probability and Statistics. Tata McGraw Hill Book Company 2017.
13. Lain Campbell. Biophysical Techniques. Tata McGraw Hill Book Company 2017.
14. Upadhyay A. Upadhyay and Nath. Biophysical Chemistry- Principles and Techniques. Himalaya Publishing House, New Delhi, 2016.

  
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Department of Botany

Pre Ph.D. theory examination model question paper

Paper: I Recent Advances in Plant Sciences and Research Methodology (w.e.f 2019)

Time 3hr

Max. Marks: 100

Answer any ALL questions

Each question carries 20 marks

1. a). Discuss the recent trends in the classification of algae and their economic importance

Or

b). Discuss in detail about Nitrogen fixation cycle

2. a) i) Ultra structure of pollen and embryo sac

ii). Fertilization in angiosperms

Or

b). Describe the role of anatomy, embryology, palenology and phytochemistry in the taxonomy

3. a). What are growth hormones? Discuss their role in the agri-horti culture

Or

b). Define pollution? Describe in detail about water and air pollutions

4. a). What is the genetic engineering? Write its concepts and applications

Or

b). Write notes on structure, organization and expression of chloroplast and mitochondrial genome

5. a). Write the working principles of Microscopy, chromatography and centrifugation

Or

b). Discuss in detail about Probability distribution

L. M. Naidu

ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM

Department of Botany, Pre-Ph.D. syllabus

Paper-II Ethnobotany and its Research Methodology (Mr.K.Gani Raju)

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**UNIT-I**

Ethnobotany definition, history, scope, interdisciplinary approaches, World centers of Ethnobotany, Ethnobotany in India. Ethnic communities of India, Andhra Pradesh and East Godavari.

Different categories of Ethnobotanical plants: Food, Medicine, Shelter, Fodder, Timber, Fuel wood, NTFPs etc

**UNIT-II**

History, scope, significance of Medicinal and aromatic plants in the World and India.

Application of natural products to certain diseases- Jaundice, cardiac, infertility, diabetics, Blood pressure, skin diseases etc. Role of research institutes on medicinal and aromatic plants (CDRI, CIMAP, NBRI, NBPGR and IUCN)

**UNIT-III**

Methods of Extraction: Pooling Extraction, Fractionated Extraction, Solvent Extraction, Hydro distillation and Microwave Extraction.

Quality control of herbal drugs: Identification and characterization of main phytochemical groups like Alkaloids, Terpenoids, Steroids and cardiac glycosides, Flavonoids and tannins.

**UNIT-IV**

Separation Techniques: Centrifugation, Distillation and Crystallization.

Chromatography techniques: Thin Layer chromatography, Analytical method of chromatography HPLC, GC etc.

**UNIT-V**

Ethics in Ethnobotanical Research: Intellectual Property Rights (IPR), International agreements and Best practices.

Anthropological Methods: Documenting knowledge and practice of medicinal plant use in a socio-ecological context

Botanical Methods: Collecting specimens, managing collections and assessing the conservation status of plants.

## Reference Books

1. Advances in Horticulture : Volume 11: Medicinal & Aromatic Plants : Edited by K.L. Chadha, Malhotra Publishing House, 2006, Reprint, xi, 935 p, ISBN : 8185048290
2. An Introduction to Ethnobotany : Definitions Methods New Concepts and Approaches : edited by S.K. Jain and Ashok K. Jain, Deep Publications, 2013, viii, 250 p, ISBN : 9789380702056
3. Chadha, K.L. 2001. Hand Book of Horticulture. ICAR Publication, Krishi Anusandhan Bhavan, Pusa, New Delhi.
4. Cotton C.M. 1997. Ethnobotany – Principles and applications. John Wiley and sons – Chichester.
5. Ethnic Tribes and Medicinal Plants: Edited by Pravin Chandra Trivedi, Pointer Pub, 2010, xii, 264 p, ISBN : 9788171326235
6. Ethno-Medicine in India Vol. II: A Selective Bibliography : Kamal Kant Misra, Mohammad Rehan and Ravindra K. Gupta, Gyan Publishing House, 2013, 359 p, ISBN : 9788121211895.
7. Faulks, P.J. 1958. An introduction to Ethnobotany, Moredale Pub. Ltd., London
8. Jain S.K., (ed.) 1981 Glimpses of Indian Ethnobotany, Oxford and I B.H., New Delhi
9. Jain S.K., 1995 Manual of Ethnobotany, Scientific Publishers, Jodhpur
10. Martin, G.J.. 1996, Ethnobotany, A methods manual, Chapman & Hall, London
11. Purohit and Vyas, 2008. Medicinal Plant Cultivation: A Scientific Approach, 2nd edn. Agrobios, India
12. Rama Rao, N and A.N. Henry (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India. Botanical Survey of India, Howrah
13. Rama Rao, N and A.N. Henry (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India. Botanical Survey of India, Howrah
14. Schuites, R.E. 1995, Ethnobotany, Chapman and Hall
15. Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India
16. Chemical Analysis. JOHN WILEY & SONS. 2013.
17. Principles and Practice of Chromatography (Chrom-Ed Book Series) Kindle Edition by Raymond P.W. Scott, 2015.
18. Analytical Method Development by HPLC For Starters Kindle Edition by Matthew S, 2015.

ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM  
Department of Botany, Pre-Ph.D. Model Question Paper  
Paper-II Ethnobotany and its Research Methodology

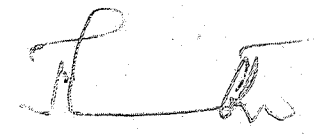
Time: 3hrs

Max Marks-100

Note: Answer All the questions. All questions carry equal marks. 5x20=100

1. A) Write in detail about the World centers of Ethno botany.  
(Or)  
B) Write about the various types of non-timber forest products.
2. A) Explain the role of natural products in treating various diseases like Jaundice, Diabetes and Cardiac diseases.  
(Or)  
B) Discuss the role of research institutes in the field of medicinal and aromatic plants.
3. A) Write about the various types of Extraction methods used in extraction of plant products.  
(Or)  
B) Write about the identification and characterization of Terpenoides.
4. A) Explain the process of Centrifugation technique used in separation of plant products.  
(Or)  
B) Write about the process and principle involved in thin layer chromatography.
5. A) Explain about the Intellectual Property Rights.  
(Or)  
B) Write about the process of collection of plant specimens and their management.

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