



**Academic Year : 2021 - 2022**

**School : School of Studies of Life Science**

**Department : Department of Botany**

**Date and Time : 29 October 2021**

### **Minutes of Board of Studies (BOS) (Botany) Meeting**

A meeting of BOS was held on 29 October 2021 and continued up to 10 November in the office of the HOD, Department of Botany at 4 PM in Hybrid mode to discuss the agenda. At the outset, Chairman welcomed all the members and put the agenda for discussion. The following members were present in the meeting

1. Dr. SK Shahi (Chairman)
2. Prof. NK Sharma (External Member)
3. Dr. AK Dixit (Member)
4. Dr. Vibhay Tripathi (Member)

After a thorough discussion, the following resolutions were made.

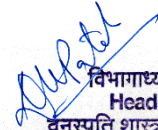
**Agenda 1-** Approval of the modification of the three-year UG syllabus for Botany (Hon's) as per CBCS system Resolution: With the few minor corrections as pointed out by the external member Prof. NK Sharma, Department of Botany, IGNTU, Amarkantak through online discussion and the members of the BOS, the modification of the syllabus was approved for further approval by the academic council/school board of Life Science of the University.

**Agenda 2-** Approval of the modification of the Two-year PG syllabus for Botany as per CBCS system Resolution: With the few minor corrections as pointed out by the external member Prof NK Sharma, Department of Botany, IGNTU, Amarkantak through online discussion and the members of the BOS, the modification of the syllabus was approved for further approval by the academic council/school board of Life Science of the University.

**Agenda 3-** Approval of the modification and addition of 4 new courses in the Pre PhD courses work. Resolution: With the few corrections as pointed out by the external member Prof. NK Sharma Bi 3 Department of Botany, IGNTU, Amarkantak through online discussion and the members of the BOS, the modification of the syllabus was approved for further approval by the academic council /school board of Life Science of the University

The following New courses are introduced from the session 2021-2022

S. NO.	Course code	Course Name
1.	LS/BOT/PPC3/REC-6	Plant Ecology, Diversity, Uses and Conservation (03) Review of literature and Seminar presentation (01)
2.	LS/BOT/PPC3/REC-7	Ethnobotany and medicinal plants (03) Review of literature and Seminar presentation (01)
3.	LS/BOT/PPC3/REC-8	Molecular stress physiology (03) Review of literature and Seminar presentation (01)
4.	LS/BOT/PPC3/REC-9	Plant systematic and evolutionary biology (03) Review of literature and Seminar presentation (01)



विभागाध्यक्ष  
Head

वनस्पति शास्त्र विभाग

Department of Botany

गुरु घासीदास विश्वविद्यालय (केन्द्रीय वि.वि.), बिलासपुर (छ.ग.)  
Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur (C.G.)  
Signature & Seal of HoD



## Scheme and Syllabus

The Ph.D course work course comprises compulsory course (04 credits; A), discipline-specific courses (04 credits; B) and research theme-specific courses (04 credits; C). Since PhD students come from different educational backgrounds, relevant courses will be chosen in consultation with the concerned DRC/RAC to compliment the previous education, improve specific skills required for thesis and subsequent career. The compulsory Courses (CC), and Discipline-Specific Courses are compulsory for all students registered in the Ph.D program in botany. Whereas, a research scholar will select elective courses (i.e., Research Specific Courses as suggested by the concerned DRC/RAC.

### Common course

Course code	Title (credit)	Credit/Marks
LS/BOT/PPC-1	Research Methodology and Publication Ethics (04)	04/100

### Discipline-specific courses

Course code	Title (credit)	Credit
LS/BOT/PPC-2	Instrumentation and techniques in Plant Sciences (04)	04/100

### Research Specific Courses (students select any one of these)

Course code	Title (credit)	Credit/Marks
LS/BOT/PPC3/REC-1	<i>Bio-resource application &amp; Herbal technology (03)</i> <i>Review of literature and Seminar presentation (01)</i>	03+01/75+25
LS/BOT/PPC3/REC-2	Bio-atmospheric Interactions and Green remediation (03) Review of literature and Seminar presentation (01)	



LS/BOT/PPC3/REC-3	Environmental Ecology (03) Review of literature/Seminar presentation (01)	
LS/BOT/PPC3/REC-4	Advance Bacterial Genetics (03) Review of literature and Seminar presentation (01)	
LS/BOT/PPC3/REC-5	Medical Botany (03) Review of literature and Seminar presentation (01)	
LS/BOT/PPC3/REC-6	Plant Ecology, Diversity, Uses and Conservation (03) Review of literature and Seminar presentation (01)	
LS/BOT/PPC3/REC-7	Ethnobotany and medicinal plants (03) Review of literature and Seminar presentation (01)	
LS/BOT/PPC3/REC-8	Molecular stress physiology (03) Review of literature and Seminar presentation (01)	
LS/BOT/PPC3/REC-9	Plant systematic and evolutionary biology (03) Review of literature and Seminar presentation (01)	



## Syllabus

### Plant Ecology, Diversity, Uses and Conservation

LS/BOT/PPC3/RSC-6

(Credits- 03; contact hour-45h; maximum marks - 75)

#### Unit I. Plant Ecology and diversity:

Plant Ecology – Introduction, Scope and Importance, Plant Diversity and its scope, Types, Plant association, Phyto-sociology, Ecological factors, Aquatic plants diversity, Plant diversity as herbs, Shrubs, Trees and climbers. Plant Population and community. Physico-chemical characters of water/Soil, Phytoremediation, Eutrophication.

#### Unit II. Plants as a source of Traditional medicine:

Medicinal plants Diversity and uses of Medicinal plants based on their utility for treatment of various disorders, Ethnobotany basic concepts and significance, Tribes and Medicinal plants, Traditional healers and baigas, Herbal preparation and utilization, CGMPB AND NMPB,

#### Unit III. Plant Diversity Loss and Conservation:

Reason for loss of plant diversity, Conservation – Need, types and importance, IUCN, Significance of plant diversity. Role of tribes for conserving Medicinal plants, TKDL, Hot spots, Alien invasive plant species.

#### Unit IV. Medicinal plants research:

Botanical gardens/Herbal gardens, CIMAP. NBPGR, NBRI, Phytochemicals, Ethnobotanical survey, Questionnaire. Plant materials extractors, Extraction techniques.



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**Suggested readings -**

1. Krishnamurthy, K. V. (2004). An advanced text Book of Biodiversity – Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi.
2. Trivedi P. C. and Sharma N. 2010. Plant resource utilization and conservation, Pointer Publishers. Jaipur.
3. Singh J. S. Singh S. P. and Gupta S. R. 2006. Ecology, Environment and resource conservation, Anamya Publication, New Delhi.
4. Das A. P. and Pandey A. K. 2007. Advances in Ethnobotany, Bishen Singh Mahendra Pal Singh, Dehradun.
5. S. K. Jain 1989. Methods and Approaches in ethnobotany. Society of ethnobotanists, Lucknow, India.
6. S. K. Jain 1990. Contributions of Indian Ethnobotany, Scientific publishers, Jodhpur.
7. P. D. Sharma, Ecology and environment, Rastogi Publications, Meerut.

**Review of literature and Seminar presentation**

(Credits- 01; contact hour-15h; maximum marks - 25)



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### **Ethnobotany and Medicinal Plants**

*LS/BOT/PPC3/RSC-7*

(Credits- 03; contact hour-45h; maximum marks – 75)

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#### **Unit: I**

**Ethnobotany: Principal and applications:** Introduction and scope of research in Central India with special reference to Chhattisgarh. The relevance of ethnobotany in the present context. Tribes of Chhattisgarh, Sources of ethnobotany in Chhattisgarh. Important ethnobotanical plants of Chhattisgarh and their bioprospecting. Ethnomedicinal plants used by tribes in various diseases.

#### **Unit: II**

**Ethnobotanical research tools:** Survey, Data collection and sampling, Documentation, compilation of data, presentation of data.

#### **Unit: III**

**Traditional systems of medicine:** History and uses of traditional medicinal plants; Introduction and types of indigenous systems of medicines. Interdisciplinary approaches in ethnobotany; Collection of ethnic information. Definition and importance of Traditional Knowledge (TK), Traditional Knowledge Resource Classification (TKRC), Traditional Knowledge Digital Library (TKDL)

#### **Unit: IV**

**Natural products-based drug discovery:** Characteristics of natural products that make them appropriate material in discovery new of drugs. Role of ethnobotany in modern medicine with examples; Medico-ethnobotanical sources in India; Significance of medicinal plants in ethno-botanical practices along with their habitat and morphology. Ethnobotany and legal aspects: Ethnobotany as a tool to protect interests sharing of wealth concept with few examples from India. Biopiracy, Intellectual Property Rights (IPR) and Traditional Knowledge (TK). Contribution of research institutes (CDRI, CIMAP and NBRI) in medicinal plants research.

#### **Suggested readings:**

1. Acharya, D., Jose Luis Rios, Rai, M. (2011) Ethnomedicinal Plants Revitalizing of Traditional Knowledge of Herbs, CRC Press, USA.



2. Chopra, R.N., Nayar, S.L. and Chopra, I.C., (1956). Glossary of Indian Medicinal Plants, CSIR, New Delhi.
3. Das, A.P. and Pandey, A.K., (2007). Advances in Ethnobotany, Bishen Singh and Mahendra Pal Singh, Dehradun.
4. Dutfield, G. (2000) Intellectual Property Rights Trade and Biodiversity, Earthscan, London, United Kingdom
5. Gary J. Martin, G.J. (2014) Ethnobotany: A Methods manual, U.K.
6. Hatfield, G. (2004). Encyclopedia of Folk Medicine: Old World and New World Traditions. United Kingdom: ABC-CLIO.
7. Jadhav, D., (2008) Medicinal Plants of Madhya Pradesh and Chhattisgarh, Publisher: Daya Publishing House, New Delhi.
8. Jain, A.K., (2016) Indian Ethnobotany: Emerging Trends, Scientific Publishers, Jodhpur.
9. Jain, S. K. (1991). Dictionary of Indian Folk Medicine and Ethnobotany, Deep Publications, New Delhi.
10. Jain, S. K. and Rao, R.R. (1977). A Handbook of field and herbarium method, Today and tomorrows, Printers and publisher, New Delhi, India.
11. Jain, S.K., (1995) Manual of Ethnobotany, Scientific Publishers, Jodhpur.
12. Kirtikar, K. R. and Basu, B. D. (1998). Indian Medicinal Plants, Part I to IV, (Reprint) (Bishen Singh Mahendra Pal Singh, Dehradun).
13. Kumar, N.C. (1993). An Introduction to medicinal Botany and Pharmacognosy, Emkay Publications, New Delhi.
14. Martin, G.S., (1995). Ethnobotany Chapman and Hall, London.
15. Mukherjee, B. (ed). (1993). Traditional Medicine, Oxford & IBH Publication Co. Pvt., New Delhi.
16. Pullaiah, T., Krishnamurty, K.V. and Bahadur, B. (2016) Ethnobotany of India, Vol. 5, The Indo-Gangetic Region and Central India, Apple Academic Press USA.
17. Quigley, D., Srivastava, V. (1999). Tribes of India. Hong Kong: Odyssey Poets.
18. Sarin, Y.K. (1996). Illustrated Manual of Herbal Drugs Used in Ayurveda (CSIR/ICMR), NISCOM, and New Delhi.





19. Sengupta, N. (2019) Traditional Knowledge in Modern India Preservation, Promotion, Ethical Access and Benefit Sharing Mechanisms, Springer India.
20. Shah N.C. (2008) Ethnobotany in India. In: Selin H. (eds) Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures. Springer, Dordrecht.
21. The Tribes of Madhya Pradesh. (1964). India: Department of Tribal Welfare, Government of M.P.
22. Trivedi, P.C., (2006). Medicinal Plants: Ethnobotanical Approaches, Agrobios, India
23. WHO, (1991)., Report Guidelines for the Assessment of herbal medicines, Geneva.

### **Review of Literature and Seminar presentation**

(Credits-01; contact hour-15h; maximum marks-25)



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## **Molecular Stress Physiology**

*LS/BOT/PPC3/RSC-8*

(Credits- 03; contact hour-45h; maximum marks – 75)

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### **Unit I**

Stress environment: Abiotic factors; water, temperature, light, pH, and salinity.

### **Unit II**

Stress damages: Cell structure, proteins, nucleic acids, lipids and membranes, physiological processes, protein synthesis.

### **Unit III**

Physiological, cellular, and biochemical mechanisms of abiotic stress in plants. Mechanism of stress adaptations: Molecular responses to stress: stress perception, signal transduction, expression of stress responsive gene and significance of gene product.

### **Unit IV**

Arabidopsis thaliana: as a model for functional genomics of plant abiotic stress responses. Functional genomic approaches to introduce abiotic stress tolerance in plant.

### **Suggested readings:**

1. Plant Physiology and Development, Sixth Edition by Lincoln Taiz, Eduardo Zeiger, Ian M. Møller, and Angus Murphy, published by Sinauer Associates.
2. Biochemistry and Molecular Biology of Plants, Second Edition. Bob B. Buchanan, Wilhelm Gruissem, Russell L. Jones, published by American Society of Plant Physiologists.
3. Plant Stress Tolerance (Methods and Protocols) by Ramanjulu Sunkar, Published by Humana Press.
4. Plant Stress Physiology, Second Edition by Sergey Shabala, Published by CABI, Oxford.

### **Review of Literature and Seminar presentation**



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**Plant Systematics and Evolutionary Biology**

*LS/BOT/PPC3/RSC-9*

(Credits- 03; contact hour-45h; maximum marks – 75)

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**Unit I. History of developments in plant classification**

Linnaean to post-Linnaean era; phenetic methods, molecular systematics, cladistic methods, phylogenetic analysis, APG classification. Diagnostic features, systematic position and affinities of major groups of flowering plants recognized in APG classification: Basal angiosperms, Magnoliids, Monocots, Commelinids, Eudicots, Core Eudicots-II. Concept of Botanical Gardens and Biodiversity Parks.

**Unit II. Species concept and molecular evolution**

Species concepts and the processes of speciation. Drivers of speciation. Evolutionary mechanisms. Postzygotic and prezygotic isolation in allopatry and sympatry; reinforcement; character displacement. Hybrid speciation; hybrid zones. Molecular evolution: Neutral theory. Pairwise distances and molecular divergence. Molecular models; dating phylogenetic events.

**Unit III. Evolutionary concept of Angiosperm origin**

A critical study of the current ideas on the origin of Angiosperms with special reference to their ancestral state, time and place of origin. The concept of primitive angiosperm flower. Origin and evolution of flower; co-evolution of flowers vis-à-vis pollinators. Origin and evolution of structure and morphology of stamens, nectaries and nectar. Origin and evolution of carpels; different types- concept of foliar origin of carpels; types of ovary; evolution of placentation types- inferior ovary, - foliar and axial concepts. Role of floral anatomy in interpreting the origin and evolution of flower and floral parts.

**Unit IV. Inferring phylogenies**

Phylogenetic trees, reading and using trees. Gene trees, species trees.

**Suggested readings:**

1. Angiosperm Phylogeny Group (2016). An update of the Angiosperm Phylogeny Group Classification for the orders and families of flowering plants: APG IV. Botanical Journal of the Linnean Society 181: 1-20.



2. Baum DA and Offner S(2008). Phylogenies and tree thinking. American Biology Teacher 70: 222-229.
3. Crawford DJ (2003). Plant Molecular Systematics. Cambridge University Press, Cambridge, UK.
4. Cronquist A (1981). An integrated system of classification of flowering plants. Columbia University Press, New York.
5. Briggs D(2009). Plant microevolution and conservation in human influenced ecosystems. Cambridge University Press. UK
6. Futuyma DJ(2009). Evolution. Sinauer Associates, Inc. Publishers, Sunderland.
7. Hall BK and Hallgr msson B (2014). Strickberger's Evolution (4th Edition). Jones & Bartlett.
8. Judd WS, Campbell CS, Kollogg EA, Stevens PF and Donoghue MJ (2008). Plant systematics: Phylogenetic approach. Sinauer Associates, Inc. Massachusetts.
9. Lawrence GHM (1951). Taxonomy of Vascular Plants. New York: Macmillan, 823 pp.
10. Nei M and Kumar S (2000). Molecular Evolution and Phylogenetics. Oxford University Press, New York. ISBN 0 19 513584 9.
11. Page RDM and Holmes EC (1998). Molecular Evolution: A Phylogenetic Approach, Blackwell.
12. Radford AE (1986). The fundamentals of plant systematics. Harper & Row. New York, NY. 498 pp.
13. Semple C and Steel MA (2003). Phylogenetics. Oxford University Press, Oxford.
14. Simpson MG (2006). Plant Systematics. Elsevier, Amsterdam.
15. Stuessy TF (2008). Plant Taxonomy: The systematic Evaluation of Comparative Data. Columbia University Press, New York.
16. Swafford DL (2001). PAUP\*. Phylogenetic analysis using parsimony (\* and other methods), version 4.Sinauer Associates, Sunderland.
17. Singh G (2010). Plant systematics: An Integrated approach. Science Publisher. USA.

### **Review of Literature and Seminar presentation**

(Credits-01; contact hour-15h; maximum marks-25)