Minutes of the meeting of Board of Studies in Plant Science

Date: 15-4-2019 Time 10 .00 AM to 5.00 PM
Venue: Department of Plant Science,
Central University of Kerala, Periye-671316

Ref. CUK/ACA/BoS/187/2013/2019/1714/E5566 dated 05th February 2019

As per the CUK letter cited, Board of studies meeting was conduced on 15-4-2019 from 10.00 AM to 5.00 PM with the following members.

Members present

Dr. K. Arunkumar
Chairman, PLS-BOS

Prof. (Dr.) T. Parimelazhagan
Expert-Member, Department of Botany
Bharathira University, Coimbatore

Prof. (Dr.) G. R. Janardhana
Expert-Member,Department of Botany
University of Mysore
Mysore

Prof. (Dr.) V. Sivaram
Expert-Member, Department of Botany
Bangalore University
Bangarore

Prof. Dr. T. Dennis Thomas
Member

Dr. K. Ramachandran
Member

Dr. Ginny Antony
Member

Draft syllabus submitted by the Department of Plant Science was thoroughly gone through and discussed based on the CUK CBCS regulations. Accordingly the board unanimously passed the following resolutions.

- Resolved to approve the proposed syllabus for M.Sc Plant Science programme to be adopted from the Academic year 2019-2020.
- Specific Textbooks of 10 to 15 are limited to each course.
- The credits for core courses were decided as 60 credits and 12 credits for elective courses.
- Accordingly 13 core courses each carry 4 credits were finalized
- Suggestions in the course content by the expert members were included and coursers were accordingly revised.
- Recent topics in all courses were included as per the expert suggestions.

15/4/19

Dr. K. Arunkumar
Chairman, PLS-BOS

Prof. Dr. T. Dennis Thomas 15/4/19
Member

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Expert-Member

Dr. Ginny Antony
Member 15/4/19

Prof. (Dr.) V. Sivaram
Expert-Member

BTY 5310	**PLANT SYSTEMATICS** (Credits 3+1*=4; Theory 4 hrs; Practical 3 hrs) *Field study
Aim	The aim of this course is to introduce students with the important concepts of plant systematics exploring botanical diversity.
Objective(s)	The objectives of the course are: • To make students familiar with the foundations of plant systematics, methods used and the research goals of a systematic stud. • To make students familiar with the concepts and the terminology used in plant systematics including modern molecular systematics. • To present the most recent knowledge of evolutionary relationships of plants as well as practical information vital to the field.
Learning outcome	After completing this course, students will be able to: • Describe the methods and principles of classical taxonomy and modern molecular systematics.
	• Relate systematics analysis to the evolution of the taxa under investigation.
S. No.	**Theory**
1.	**History of developments in taxonomy:** Systematics - concepts and components; Taxonomic literature - Floras, Monographs, Indices, Keys and Journals. Field and Herbarium Methods. Importance of Herbaria and Botanical gardens.
2.	**Classification of flowering plants:** Principles, Outlines, Merits and Demerits of Bentham and Hooker; Engler and Prantl; Hutchinson, and Takhtajan. Recent classification based on molecular systematics i.e. APG I to APG IV and recent updates, Merits and demerits of phylogenetic classification
3.	**Botanical nomenclature:** International code of Nomenclauture (ICN) for algae, fungi and Plants: General Principles, Typification, Principles of priority and their limitations - Effective and valid publication – Authors, Citations Retention, choice and rejection of names.
4.	**Taxonomic evidence:** Secondary metabolites, Anatomy, Embryology, Cytology, Polyploidy, palynology in relation to taxonomy. **Numerical methods in taxonomy:** Phenetics, Principal Component Analysis, Discriminant Analysis.

5.	**Molecular systematics:** The module deals with central concepts of molecular systematics, technologies for collection of molecular data and basic methods for phylogenetic analysis. **Phylogenetic systematics:** The principles, methodology, and applications of phylogenetic analyses includes taxon selection, character analysis (description, Character Selection, character state discreteness, character correlation, homology assessment, character state transformation series and polarity, character weighting, character step matrix, character × taxon matrix), cladogram construction (apomorphy, recency of common ancestry, monophyly, parsimony analysis, unrooted trees, polytomy, reticulation, taxon selection and polymorphic characters, outgroup comparison, ancestral versus derived characters, consensus trees, long branch attraction, maximum likelihood, bayesian analysis, measures of homoplasy, cladogram robustness) and cladogram analysis (phylogenetic classification, character evolution, biogeography and ecology, ontogeny and heterochrony). **Molecular data for phylogenetic analysis and identification:** Acquisition of molecular data, DNA sequence data (Polymerase Chain Reaction, DNA sequencing reaction, types of DNA sequence Data (nuclear DNA), chloroplast and mitochondrial DNA), analysis of DNA sequence data; DNA barcoding; Restriction Site Analysis (RFLPs), allozymes, microsatellite DNA, Random Amplified Polymorphic DNA (RAPDS), Amplified Fragment Length Polymorphism (AFLPs). **Plant introgressions, polyploidy, evolution and crop domestication.**
6.	**Study tour and submission of field report:** The students have to take up a mandatory field/study tour for 9 days covering the topics in core courses spread across three semesters (I, II and III). **The study tour program will be as follows:**
	1. One major field trip of not less than 5 days to study the taxonomy of the flora existing at different agro climatic conditions as well as for making herbaria and digital Album. 2. The rest of the 4 days include one-day field/ study trips for studying the local flora in the marine, fresh water and hill environments and for preparing reports. After the tour taken up by students during the II semester, students are required to submit 5 herbaria, 25 digital photos with taxonomical and ecological information. In addition to this, Field/Study tour report is also to be submitted for evaluation.
S. No.	**Laboratory/Practical**

1.	Live plants/ Herbarium specimens of the following families will be provided in the class for description and identification (classification based on APG IV): Construction of floral diagrams, floral formula and Technical descriptions of the Species from the given families: 1. Ranunculaceae, 2. Lentibularaceae, 3. Balasaminaceae, 4. Magnoliaceae 5. Guttiferae (Clusiaceae) 6. Malvaceae 7. Fabaceae 8. Caesalpiniaceae 9. Mimosaceae 10. Lythraceae 11. Melastomaceae 12. Cucurbitaceae 13. Apiaceae 14. Rubiaceae 15. Compositae (Asteraceae) 16. Apocynaceae 17. Boraginaceae 18. Convolvulaceae 19. Scrophulariaceae 20. Acanthaceae 21. Lamiaceae 22. Euphorbiaceae 23. Orchidaceae, 24. Poaceae, 25. Cyperaceae 26. Araceae
2.	Preparation of dichotomous keys, Phylogenetic analyses using PAUP. Study of the local flora by two to three classes.

Text Books:

1. APG III, 2009. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. Botanical Journal of the Linnean Society 161: 105 –121.
2. Barry G. Hall, 2007. Phylogenetic Trees Made Easy: A How-To Manual, Third Edition.Sinauer Associates, Inc., Publishers, Sunderland, USA.
3. Benson,L.D. 1962. Plant Taxonomy: Methods and Principles. Ronald Press, New York.
4. Cronquist, A. 1981. An Integrated System of Classification of Flowering Plants. Columbia University Press, New York.
5. Cracknell AP, Hayes L .2009. Introduction to Remote Sensing. CRC Press, Boca Raton, USA (Special Indian Edition).
6. Crawford DJ .2003. Plant Molecular Systematics. Cambridge University Press, Cambridge, UK.
7. Cronquist A .1981. An integrated system of classification of flowering plants. Columbia University Press, New York.
8. Davis, P.H. and V.M. Heywood. 1963. Principles of Angiosperm Taxonomy. Oliver and Boyd, Edinburgh.
9. Douglas E. Soltis, Pamela E. Soltis, Peter K. Endress, and Mark W. Chase, 2005. Phylogeny and Evolution of Angiosperms. Sinauer Associates, Inc., Publishers, Sunderland, USA.
10. Hollingsworth PM, Bateman RM and Gornall RJ (1999). Molecular systematics and Plant Evolution. Taylor and Francis, London.
11. Jones, S.B. and A.E. Luchsinger. 1987. Plant Systematics (2nd Ed.) McGrawHill Book Company. New York.

12. Judd WS, Campbell CS, Kellogg EA, Stevens PA and Donoghue MJ (2002) Plant Systematics: A Phylogenetic Approach. Sinauer Associaes, Inc., Massachusetts.
13. Lawrence, G.H.M. 1951. Taxonomy of Vascular. Plants. Oxford and IBH Publishing Co.
14. Michael George Simpson, 2006. Plant systematics. Elsevier Academic Press.
15. Quicke, D.L.J. 1993. Principles and Techniques of Contemporary Taxonomy. Blackie Academic and Professional (An imprint of Chapman & Hall.).
16. Radford, A.E., W.C. Dickinson, J.R. Massey and C.R. Bell. 1974. Vascular Plant Systematics, Harper and Row, New York.
17. Salemi, M. and A.-M. Vandamme (Eds.) 2003.The Phylogenetic Handbook. A Practical Approach to DNA and Protein Phylogeny. Cambridge University Press.
18. Sivarajan, V.V. 1991 (2nd ed.). Introduction to the Principles of Plant Taxonomy (Ed. N S K Robson). Oxford and IBH publishing Co. Pvt. Ltd.
19. Stuessy, Tod F., 2009. Plant taxonomy : the systematic evaluation of comparative data (2nd ed.). New York : Columbia University Press.