BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024

M.Phil. Classical and Molecular Taxonomy and Systematics [FT / PT] Programme

(For the candidates to be admitted from the academic year 2009-2010 onwards)

Semester I	Title of the Course	Marks			Credits
		IA	UE	Total	
Course -I	Research Methodology	40	60	100	4
Course - II	Classical Taxonomy & Molecular Systematics	40	60	100	4
Course- III	Paper on Topic of Research (Guide will prepare the syllabus and it will be sent to the COE)	40	60	100	4
Course – IV	Teaching and Learning skills (Common Paper)	40	60	100	4
Semester II					
	Dissertation and Viva-Voce Viva Voce 50 marks Dissertation 150 marks			200	8

For each Course other than the Dissertation

Continuous Internal Assessment	– 40 Marks
End Semester Examination	– 60 Marks
Total	– 100 Marks

Question paper pattern for Course I - III

10 questions compulsory	10 x 01 = 10 Marks (2 from each unit)
5 questions	05 x 04 = 20 Marks (either or type, one from each unit)
3 questions from 5	03 x 10 = 30 Marks (one question from each unit)
Total	60 Marks

Question paper pattern for Course IV

5 Questions 05 x 12 = 60 Marks (either or type, one from each unit)

CIA components

Tests	(2x10) -	20 Marks
Term Paper	–	10 Marks
Seminar	-	10 Marks

SEMESTER I - COURSE I - RESEARCH METHODOLOGY

Objectives

To initiate the students into research activities and to learn to handle various instruments, their principles and applications.

Unit – I

Buffers: Characteristics and preparation.
pH meter – principles, measurement of pH, pKa.
Electrometric determination, glass and reference electrodes.
Gas-measuring electrodes – basic principles, applications of Clark electrode.
Centrifuges – principles, types and operation.
Microscopy – Electron Microscopy (tem, sem) Fluorescence Microscopy

Unit – II

Chromatography- basic principles – Detailed study of HPLC, principles of Ion exchange; molecular sieve, and affinity chromatography and TLC.
Electrophoresis – basic principles – its types, electrophoretic mobility and factors influencing electrophoretic mobility; Isoelectric focusing, applications, PAGE

Unit – III

Tracer techniques – nature of radioactivity, patterns of decay, half life – detection of radiation and measurements by GM Counter, Scintillation counter, autoradiography and applications of Isotopes. Application in Biology – principles, instrumentation – calorimetry, Spectrophotometer, UV/Vis, Flame photometer, Atomic absorption spectrophotometer, NMR and ESR

Unit - IV

Measures of Central Values and Dispersion – Probability; Binomial, Poisson and Normal – Correlation and Regression for simple and linear data – Testing of significance – large sample test, t test and chi-square test. Analysis of variance; One and Two way ANOVA.

Unit – V

Research – types, objective an approaches. Sample –types: Sampling Techniques.
Hypothesis; Definition, characteristics, types, significance. Literature collection web browsing. Writing review of Literature and Journal articles, impact factor and citation index, Structure of thesis Manuscript for publication and proof correction.

References

1. Kothari,C.R. : Research Methodology – Methods & Techniques, Wishwa Prakashan
2. Gupta, S.P : Statistical Methods, Sultan Chand & Sons.
3. Hillis DM *et al*. : Molecular Systematics of Plants
4. Anon : CBE Style Manual (A guide for authors; editors and publishers in biological Science)
5. Freifelder Molecular Biology

6. Reddi, O.S : Recombinant DNA Technology, A Laboratory Manual

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COURSE – II :
CLASSICAL TAXONOMY AND MOLECULAR SYSTEMATICS

Unit-I

The scope of Taxonomy – concept of predicitivity; general and special purpose classifications, alpha and major systems of classification; The development of plant taxonomy – ancient classifications, post-Linnaean, phylogenetic and modern phenetic systems - History of Indian taxonomic botany.

Taxonomic hierarchy, plant nomenclature – basis, rules and typification. taxonomic keys; - natural, artificial, phylogenetic, general and special purpose. Classification systems ICBN and Basic rules: specimen preparation and herbarium management.

Unit-II

Concept of characters. Role of morphology, comparative plant anatomy, embryology, karyology, palynology and paleobotany, ecology and physiology and biochemistry in taxonomy. serotaxonomy, phytogeography, Concept of species and speciation.

Unit-III

Taxonomic literature, Floras and Monographs- their need and methodology, Floristics of Tamil Nadu BSI and its role

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Taxonomic data bases – Need for such databases – Taxonomic Databases working Group- The Tree of life – Tree base – Database on Phylogenetic knowledge – Taxonomic information systems- Database at the Royal Botanical Garden – on line herbaria – ETI database – Taxonomic softwares: Linnaeus, Darwin , Species 2000, ILDIS (Legumeline), SA 2000 – other databases on Biodiversity.

Unit –IV

Molecular Systematics: Context and controversies; Methods of estimating genetic diversity – isozymes, RFLP, RAPD and its modifications. Applications of molecular systematics. Generation and Types of molecular data, analysis of molecular data – alignment of sequences, homoplasy, phylogeny reconstruction, gene trees and species trees; - chloroplast and mitochondria DNA and their role in systematics, Role of RNA in Systematics.

Unit- V

Digital Taxonomy – Principles of computer-aided taxonomy – data retrieval systems – Phenetic taxonomy: objectives and hypothesis – selection of operational taxonomic units, character clans and character stage, degree of overall similarity and distimularity, cluster analysis.

*Cladistic taxonomy***:** Use of morphological, phytochemical and molecular data in cladistics. molecular systematics and phylogeny. Softwares and their use in construction of dendrograms and cladistic analysis.

References

Harborne, J.B. & Turner, B.L. 1984, Plant Chemosystematics, Academic Press, London.

Heywood, V.K. & Moore, D.M., 1984, Current Concepts in Plant Taxonomy, Academic Press, London.

Davis, P.H. & Heywood,V.M. 1963, Principles of Angiosperm Taxonomy, Oliver& Boyd, Edinburgh and London.

Lawrence, G.H.M., 1955, The taxonomy of Vascular Plants, Central Book Dept., MacMillan, New York.

Michael,G. Simpson. Plant Systematics. 2006. Elsevier Academic Press, Burlington, MA.
Gurcharan Singh, Plant Systematics, (2 ed.), 2004. Oxford & IBH Publishing Co, Pvt. Ltd., New Delhi.

Hillis, D.M., Mortiz,C. & Mable, B.K. (eds.) 1996, Molecular Systematics, Sinaver Associates, Sunderland, USA.

Harborne, J.B. & Turner, B.L. 1984, Plant Chemosystematics, Academic Press, London.

Krishnamurthy, K.V. 2003. An Advanced Text Book on Biodiversity. Oxford & IBH, New Delhi.

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COURSE –IV – TEACHING AND LEARNING SKILLS

Objectives:

- acquaint different parts of computer system and their functions
- understand the operations and use of computers and common Accessories
- develop skills of ICT and apply them in teaching learning context and Research
- appreciate the role of ICT in teaching, learning and Research
- acquire the knowledge of communication skill with special reference to its elements, types, development and styles
- understand the terms communication Technology and Computer mediated teaching and develop multimedia / e-content in their respective subject
- understand the communication process through the web
- acquire the knowledge of Instructional Technology and its Applications
- develop different teaching skills for putting the content across to targeted audience

Unit I – Computer Application Skills

Computer system: Characteristics, Parts and their functions – Different generations of Computer – Operation of Computer: switching on / off / restart, Mouse control, Use of key board and some functions of key – Information and Communication Technology (ICT): Definition, Meaning, Features, Trends – Integration of ICT in teaching and learning – ICT applications: Using word processors, spread sheets, Power point slides in the classroom – ICT for Research: On-line journals, e-books, Courseware, Tutorials, Technical reports, Theses and Dissertations

Unit II – Communication Skills

Communication: Definitions – Elements of Communication: Sender, Message, Channel, Receiver, Feedback and Noise – Types of Communication: Spoken and written; Non-verbal communication –

Intrapersonal, Interpersonal, Group and Mass communication – Barriers to communication: Mechanical, Physical, Linguistic & Cultural – Skills of communication: Listening, Speaking, Reading and writing – Methods of developing fluency in oral and written communication – style, Diction and Vocabulary – Classroom communication and dynamics

Unit III – Communication Technology

Communication Technology: Bases, Trends and Developments – Skills of using Communication Technology – Computer Mediated Teaching: Multimedia, E-content – Satellite-based communication: EDUSAT and ETV channels, Communication through web: Audio and Video applications on the Internet, interpersonal communication through the web.

Unit IV – Pedagogy

Instructional Technology: Definition, Objectives and Types – Difference between Teaching and Instruction – Lecture Technique: Steps, Planning of a Lecture, Delivery of a lecture – Narration in tune with the nature of different disciplines – Lecture with power point presentation – Versatility of lecture technique – Demonstration, Characteristics, Principles, Planning Implementation and Evaluation – Teaching – Learning Techniques: Team Teaching, Group discussion, Seminar, Workshop, Symposium and Panel Discussion – Models of teaching: CAI, CMI and WBI

Unit V – Teaching Skills

Teaching skill: Definition, Meaning and Nature – Types of Teaching skills: Skill of Set Induction, Skill of Stimulus Variation, Skill of Explaining, Skill of Probing Questions, Skill of Black Board writing and Skill of Closure – Integration of Teaching Skills – Evaluation of Teaching Skills

References:

1. Bela Rani Sharma (2007), Curriculum Reforms and Teaching Methods, Sarup and sons, New Delhi

2. Don Skinner (2005), Teacher Training, Edinburgh University Press Ltd., Edinburgh
3. Information and Communication Technology in Education: A Curriculum for Schools and programme of Teacher development, Jonathan Anderson and Tom Van Weart, UNESCO, 2002
4. Kumar K.I (2008) Educational Technology, New Age International Publishers, New Delhi
5. Mangal, S.K. (2002) Essential of Teaching – Learning and Information Technology, Tandon Publications, Ludhiana
6. Michael D. and William (2000), Integrating Technology into Teaching and Learning: Concepts and Applications, Prentice Hall, New York
7. Pandey S.K. (2005) Teaching Communication, Commonwealth Publishers, New Delhi
8. Ram Babu A. and Dandapani S (2006) Microteaching (Vol.1&2) Neelakamal Publications, Hyderabad
9. Singh V.K. and Sudarshan K.N. (1996) Computer Education, Discovery Publishing Company, New York
10. Sharma R. A. (2006) Fundamentals of Educational Technology, Surya Publications, Meerut
11. Vanaja. M. and Rajasekar S. (2006) Computer Education, Neelkamal Publications, Hyderabad.

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