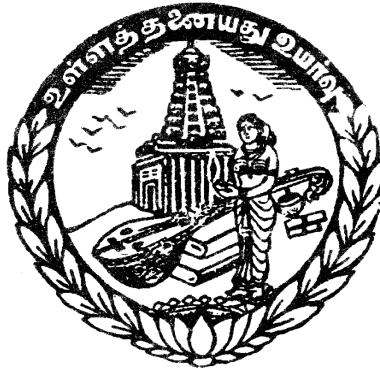


**KUNTHAVAI NAACHIYAR GOVERNMENT ARTS COLLEGE  
FOR WOMEN (Autonomous)**

**THANJAVUR – 613 007**



***PG & RESEARCH DEPARTMENT OF BOTANY***

***M. Phil., BOTANY SYLLABUS***

**2009 – 2010 onwards**

## M.Phil. BOTANY [FT/PT] Programme

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

### COURSE STRUCTURE

Semester I	Title of the course	Marks			Credits
		IA	CE	Total	
Course - I	Research Methodology	40	60	100	4
Course - II	Advances in Plant Science	40	60	100	4
Course - III	Applied Botany	40	60	100	4
Course - IV	Teaching and Learning Techniques (Common Paper)	40	60	100	4
<b>Semester II</b>	Dissertation and Viva-Voce Viva Voce 50 marks Dissertation 150 marks			200	8

#### For each Course other than the Dissertation

Continuous Internal Assessment (CIA)	- 40 Marks
End Semester Examination (ESE)	- 60 Marks
Total	- 100 Marks

#### Question paper pattern

Maximum Marks	: 60
5 Questions either or pattern	: 5x12 =60 marks (compulsory taken one either or question from each unit)
Time	: 3 Hrs

#### CIA components

Model Exam	- 10 Marks
Term Paper	- 15 Marks
Seminar	- 10 Marks
Assignment	- 5 Marks
Total	- 40 Marks

**Kunthavai Naachiyar Govt. Arts College for Women (Autonomous)**

**Thanjavur – 613 007**

**Degree of Master of Philosophy**

**M.Phil. Botany Programme**

**Course Structure from 2009-2010 onwards**

<b>Semester</b>	<b>Subject Code</b>	<b>Course</b>	<b>Title</b>	<b>No. of Hours</b>	<b>Credit</b>	<b>Internal + External</b>	<b>Total Marks</b>	
<b>I Semester</b>	M3K1BT1	Course I	Research Methodology	4*	4	40 +60	100	
	M3K1BT2	Course II	Advances in Plant Science	4*	4	40 +60	100	
	M3K1BT3	Course III	Applied Botany	4*	4	40 +60	100	
	M3K1BT4	Course IV	Teaching & Learning Techniques	4*	4	40 +60	100	
	* Includes one hour library				16	16	160+240	400
	<b>Total</b>							
<b>II Semester</b>				-	8	50 + 150	200	
<b>Total</b>					<b>24</b>	<b>210 + 390</b>	<b>600</b>	

## CORE COURSE I – RESEARCH METHODOLOGY

### UNIT-I:

**Microscopy:** Principle and preparation of material for Transmission Electron Microscope (TEM) and Scanning Electron Microscope (SEM), LCD preparation. Photomicrography - Developing and printing of micrographs.

### UNIT-II:

**Spectroscopy:** Infrared, UV visible and Fluorescence Spectrophotometers. Radiation sources - Monochromators, Atomic absorption, Molecular absorption – Emission of radiation. Flame Emission Photometry, Plasma Emission Spectroscopy, Atomic Absorption, Spectrophotometry.

### UNIT-III:

**Separation: Principles of separation techniques:** Centrifuge-Principles, types - Radioactivity counters (GM and Scintillation counters) High Performance Liquid Chromatography (HPLC), Ion - Exchange Chromatography, Gel Permeation Chromatography, Nuclear Magnetic Resonance(NMR).

### UNIT-IV:

**Molecular biological techniques:** Isolation and amplification of nucleic acid – Separation and staining of DNA, Quantification of DNA, chromosomal DNA isolation, Plasmid isolation. Principle, Separation of proteins through electrophoresis, Immunoelectrophoresis. Polymerase Chain Reaction (PCR). Nucleic acid transfer by blotting - Southern, Northern and Western blotting.

### UNIT-V:

**Research Publication:** Preparation of manuscripts – full papers, short communications – review papers – thesis writing – bibliography – index card and its maintenance. Internet and applications: Web Browsing and searching – Electronic biological databases – Biological abstracts and Current contents.

## REFERENCE BOOKS

Anbalagan, K. Electrophoresis – A Practical Approach. Life Science Book House, Madurai. Heftmann, E. Chromatography. Van Nostrand Reinhold Co.

Holme, D.J. and Hazel Peck. 1993. Analytical Biochemistry. Hohn Widely & Sons Inc., New Delhi.

Plummer, D.T. An Introduction to Practical Biochemistry. Tata Mc Graw-Hill Publishing Company Limited, New Delhi.

Sadasivam, S. and A. Manikam. Biochemical Methods. Wiley Eastern Ltd.,

Sakharam Rao, J. 1978. Biological Tools and Instrumental Techniques (A Laboratory Manual).

Sharma, V.K. Technique in Microscopy and Cell Biology. Tata Mc Graw-Hill Publishing Company Ltd., New Delhi.

Wilson, K. and John Walker. Principles and techniques of Practical Biochemistry. Cambridge University Press.

Holme, D.J. and Hazel Peck. Analytical Biochemistry

## **CORE COURSE II – ADVANCES IN PLANT SCIENCE**

### **UNIT-I**

#### **REMOTE SENSING**

Principle and components- Application and limitation- Remote sensing in agricultural and afforestation programmes. Resource management. Pollution monitoring- Water, Air, Ocean. Environmental Degradation-Desertification-Industry-Mining. Ground water- Damage Assessment.

### **UNIT-II**

#### **BIOREMEDIATION**

Principles and application of bioremediation – Bioremediation and environmental health disorders-metabolic pathway for the degradation of xenobiotics. Bioremediation of surface soils. Microbial activity in soil and water. Mineral soil.-Principle, methods and application of soil reclamation- Biodegradation of carbonates-Biomobilization of silicon, phosphate, nitrogen.

### **UNIT-III**

#### **TOXICOLOGY**

Toxicology-Basic principles-types, source and mode of action of toxins-toxicants-toxicity, acute, sub acute. Chronic-dose effect. Dose response, safe limits-pesticides-sources and mode of action-their biomagnifications-residual effects.

### **UNIT-IV**

#### **BIOINFORMATICS**

Computer concepts- MS office-Computer applications in Biology-Bio informatics and its applications- Web browsing and searching. Basic knowledge of photoshop.

Electronic biological databases-Biological abstracts, Medicines, Current contents etc., Genetic computers group Data bases: Primary nucleic acid data bases- EMBL-Gene bank and DDBJ Structure of gene bank entries. Protein sequence data bases- Primary data bases PIR, MIPS,SWISS.Secondary data bases- Pro site FASTA and BLAST

### **UNIT-V**

#### **NANOTECHNOLOGY**

Bionanotechnology – Nanoparticles – Nanowires - Biosensors, Nanotechnology in drug delivery. Bionano information fusion.

## REFERENCE BOOKS

Estes J.E., and Senger, L.W. Remote sensing Techniques for Environmental Analysis

Muralikrishna I.V. 1995 .Remote sensing and GIS for Environmental Planning

Danson. F.M. and Plummer, S.E.(1995) Advance in Environmental Remote Sensing

Baker, K.H. and Herson, D.S., (1994) Bioremediation, Mc Graw-Hill inc.

Leisinger.T.Cook. Microbial Degradation of Xenobiotics and Recalcitrant Compounds

Schuurmann, G. Market, G., (1998), Toxicology, A. John Wiley & Sons, Inc. and Spektrum Akademischer Verlag Co-Publication.

Cutter, S.L. (1994), Environmental Risks and Hazards. prentice – Hall of India, New Delhi.

Agarwal, K.M., Sikdar, P.K. and Deb.S.C. (2002), A text book of Environmental Lynn E. Foster 2007. Nanotechnology. Dorling Kindersly (India) Pvt. Ltd.

## **CORE COURSE III – APPLIED BOTANY**

### **UNIT – I**

#### **PLANT TAXONOMY:**

Plant taxonomy- Operative system, Principle, Species concept, Biodiversity- Definition, classification, collection of Data, Endemism, Exsitu and Insitu conservation.

B.S.I., N.B.R.I., Tropical Botanic Gardens (TBG) – Trivandraum.

Intellectual Property Rights.

### **UNIT – II**

#### **HERBAL TECHNOLOGY:**

Medicinal plants – Collection, Identification and storage - mineral and phytochemical constituents – qualitative studies – therapeutic proportion organic cultivation of herbs – mass multiplication of medium, quality improvement of medicinal plants.

### **UNIT – III**

#### **MICROBIOLOGY:**

Microbial diversity – Microbial genetics – Microbial metabolism - Application aspects – Aeromicrobiology – Water microbiology – Genomics and Proteomics. Organic composting – Vermicomposting – Biodegradation – Microbial herbicides – Microbial production of organic acids (Vinegar, Lactic acid & citric acid). Vitamins – Vitamin B12, Riboflavin B2.

### **UNIT – IV**

#### **TISSUE CULTURE:**

Explant preparation, Sterilization, Media preparation, various types of media, Micropropagation, Callus induction. Cell culture, Cell suspension culture, Isolation of protoplasts, Protoplast culture, Protoplast fusion, Embryo culture and Somatic embryogenesis.

### **UNIT – V**

#### **BIOMETRY:**

Sampling and sampling theory. Types of sampling – RBD, CRD. Frequency distribution – Central tendency, mean, mode, median. Measurement of Dispersion – Deviation, Degree of freedom, confidence limit, standard error. Test for significance – ‘t’ test, one way and two way analysis of variance. Correlation – Types, methods of studying correlation. Co-efficient of determination and non-determination, partial correlation.



## REFERENCE BOOKS

- Anbalagan, K. Electrophoresis – a practical approach. Life Science Book House, Madurai.
- Aneja, K.R. Experiments in Microbiology, Plant Pathology and Tissue Culture. Wiley Eastern Ltd., Madras.
- Dodds, J.H. and Roberts, L.W. Experiments in Plant Tissue Culture, Cambridge University Press.
- Dwivedi, J.N. and Singh, R.B. Essential of Plant Techniques. Scientific Publishers, Jodhpur.
- Gasque, C.E. A Manual of Laboratory Experiences in cell Biology. Universal Book Stall, New Delhi.
- Gupta, P.K. Elements of Biotechnology. Rastogi and Company, Meerut.
- Heftmann, E. Chromatography, Van Nostrand Reinhold Co.
- Holme, D.J. and Hazel Peck. Analytical Biochemistry.

## **COURSE IV – TEACHING AND LEARNING TECHNIQUES**

### **UNIT-I:**

#### **HIGHER EDUCATION:**

Historical Perspective – The objective of higher education. Role of higher education – Social focus – Curricular focus – Administrative focus – Need for Technology. Methodology – Learning and Teaching.

### **UNIT-II :**

#### **REMEDIAL TEACHING:**

Remedial teaching-diagnosis – Principles of Diagnosis – Steps in Diagnosis-Reading-Remedial Education in Reading-Causes of Reading Disability-Reading Programmes-Development of reading Programme-Corrective Instruction-Remedial Instruction - Remedial Teaching for Academic Low Achievers.

### **UNIT-III:**

#### **COMMUNICATION SKILLS-VERBAL:**

Communication: Definitions-Elements of Communication: Sender, Message, Channel, Receiver, Feedback and Noise-Types of communication: Spoken and Written.

### **UNIT-IV:**

#### **COMMUNICATION SKILLS – NON-VERBAL:**

Communication - Intrapersonal, Interpersonal, Group and Mass Communication. 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-V:**

#### **TEACHING SKILLS:**

Teaching Skill: Definition, Meaning and Nature-Types of Teaching skills: 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 Teaching Skills.

### **REFERENCE BOOKS**

E.G.Vedanayagam. Teaching Technology for College Teachers. Sterling Publishers Private Limited,.

Kumar, K.L (2002) Educational Technology, New Age International Publishers, New Delhi.

Pandey, S.K (2005) Teaching Communication, commonwealth Publishers, New Delhi.

Singh, V.K and Sudarshan, K.N (1996), Computer Education, Discovery Publishing Company, New York.

Vanaja, M and Rajasekar, S (2006), Computer Education, Neelkamal Publications, Hyderabad.