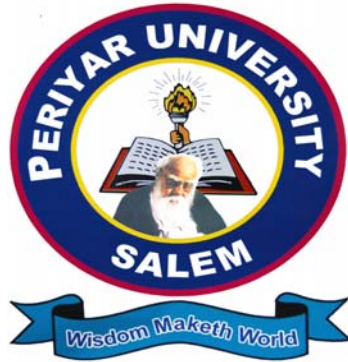


**PERIYAR UNIVERSITY
PERIYAR PALKALAI NAGAR
SALEM – 636 011**



**DEGREE OF MASTER OF PHILOSOPHY
CHOICE BASED CREDIT SYSTEM
SYLLABUS FOR M.PHIL. BOTANY
FOR THE STUDENTS ADMITTED FROM THE
ACADEMIC YEAR 2012 – 2013 ONWARDS**

COURSE STRUCTURE

SEM	CODE	Course title	Hrs.	Marks		Total
				IA	EA	
I	Core course -I	Research methodology	6	25	75	100
	Core course -II	Advances in Botany	6	25	75	100
	Core course -III	Papers On Topic of Research (Guide will prepare the syllabus and it will send be sent to the COE)		25	75	100
	Core course -IV	Dissertation and Viva voce	Dissertation -150 marks Viva voce -50marks Total - 200 marks			

CIA COMPONENTS

Test - 15Marks

Seminar – 10 marks

SEMESTER I
CORE COURSE I - RESEARCH METHODOLOGY

Unit I - Centrifugation and microscopy

Centrifugation: Principle and Types of centrifuges. Ultracentrifugation, density gradient centrifugation and continuous centrifugation.

Microscopy - Differential interference contrast (DIC), polarization, fluorescent Microscopy, dark field and phase contrast microscopy. Electron microscope- SEM and TEM. Atomic Force Microscopy.

Unit II - Spectrometry, Electrophoresis and Separation techniques

Spectrophotometer - Principle - Beer Lambert's Law. UV, IR, FTIR, Atomic Absorption Spectroscopy, CD, Stop Flow, Mass, MALDI-TOF and NMR.

Electrophoresis: Principle of Gel electrophoresis, Polyacrylamide gel electrophoresis (PAGE & SDS PAGE) and Agarose gel electrophoresis, comet assay and capillary electrophoresis. Two dimensional electrophoresis and isoelectrofocussing.

Chromatography: Principle, Procedures and Application of TLC, PC, Gel Filtration and Ion exchange, Affinity Chromatography, GC, GLC, HPLC/FPLC and HPTLC.

Unit III - Molecular biological techniques

Molecular biological techniques: Isolation and amplification of nucleic acid- Genome DNA (*E.coli*), Plasmid DNA, total RNA, Polymerase chain reaction - Types and its application.

Gene cloning techniques: Phosphatase treatment of cloning vectors, use of adapters and linkers in cloning-screening of recombinants-labeling of nucleic acids by radioactive methods plaque and colony hybridization-southern blotting and western blot-Northern blot-DNA finger printing and Microarray.

Unit IV - Biostatistics

Biostatistics: Collection and Presentation of Experimental data - Measures of Central Tendency: Arithmetic Mean, Median, Mode, Position of averages, Geometric Mean, Harmonic mean and percentile - Measures of Dispersion: Range, Inter quartile range, variance, standard deviation and standard error.

Correlation and Regression: Correlation coefficient - Types of correlation - Regression- Simple and Linear regression - Biological significance of correlation and regression - Tests of significance: Basis of statistical inference - Student's 't' test for mean, difference

of means and test for correlation and regression coefficients – Chi-square test – Analysis of variance and DMRT. 3

Unit V- Data collection, analysis and Research publications

Data collection and analysis-Web browsing and searching - Electronic biological data bases – NCBI, Pub Med, Sequence and Structure data bases. Research publications, Preparation of manuscripts-full paper, short communications and LCD preparations. Review paper, Thesis writing, Bibliography, Index card and Proof reading.

References:

1. Batschelet, E. (1991). Introduction to Mathematics for Life Scientists. Springer International Student Edn., Narosa Publishing House, New Delhi.
2. Becker, J.M., Caldwell, G.A. and Zachgo, E.A. (1996). Biotechnology: A Laboratory Course, 2nd Edn. Academic Press, Inc., San Diego, California.
3. Cannel, J.P. (1998). Natural Products Isolation. Humana Press, New Jersey, USA.
4. Chirikjian, J.G. 1995. Biotechnology: Theory and Techniques Vol. I. Plant Biotechnology, Animal Cell Culture, Immunobiotechnology. Jones and Bartlett Publishers, London, England.
5. Cynthia Gibas and Per Jambek. (2001). Developing Bioinformatics computer skills, Shroff Pub., Mumbai.
6. Forthofer, L. (1995). Introduction to Biostatistics, Academic Press, New York.
7. Gupta, S.C. and Kapoor, V.K. (2002) Fundamentals of Mathematical Statistics, (11th Edn.). Sultan Chand & Sons, New Delhi.
8. Harborne, J.B. (1998). Phytochemical Methods. Chapman & Hall, London.
9. Jordan, D.W. and Smith, P. 2002. Mathematical Techniques. Oxford University Press, New Delhi.
10. Primrose, *et al.* (2005). Principles of gene manipulation. Black Well Science, London.
11. Sambrook and Russel. (2001). Molecular cloning-A laboratory manual. Cold Spring Laboratory Press, New York.
12. Wilson K, Walker, J. (1994). Principle and techniques of practical biochemistry, 4th Ed) Cambridge university press , Cambridge

SEMSTER I

CORE COURSE – II ADVANCES IN BOTANY

Unit-I. Plant Biodiversity

Concepts, principles and scope. *In situ* conservation: Sanctuaries, National parks, Biosphere reserves, Mangroves – *Ex situ* conservation: Botanical gardens, Gene banks, Seed Banks, Cryobanks – Activities of IUCN, NBPGR – Applications of molecular markers in Biodiversity. Plant biodiversity databases

Unit-II. Plant Cell and Molecular Biology

Structural organization of the plant cell – Fundamental aspects of cell organelles – Organization of plastid and mitochondrial genomes. Techniques in cell biology – Replication in prokaryotes and eukaryotes , Central dogma of Molecular biology – transposons -retro transposon - Mutation – types ,biochemical basis . *in situ* hybridization for location of transcripts in cell types – FISH, GISH.

Unit-III. Plant Physiology and Biochemistry

Membrane Transport Proteins – Signal transduction – Light harvesting complexes – CO₂ sequestration – overview of respiratory cycles – Synthesis of membrane lipids – Phytochemical and biochemical properties of cryptochromes – Physiological role of brassinosteroids – Polyamines – Genetic and molecular analysis of photoperiodism – Molecular aspects of stress physiology.

Unit-IV Plant Biotechnology

Genetic engineering of plants – Genetic and physical mapping of genes, Functioning of genomics– Protein profiling and its significance., Genome mapping .Tissue culture – organogenesis , embryogenesis , Role of tissue cultural in secondary metabolite production and technology. Intellectual property Rights – Forms of protection – copy right, trade mark, patent - Plant Breeders rights -

Unit-V Nanobiotechnology

Social background of technological revolution –Nano technology and its types, magnitude of size, shape and phase of molecules – top down and bottom up approaches - delivery systems (Liposome nanocontainers for drug and gene delivery) –

Fluorocarbons for drug delivery- Bionanomachines – protease nanolithography (quantum dots) – microparticles, Nanorobots..

Reference books

1. Kleinsmith, L.J. and Kish, V.M. (1995) Principles of cell and molecular biology, 2nd Edition, Harper Collins College Publishers, New York, USA.
2. Lewin, B. (2007). Genes IX. Oxford University Press, New York.
3. Alberts, B., Lewis, J., Raff, M., Roberts, K. and Watson, J.D. (1999.) Molecular Biology of the Cell. Garland Publishing, Inc., New York.
4. Buchanan, B.B., Ruissem, W. and Jones, R.L. (2000). Biochemistry and Molecular Biology of Plants. American Society of Plant Physiologists, Maryland, USA.
5. Moore, T.C. (1989). Biochemistry and Physiology of Plant Hormones. Springer Verlag, New York, USA.
6. Stryer, L., (1988). Biochemistry, WH Freeman & Co., NY.
7. Falk, D.A., Olwell, M. and Millan, C. 1996. Restoring Diversity. Island Press, Columbia, USA.
8. Kothari, A. 1997. Understanding Biodiversity: Life Sustainability and Equity. Orient Longman.
9. Plucknett, D.L., Smith, N.J.H., William, J.T. and Murti Annishetty, N. 1987. Gene banks and Worlds food. Princeton University Press, Princeton, New Jersey, USA.
10. George, E.F. 1993. Plant Propagation by Tissue Culture, Part I and II. Exegetics Ltd. Edington, U.K.
11. Glick, B.R. and Thompson, J.E. 1993. Methods in Plant Molecular Biology and Biotechnology, CRC Press, Boca Raton, Florida.
12. Ignacimuthu, S.J.(2003). Plant Biotechnology. Oxford & IBH Publishing, New Delhi
13. Salisbury, F, B and Ross, C.W (1986). Plant Physiology. Third edition, CBS Publishers and Distributors, New Delhi

MODEL QUESTION PAPER

M.Phil., BOTANY DEGREE EXAMINATION

(For Students Admitted from the academic year 2012 – 2013)

CORE COURSE I - RESEARCH METHODOLOGY

Time: 3Hrs.

Max. Marks: 75

Part A

5 x 5 = 25

Answer all questions; all questions carry equal marks, (either a or b) Draw diagrams wherever necessary, each answer should not exceed 300 words.

1. a) Write a short notes on Principle of centrifugation
Or
b) Explain the working mechanisms of phase contrast microscope
2. a) discuss NMR Spectroscopy
Or
b) Write the application of TLC
3. a) define Plasmid DNA and explain its structure and function
Or
b) Explain DNA finger printing
4. a) write significance of percentile calculation
Or
b) Discuss about the application of measures of dispersion in biological research
5. a) Write notes on NCBI and PubMed
Or
b) "Editing is essential for manuscript preparation "-Justify

Part B

5 x 10 = 50

All questions carry equal marks, (either a or b) Draw diagrams wherever necessary, each answer should not exceed 1000 words.

6. a) Explain in detail different types of centrifuge and their application
Or
b) Give detail account on SEM
7. a) Discuss the principle and mechanism of Spectrophotometer
Or

- b) Explain two dimensional Electrophoresis and write its application
8. a) Describe PCR and its working procedure
Or
b) Explain techniques of Western blotting and its application
9. a) A cross involving different gene gave rise to F₂ generation of tall and dwarf in the ratio of 110:90 by means of chi -square test prove whether this value is deviating from 3:1 ratio (Table value =3.841 and level of significance 5%)
Or
b) Explain relationship between coefficient of correlation and regression with example
10. a) write in detail various method of literature collection
Or
b) Explain the procedure for preparation of manuscript

MODEL QUESTION PAPER

M.Phil., BOTANY DEGREE EXAMINATION

(For Students Admitted from the academic year 2012 – 2013)

CORE COURSE II- ADVANCES IN BOTANY

Time: 3Hrs.

Max. Marks: 75

Part A

5 x 5 = 25

Answer all questions; all questions carry equal marks, (either a or b) Draw diagrams wherever necessary, each answer should not exceed 300 words

1. a) Write a short notes on Biosphere reserves
Or
b) Discuss the activities of NBPGR
2. a) Describe organization of Mitochondrial Genome
Or
b) Give a short account on FISH
3. a) Write a short notes on signal transduction
Or
b) Briefly write about polyamines and its application
4. a) Write about plant breeder rights
Or
b) Discuss the advantages of genetically engineered plants
5. a) Define magnitude of Nanobiotechnology
Or
b) Give notes on nanorobots

Part B

10 x 5 = 50

Answer all questions; all questions carry equal marks, (either a or b) Draw diagrams wherever necessary, each answer should not exceed 1000 words

6. a) Explain the *Ex situ* conservation with suitable example
Or
b) Discuss the various molecular markers and write its application

7. a) Discuss the techniques adopted in cell biology
Or
b) Explain the Plasmid replication
8. a) Discuss the adaptive mechanisms in *Arabidopsis thaliana* to varying day length
Or
b) Write an essay on light harvesting complex
9. a) sketch out scheme for genetic engineering in plants
Or
b) Explain the role of tissue culture in secondary metabolites production
10. a) Describe the technique of Liposome mediated Drug delivery
Or
b) Discuss - nanomedicines are BOON or BANE

MODEL QUESTION PAPER

M.Phil., BOTANY DEGREE EXAMINATION

(For Students Admitted from the academic year 2012 – 2013)

CORE COURSE III – PAPERS ON TOPIC OF RESEARCH

PART A

5 questions 05X05=25 marks (either or, one from each unit)

PART B

5 questions 5X10=50 Marks (either or, one from each unit)