

NGM COLLEGE (AUTONOMOUS), POLLACHI – 01.
M.Sc. BOTANY SYLLABUS
[CHOICE BASED CREDITS SYSTEM] [FOR 2015-2017BATCH & ONWARDS]
SCHEME OF EXAMINATION

Sem	Code	Subject title	Class hours /Week	Exam Hrs	Maximum marks			Credits
					Internal	External	Total	
III	15PBY309	Plant Systematics	5		25	75	100	5
III	15PBY310	Biochemistry	5		25	75	100	4
III	15PBY311	Research Methodology and Biostatistics	5		25	75	100	4
III	15PBY3E2	Elective -2 Genomics and Proteomics	5		25	75	100	5
III	15PBY312	Core Practical- III (Plant Systematics & elective -2)	5		40	60	100	4
III	15PBY313	Core Practical –IV (Biochemistry & Biostatistics)	5		40	60	100	4
IV	15PBY414	Plant Biotechnology	5		25	75	100	4
IV	15PBY4	Environmental monitoring & management	5		25	75	100	4
IV	15PBY4E3	Elective -3 Forest Botany	5		25	75	100	5
IV	15PBY415	Core Practical -V (for core papers & elective -3)	5		40	60	100	4
IV	15PBY4P1	Project Work and Viva-Voce	6		40	150	200	8
		Total					1200	51

SCHEME OF VALUATION

Papers	Creditss	Internal	External	Total
Core	4	25	75	100
Core practical	4	40	60	100
Elective	5	25	75	100
Non- major elective	2	25	75	100
Project work	8	0	100	200
viva-voce		50	50	

General question paper pattern

Max. Marks:100	Internal : 25	External : 75	
Section	Pattern	Mark	Total
Part A	One word question/multiple choice/ true/false (10 Questions)	10X1	10
Part B	Either (or) choice (5 Questions)	5X5	25
Part C	Either (or) choice (5 Questions)	5X8	40
Total :			75

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY309 Title : PLANT SYSTEMATICS		Semester: 3
Hrs/Week :	5	Credits: 5
Objectives	• To learn nomenclature systems and to identify the plants • To introduce modern trends in taxonomy • To know the economic uses of plants	

Unit	Content	Hrs
Unit I	A brief historical account of the classification of angiosperms upto the present day. Systems of classification: Detailed study of Bentham & Hooker, Engler & Prantl, Bessy, Hutchinson, Takhtajan, Cronquist – Merits and demerits - International code of Botanical Nomenclature - Typification, Principles of priority and their limitations, Effective and valid publication, citation, retention, choice and rejection of names.	13
Unit II	Vegetative, floral characters and economic importance of the following families: Polypetalae: Portulacaceae, Menispermaceae, Caryophyllaceae, Zygophyllaceae, Oxalidaceae, Polygalaceae, Tiliaceae, Aizoaceae, Lythraceae, Combretaceae.	13
Unit III	Vegetative, floral characters and economic importance of the following families: Gamopetalae: Oleaceae, Apocynaceae, Gentianaceae, Boraginaceae, Pedaliaceae, Bignoniaceae, Monochamydeae: Loranthaceae, Nyctaginaceae, Chenopodiaceae, Monocots: Commelinaceae, Aroideae, Cyperaceae.	13
Unit IV	Flora, Monograph, Keys, Botanical gardens – Source of taxonomic information, Anatomy, Embroyology, Palynology, Cytology and Ultra structure and phyto chemistry.	13
Unit V	Biosystematics- its aim and scope – Biosystematic categories – phenotypic plasticity – Turrreson's work – population concept– species and genus concepts – Genecology – ecological differentiation – numerical taxonomy.	13

TEXT BOOKS

1. A classification of flowering plants Vol. I & II Rendle A.R. Cambridge University press.
2. Taxonomy of vascular plants. Lawerance.H.M. Mac Millan & Co.
3. Principles of Numerical Taxonomy. Sokal, S.R and Sneath P.H, N.H Fremen& co.

REFERENCE BOOKS

4. New concepts in flowering plants taxonomy. Heslop. J. Herrison.
5. Plant Taxonomy – Hey wood, V.H. English hand book society
6. Principles and methods of Plant Biosystematics-solbrig. The Mac Millian Company.
7. An introduction to plant Nomenclature. S.S.R. Bennet international Book distribution India.
8. An aid to the International code of Botanical. Hentry A.N. Today & Tomorrow Pvt. Ltd.
9. Principles of angiosperm Taxonomy. Devis& Hey wood Krieger publication Co.
10. Introduction to Principles of Plant Taxonomy Sivarajan Oxford & IBH Pvt. Company.
11. A hand book of field and Herbarium methods Jain S.K. and Rao R.R. Today and Tomorrow Publications.
12. Plant Taxonomy and Biosystematics. Staceclive. A Edward Arnold.

Compiled by Name with Signature	Verified by HOD Name with Signature	CDC	COE
Dr. P. Sathish kumar	Dr. E. Neelamathi		
Dr. C. Anbarasu			

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015

Subject Code : 15PBY310 Title : BIOCHEMISTRY		Semester:3
Hrs/Week :	5	Credits: 4
Objectives	- To know the biochemical molecules of life - To understand the biophysical laws governing universe	

Unit	Content	Hrs
Unit I	Acids and bases, strength of acids – strong acids, weak acids - ionization of water – K_w , pH - dissociation of acids – pK_a , Henderson - Hasselbalch equation. Buffers - definition, chemical composition, characteristics of buffer, buffer action, buffer capacity - biological role of buffer system - measurement of pH – colorimetric methods and electrometric methods.	13
Unit II	Carbohydrates: structure and biological functions - monosaccharides: classification, structure - oligosaccharides: structure, formation; common examples – sucrose, lactose - polysaccharides: classification, functions – structure of cellulose, starch and glycogen - sugar derivatives: glycoproteins, proteoglycans, mucoproteins.	13
Unit III	Lipids: classification, properties, functions - structure of fatty acids, essential fatty acids - storage lipids – triglycerols - structural lipids – membrane lipids - lipid biosynthesis, fat breakdown – β oxidation.	13
Unit IV	Amino acids: structure and classification of amino acids - biosynthesis of amino acids - proteins classification of proteins based on structure and function - oligo- and polypeptides - primary structure – peptide bond - secondary structure – Ramachandran plots, α -helix, β sheet - tertiary structure – quaternary structure- functions of proteins	13
Unit V	Enzymes: General characters of enzymes – IUB system of enzyme classification - mechanism of enzyme activity - factors affecting enzyme activity - enzyme kinetics - Michaelis-Menton kinetics - regulation of enzyme activity - allosteric effect - enzyme inhibition – reversible and irreversible inhibition, competitive, non-competitive, uncompetitive - Dixon plot - cofactors and coenzymes.	13

TEXT BOOKS

1. Satyanarayana, U. 2005. Biochemistry. Books and Allied (P) Ltd. Calcutta.
2. Lehninger, A.I. 1987. Biochemistry, Kalyani Publishers, New Delhi
3. Veerakumari, I. 2004. Biochemistry, MJP Publishers, Chennai.

REFERENCE BOOKS

4. Campbell, M.K. 1999. Biochemistry, Saunders College Publishing, New York. Harborne, J.B. 1999. Plant Biochemistry. Chapman & Hall, New Delhi. Jain, J.L. 2005. Fundamentals of Biochemistry. S. Chand & Co. New Delhi.

5. Plummer, D.T. 1996. An introduction to practical biochemistry. McGraw Hill.
6. Conn E.E. and P.K. Stumpf. 1987. – Outlines of Biochemistry, Wiley Eastern Ltd, Chennai.
7. Lubert Stryer. 1986. Biochemistry, CBS Publishers, New Delhi.

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Dr. R. Rakkimuthu	Dr. E. Neelamathi		
Dr. P. Sathish Kumar			

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY311 Title : RESEARCH METHODOLOGY		Semester:3
Hrs/Week :	5	Credits: 4
Objectives	• To equip students with the knowledge of scientific data analysis and presentation. • To teach the skills to write research documents • To provide the knowledge on handling softwares in research analysis	

Unit	Content	Hrs
Unit I	Research: concept & objectives - types of research: descriptive vs. analytical, applied vs. fundamental, quantitative vs. qualitative, conceptual vs. empirical – research methodology: formulation of research problem – hypothesis development - research process - steps and elements - analysis of the problem – research writing: preparation of research report – presentations - proposals - writing thesis/dissertation and article – LaTeX and manuscript preparation.	13
Unit II	Literature collection and citation: Bibliography – bibliometrics (scientometrics): definition - laws (Lotka's Law, Bradford's Law and Zipf's Law) - Bibliometrics indicators and indices – citation index - SCI- h-index – page rank - impact factor and evaluation - citation styles (APA, MLA, Chicago, Vancouver and Harvard) - citations and bibliography using Bibloscope – plagiarism and antiplagiarism softwares (Plagiarism checker, Copyleaks, Viper and Turnitin).	13
Unit III	Biostatistics: data collection & representation: graph and tabulation - measures of central tendency: mean (arithmetic), median and mode - measures of dispersion: standard deviation - standard error –co-efficient of variation - measures of significance: Chi-Square test – F-test - t- test – correlation - scatter diagram - Spearman's rank correlation coefficient - regression coefficients - lines of regression & their properties - analysis of variance (ANOVA-single factor) – multivariate analysis – probability of distribution (binomial, poisson and normal).	13
Unit IV	Softwares for Biostatistics: MS- EXCEL – spreadsheet – chart sheet – database - data representation (tabulation and graphing) – formulas and statistical functions (mean, median, standard deviation; F-test, t-test, CORREL and ANOVA) – SPSS – data editor & viewer – data analysis (Chi-square, t-test, correlation, regression and ANOVA (single factor) – graphing.	13

Unit V	Instrumentation: Microscopy (phase contrast, fluorescent, SEM, SEM and digital) - Colorimeter - Spectrophotometer (UV, visible, IR and AAS) – Spectroscopy (FTIR & NMR) - pH Meter – Centrifuges - Lyophilizer - Separation techniques: Chromatography (HPLC and GC-MS) - Electrophoresis (Agarose and PAGE) - ELISA reader – PCR.	13
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TEXT BOOKS

1. Mount, D. W. 2004. *Bioinformatics: sequence and genome analysis. Cold Spring Harbour Laboratory Press.*
2. Kothari, C.R. Research Methodology: Methods and Techniques (2nd revised edition). 2008. *New Age International.*

REFERENCE BOOKS

3. M.H. Cordon and R. Macrae, 1987. Instrumental analysis in the Biological Science, Blackie and Son Limited, London.
4. Sadasivan and Manickam, Biochemical Methods.
5. Jayaraman, J. Laboratory Manual of Biochemistry.
6. Harborne, Phytochemical methods.
7. Prasad and Prasad, Microtechnique.
8. Rajiv, K. Sinha and Shweta Sinha, 2005. Ethnobiology, Surabi Publications, Jaipur.

Journals:

1. *Journal of Mixed Methods Research.*
2. *Journal of Research Methods and Methodological Issues.*

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Dr. E. Neelamathi	Dr. E. Neelamathi		
Dr. P. Sathish Kumar			

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015

Subject Code : 15PBY3E2 Title : GENOMICS AND PROTEOMICS		Semester:3
Hrs/Week :	5	Credits: 5
Objectives	• To detail the various web based resources for biological information. • To provide a platform for molecular understanding of the structure-function relations in DNA/RNA/Proteins.	

Unit	Content	Hrs
Unit I	Bioinformatics: Introduction to bioinformatics – dogmas of life – central and peripheral - applications – biological databases – NCBI, EBI and Genome net – archives and information retrieval – gateways to archives – data warehousing and mining.	13
Unit II	Genomics: Genome analysis – prokaryotic and eukaryotic gene structure – c- value paradox – internal organization of structural genes – genome sequencing – clone based sequencing – shot gun method – identification of genes in contigs – CpG islands – ORF – chromosomal rearrangements – Human genome project.	13
Unit III	Sequence alignment – pairwise alignment - methods – scoring matrices – PAM and BLOSUM – multiple sequence alignment – evaluation and applications of multiple sequence alignment – phylogenetic analysis – phylogenetic trees – methods of phylogenetic analysis – distance method – character based method – tree evaluation – tools for phylogenetic analysis.	13
Unit IV	Gene identification and prediction – pattern recognition – gene prediction methods – gene finding by ORF prediction – homology based approaches – statistical and HMM approaches - searching for CG islands and protein binding sites – gene prediction tools.	13
Unit V	Proteomics: Structure based protein classification approaches – protein structure databases – protein structure visualization tools - tools for protein structure prediction - primary and secondary structure analysis and prediction – motifs, profiles, patterns and fingerprints search. Proteomics classification - Tools and techniques in proteomics.	13

TEXT BOOKS

1. Rastogi, S. C., N. Mendiratta, and P. Rastogi (2008), Bioinformatics – Methods and applications, Genomics, Proteomics and Drug discovery, PHI Learning pvt Ltd., New Delhi.
2. Baxevanis and Quellet (1998). Bioinformatics. A practical guide to analysis of genes and proteins.

3. Arthur M.Lesk (2002) Introduction to Bioinformatics.

REFERENCE BOOKS

1. Bioinformatics: A biologist's guide to biocomputing and the internet. 2000. Stuart M. Brown.
2. Introduction to Bioinformatics. 1999. T.K.Attwood and Parry-Smith.
3. Introduction to Bioinformatics. 2002. S.Sundararajan and R.Balaji.
4. Bioinformatics: Sequence and genome analysis. 2001. David W. Mount. SEM.IV

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Dr. E. Neelamathi	Dr. E. Neelamathi		

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY312 Title : CORE PRACTICAL-III		Semester:3
Hrs/Week :	5	Credits: 4
Objectives	• To know the vegetative and floral characters of angiosperms. • To understand the techniques of herbarium • To get hands on experience with bioinformatics tools	

Unit	Content	Hrs
Unit I	PLANT SYSTEMATICS • Study of the vegetative, floral characters & economic importance of all the families given in the theory • Preparation of artificial key • Submission of herbarium sheets – 30.	13
Unit II	BIOINFORMATICS • An introduction to the computing platforms. • Molecular databases. • Database searches (BLAST and FASTA). • Prediction of ORF, splice sites & promoter elements of DNA. Gene finding strategies in genomic DNA. • Estimating protein secondary structure and physical attributes. • Multiple sequence alignment. • Secondary structure of proteins. • Molecular modeling and visualization. • Getting familiar with SPSS. • Calculating the measures of central tendency, dispersion. • Hypothesis Testing. • Comparing Means using SPSS. • Correlation & regression analysis using SPSS.	13

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Dr. P. Sathish Kumar				
Dr. C. Anbarasu				
Department	Botany			
Course	M.Sc., Botany			Effective from the Year: 2015

Subject Code : 15PBY313		Semester: 3
Title : CORE PRACTICAL-IV		
Hrs/Week :	5	Credits: 4
Objectives	• To understand the techniques of biomolecular estimation • To know the qualitative tests for bioactive compounds • To get a knowledge on OFFICE tools to solve statistical problems.	

Unit	Content	Hrs
Unit I	BIOCHEMISTRY: 1. Estimation of starch by Anthrone method. 2. Estimation of protein Lowry's method. 3. Estimation of lipid. 4. Estimation of amino acids. 5. Determination of enzyme activities – Catalase, Ascorbic acid oxidase and polyphenol oxidase. 6. Qualitative estimation of phenols, flavonoids and alkaloids.	13
Unit II	RESEARCH METHODOLOGY 1. Research process 2. Hypothesis development 3. Research writing 3.1. How to write a research proposal? 3.2. How to write a research report? 3.3. Thesis writing 3.4. Manuscript preparation using latex 4. Bibliometrics 5. Bibliometrics index 6. Citation index 7. Citation styles 8. Bibliography and biblioscope	
UnitIII	BIOSTATISTICS 1. Collection, analysis and graphical representation of data 2. Measures of central tendency - mean, median and mode 3. Measures of dispersion: range, standard deviation, coefficient of variation correlation 4. Test of significance - Chi-square test and Student't' test. 5. Simple exercises in MS- Word 6. Presentation in MS-Powerpoint 7. Statistical calculations and chart preparation in MS-Excel 8. Creation of database in MS-Access.	13

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Dr. C. Anbarasu			

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015

Subject Code : 15PBY414		Semester:4
Title : PLANT BIOTECHNOLOGY		
Hrs/Week :	5	Credits: 4
Objectives	• To acquire knowledge on plant tissue culture • To provide detailed information about the tissue culture practices • To cover information about the biotechnology to agriculture, in raising transgenic plants	

Unit	Content	Hrs
Unit I	Genome organization and protein targeting: general organization of nuclear, mitochondrial and chloroplast gene - targeting of proteins synthesized in cytoplasm to chloroplast, mitochondria of plants – <i>Arabidopsis</i> – genome size and organization.	13
Unit II	Structure and expression of gene: tissue specific genes - structure and organization of nuclear genes concerning storage proteins, phytochrome, microbial infection and other stresses - maize transposable elements - organization and function of transposons.	13
Unit III	Development of plant transformation cassettes: Structure and function of Ti plasmid of <i>Agrobacterium</i> - mechanism of T-DNA transfer to plants - Ti plasmid vectors for plant transformation - promoter and marker genes in plant transformation.	13
Unit IV	Gene transfer and tissue culture techniques: physical, chemical and biological methods for plant gene transfer – micropropagation - shoot-tip culture - callus and cell suspension culture - haploid production - rapid clonal propagation - somoclonal variation - somatic embryogenesis - somatic hybridization - cybrids - synthetic or artificial seeds.	13
Unit V	Transgenic plants for virus resistance - herbicide tolerance - delay of fruit ripening - resistance to insect, fungi and bacteria - production of antibodies, viral antigens and peptide hormones in plants – RNAi mediated crop improvement – ethics in plant biotechnology – IPR.	13

TEXT BOOKS

1. Slater A. Scott N. and Fowler M. 2008. Plant Biotechnology: The Genetic Manipulation of Plants. Oxford University Press Inc.
2. Satyanarayanan U. 2007. Biotechnology. Books and Allied (P) Ltd., Kolkata.

REFERENCE BOOKS

3. Lea, PJ, Leegood, RC . 1993. Plant Biochemistry and Molecular Biology. eds. John Wiley and Sons, Chichester and New York.
4. Mahesh S. 2008 Plant Molecular Biotechnology. New Age International Publishers.
5. Ramavat K.G. 2006 Plant Biotechnology S. Chand and Co. Ltd., New Delhi
6. Trivedi P.C. 2000 Plant Biotechnology – Recent Advances. Panima Publication Corporation, New Delhi
7. Ignacimuthu S. 1998 Plant Biotechnology. Oxford and IBH
8. Reynolds P.H.S 1999. Inducible Gene Expression in Plants. CABI Publishing, U.K.

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Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY415 Title : ENVIRONMENTAL MANAGEMENT AND CONSERVATION OF BIODIVERSITY		Semester: 4
Hrs/Week :	5	Credits: 4
Objectives	• To exposes the students to the concept of ecology, environmental problems and their consequences. • To give an insight to the students as how to exploit various biotechnological strategies to solve these environmental hazards, with special attention on the byproducts of different industries.	

Unit	Content	Hrs
Unit I	Current status of environment – issues and challenges - climate change - greenhouse gases: sources, trends and role - ozone layer and ozone hole - consequences of climate change (CO ₂ sequestration, global warming, sea level rise, UV radiation) - El-Nino and La Nina phenomenon - environmental monitoring: meaning and scope - concept of biomonitoring and biological indicator	13
Unit II	Environmental management: definition and basic concepts - environmental impact assessment (EIA) : Scope, importance and application of EIA process - eco-restoration/remediation - ecological foot prints – carbon foot print - ecolabeling - environmental auditing & standards - certification& accreditation- SO standards for environmental management systems (EMS) - ISO 14000 14001 & 26001 - OHSAS 18001.	13
Unit III	Environmental agencies: EPA - MAB - UNEP - MoEn&F - treaties, agreements and conventions: Geneva convention (1979) Vienna convention (1985) - convention on biological diversity (CBT) - Convention on International Trade in Endangered Species of Fauna and Flora (CITES, 1973) Montreal protocol (1987) - Earth summit 1992 & 2002 - Convention on biodiversity (1992) – United Nations Framework Convention on Climate Change (UNFCCC) - Kyoto protocol (1997) – Antarctic treaty (2004).	13
Unit IV	Biodiversity: Biodiversity concepts and definitions - genetic diversity, species diversity and ecosystem diversity - agro biodiversity and cultivated taxa - loss of biodiversity - threats to biodiversity: natural and anthropogenic - IUCN threat categories: red data book and red lists - conservation of biodiversity: <i>in situ</i> conservation – sanctuaries, national parks, biosphere reserves, MPCA, MPDA, mangroves, coral reefs, sacred groves - <i>ex-situ</i> conservation: botanical gardens. arborata and palmate - herbaria, gene banks, seed banks.	13
Unit	National and international organizations in conservation of biodiversity – IUCN, NBPGR,	

V	BSI, ICAR, CSIR, DBT, DST, NBSAP, NGOs - biodiversity legislation and conventions - international biodiversity laws - biodiversity register - national biodiversity legislation – national biodiversity bill (2000) –biological diversity act (2002) - trade restrictions - economic, legal and ethical issues of biodiversity - Indian case studies on conservation/management strategy (project tiger & project elephant).	13
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Text books

1. Krishnamurthy, K.V. 2004. An advanced textbook on Biodiversity: Principles and practice. Oxford and IBH. Publ. Co. New Delhi. 260p.
3. Singh, J.S., Singh, S.P. & Gupta, S.R. 2006. Ecology, Environment and Resource Conservation. Anamaya Publ., New Delhi. 68 8Pp.
4. Cunningham, P. and Mary Ann Cunningham, 2007. Principles of Environmental Science. The McGraw-Hill, New Delhi.

Reference Books:

1. Chiras, D. D., 2009. Environmental Science, 8th edition, Jones and Bartlett Publishers, Sudbury, Massachusetts (www.jbpub.com).
2. Groombridge, B. (Ed.) 1994. Global Biodiversity – status of the Earth’s living resources. Chapman & Hall, London.
4. Melchias, G. 2001. Biodiversity and Conservation. Oxford IBH. New Delhi. 236Pp.
5. Odum E.P. Gray, W. Barrell 2004. Fundamentals of Ecology. 15th edition. Thomas Asia Pvt. Ltd.
6. Chapman, J.L. and Reiss, M.J. 1999. Ecology; Principles and Applications. II Ed. Cambridge University Press. New York.
7. Putman, R.J. and S.D. Wratten. 1984. Principles of Ecology. University of California Press, Berkeley and Los Angeles.
8. Sharma P.D. 2001. Ecology and Environment. Rastogi Publications, Meerut.
9. Burden F. R., McKelvie I., Forstner U., and Guenther A., 2002, Environmental Monitoring Handbook, McGraw-Hill, New York.
10. Goldsmith F. B., 1995, Monitoring for Conservation and Ecology. London: Chapman and Hall.

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Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY4E3 Title : FOREST BOTANY		Semester: 4
Hrs/Week :	5	Credits: 5
Objectives	• To study the forest ecosystem and associated components • To study the parameters to measure the forest cover • To import knowledge on conservation measures for forest	

Unit	Content	Hrs
Unit I	Forest – introduction - definition – classification - forest types and their components: montane forests (evergreen, coniferous, sholas and grasslands); terrestrial forests (semi evergreen, deciduous, moist deciduous, dry deciduous and scrubs jungles); tidal forests (salt marsh and mangroves).	13
Unit II	Dendrology: introduction - importance and scope of dendrology - general forms of woody trunk and deviations (buttresses, flutes, crooks) - morphology and description of barks of common trees - characteristics of blaze on bark, colour, gums, and latex - morphology of leaf, description of different types of leaves, - colour of young and old leaves as features of identification - reproductive morphology of plants - description and identification of reproductive parts.	13
Unit III	Forest mensuration - introduction – definition - objectives and scope of forest mensuration. Scales of measurement (nominal, ordinal, interval and ratio scale) - measurement of single tree – standard rules - measurement of tree diameter and girth using rulers, callipers and tapes - bark measurements - objectives, thickness, surface area and volume - crown measurements - objectives, diameter, height, surface area and volume - height measurements – (direct and indirect methods) - height measuring instruments - Abney's level.	13

Unit IV	Wood science: Microscopic structure of wood: vessels, tyloses, tracheids, fibres, wood parenchyma - wood rays, grain and texture - chemical composition of wood - Physical properties of wood (Colour luster, fluorescence, odour and weight) - mechanical properties of wood – (bending, hardness and shear) - annual rings – identification and classification of wood (early wood and late wood, soft wood and hard wood, pycnoxylic and manoxylic wood) - annual rings - dendrochronology - commercial wood species and identification – synthetic woods – plywood – fuel wood – pulp and paper making woods – match stick wood.	13
Unit V	Forest – conservation and management: Strategies for conservation - <i>In situ</i> conservation: (afforestation, social forestry, agro forestry, botanical gardens, biosphere reserves, national parks, sanctuaries, sacred groves and sthalavrikshas) - <i>ex situ</i> conservation (cryopreservation, gene banks, seed banks, pollen banks, DNA banks, tissue culture and biotechnological strategies) - silviculture – elements and systems - clear felling, simple coppice and selection felling.- ethnobotany - forest conservation through laws - the biological diversity Act (2002 in force) - world conservation strategy (WCS) and National biodiversity strategy and action plan (NBSAP)..	13

TEXT BOOKS

1. Daniel, Helms and Baker, 1979. Principles of Silviculture McGraw-Hill Book 1. Company.
2. Chaturvedi, A.N. and L.S. Kanna. 1982. A handbook on Forest Mensuration. International Book Distributors.
3. Avery, T.E. 1967. Forest Measurements. Mc Grand Hill Book Company, Newyork.
4. Ramprakash. (1986). Forest management. IBD Publishers, Debra Dun.

REFERENCE BOOK

1. Khanna, L. S. 1984. Principles and Practice of Silviculture, Khanna Bhandu, Dehra Dun. P. 476.

2. Ram Prakash and L.S. Khanna. 1991. Theory and Practice of Silvicultural systems.
International Book Distributors, Dehra Dun.
3. Sagreiya, K.P. Forests and Forestry, 1997. National Book Trust India.
4. Anonymous. 1976. Indian forest utilization. Volume I and II ICFRE Publication, Dehradun.
5. Mehta, T. 1981. A handbook of forest utilization. Periodical Expert Book Agency, Delhi. 298 p.
6. Rao, K.R. and Juneja, K.B.S. 1992. Field identification of 50 important timbers of India. ICFRE Publi. Dehradun 123 p.
7. Gupta, T. and Guleria, A. 1982. Non-wood forest products in India : Economic potential. Oxford and IBH Publication, New Delhi. 147 p.
8. Bor,N.L (2010). A Manual of Indian Forest Botany,(Second Edition) Asiatic pub., New Delhi Page 53 of 96.
9. Negi,S.S.(2001),Forest Policy and Law, International Book Distributing Co.Dehradun.
10. Rahman, C.A. (2009), Compilation of Forest Policy and Law. International Book Distributing Co.Dehradun

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Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY415 Title : CORE PRACTICAL-V		Semester:4
Hrs/Week :	5	Credits: 4
Objectives	• To understand the concepts of plant tissue culture techniques • To study the vegetation and analyse its properties • To acquire knowledge on forest and its nature.	

Unit	Content	Hrs
Unit I	PLANT BIOTECHNOLOGY: 1. Isolation of genomic DNA from plants 2. Qualitative and quantitative analysis of plant genomic DNA 3. Protein separation by SDS-PAGE 4. Preparation of Plant Tissue Culture Media 5. <i>In vitro</i> germination of seeds.	13
Unit II	6. Callus induction 7. Meristem culture 8. Micropropagation 9. Production of artificial seeds 10. Preparation of competent cell- <i>E. coli</i> and <i>Agrobacterium</i> 11. <i>Agrobacterium</i>-mediated gene transformation to plants. 12. Amplification of a plant gene using PCR	
Unit III	Environmental management and Conservation of biodiversity 1. Vegetation analysis- Quadrata method and Belt transect methods. 2. Estimation of total biomass and herbage yield by harvest method. 3. Water analysis for dissolved oxygen and carbon-di-oxide. 4. Calculation of pollution indices 4.1 Bio-accumulation 5. Environmental impact Assessment	13

	6. Carbon foot printing 7. Biodiversity indices 8. Ex-situ conservation 9. Case studies – Environmental Management	
Unit IV	FOREST BOTANY: 1. Determination of age of tree 2. Phenology studies 3. Germination studies – percentage, competition. 4. Physical features of wood – height, diameter, density, moisture.	13
Unit V	5. Anatomical features of wood – porous, non-porous, ring-porous, diffused-porous, different kinds of wood parenchyma rays. 6. Menstruation – measurement of tree height and diameter 7. Species diversity index – (Shannon wiener index, Simpson diversity index) 8. Mapping studies 8.1 Forest types (Evergreen, Semi evergreen, Deciduous and Mangrove)	13

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Dr. P. Sathish Kumar	Dr. E. Neelamathi		
Dr. C. Anbarasu			

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY4P1 Title : PROJECT WORK AND VIVA VOCE		Semester: 4
Hrs/Week :	6	Credits: 8
Objective :	• To get knowledge on research • To improve knowledge on instrumentation • To provide the knowledge on handling software in research analysis	

Compiled by Name with Signature	Verified by HOD Name with Signature	CDC	COE
Dr. E. Neelamathi	Dr. E. Neelamathi		