

**DEPARTMENT OF BOTANY
NALLAMUTHU GOUNDER MAHALINGAM
COLLEGE (AUTONOMOUS),
POLLACHI – 642 001.**

M.Sc. BOTANY

**SYLLABUS
&
SCHEME OF EXAMINATION**

CHOICE BASED CREDIT SYSTEM (CBCS)

**[FOR THE STUDENTS ADMITTED DURING THE
ACADEMIC YEAR 2015-2016 BATCH & ONWARDS]**

**(PASSED ON THE BOARD OF STUDIES
HELD ON AUGUST 2015)**

NGM COLLEGE (AUTONOMOUS), POLLACHI – 01.

M.Sc. BOTANY SYLLABUS

[CHOICE BASED CREDIT SYSTEM]

[FOR 2015-2016 BATCH & ONWARDS]

SCHEME OF EXAMINATION

Sem	Code	Subject title	Class hours Wee	Internal	External	Total	Credits
I	15PBY101	Phycology, Mycology, Pathology, Lichenology and Bryology	5	25	75	100	4
I	15PBY102	Pteridophytes, Gymnosperms and Palaeobotany	5	25	75	100	4
I	15PBY103	Microbes & Microbial technology	5	25	75	100	4
I	15PBY1E1	Elective -I Algal Biotechnology	5	25	75	100	5
I	15PBY104	Core Practical- I (for core papers & elective -1)	5	40	60	100	4
II	15PBY205	Cytology, Anatomy and Embryology	5	25	75	100	4
II	15PBY206	Plant physiology	5	25	75	100	4
II	15PBY207	Genetics and Plant Breeding	5	25	75	100	4
II	15PBY208	Core Practical- II (for core papers)	5	40	60	100	4
II	15PBY2N1	Non- Major Elective -1A Mushroom cultivation	1		100	100	2
	15PBY2N2	Non- Major Elective -1B Bioinformatics					
		Total				1000	39

SCHEME OF VALUATION

Papers	Credits	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 : 15PBY101 Title : PHYCOLOGY, MYCOLOGY, PATHOLOGY, LICHENOLOGY AND BRYOLOGY	Semester: 1	
Hrs/Week :	5	Credits: 4
Objectives	<ul style="list-style-type: none"> • To define and characterize the floral diversity • To understand the range of diversification of species • To realize the fundamental values of diversity • To evolve strategies for diversity conservation and sustainable use. 	

Unit	Content	Hrs
Unit I	PHYCOLOGY: General characteristics – distribution - classification of algae (Fritsch, 1945) - comparative studies of structure, distribution, reproduction, life cycles, phylogeny and interrelationships of cyanophyta, chlorophyta, phaeophyta and rhodophyta - economic importance of algae.	13
Unit II	MYCOLOGY: General characteristics of fungi - classification of fungi (Alexopoulos and Mims, 1979) - structure, distribution, nutrition, reproduction, phylogeny and interrelationship of myxomycetes, oomycetes, ascomycetes, basidiomycetes and deuteromycetes - host-parasite interaction - heterothallism and economic importance of fungi – contributions of eminent Indian mycologists.	13
Unit III	PATHOLOGY: Fungi and plant diseases – pathogenesis – defense mechanism in plants – phytotoxins and phytoalexins – causal organism, symptoms, disease cycle and control measures of the following diseases – downy mildew of grapes, panama disease of banana, leaf rust of coffee and sheath blight of rice – fungi as biocontrol agents.	13
Unit IV	LICHENOLOGY: General characteristics of lichens - classification of lichens (Hale, 1969) - occurrence and interrelationship of phycobionts and mycobionts, structure and reproduction in ascolichens, basiodiolicheas and deuterolichens - lichens as indicators of pollution - economic importance of lichens.	13
Unit V	BRYOLOGY: General characteristics of bryophytes - classification of bryophytes (Riemers, 1954) – distribution, structure, reproduction of gametophyte and sporophytes in major classes of bryophytes – spore dispersal mechanism and economic importance - bryophytes as pollution indicators.	13

TEXT BOOKS

1. Gangulee and Kar, 1970. College Botany Vol. II. New Central Book Agency, New Delhi.
2. Rangaswamy, G. and Mahadevan, A. (1999). Diseases of crop plant in India 4th Edition.
3. Smith, G.M. 1938. Cryptogamic Botany. Vol, I. Mc Graw Hill Book Co., New York.
4. Vashishta, B.R., Sinha, A.K. and Kumar, A. 2005. Botany for degree Students, Bryophyta. S. Chand and Co. Ltd, New Delhi.

REFERENCE BOOKS

1. Alexopoulos, C.J. and Mims, C.W. 1979. Introductory Mycology. Wiley Eastern Ltd, New Delhi.
2. Fritsch, F.F. 1972. The Structure and Reproduction of the Algae Vol. II. Cambridge University Press, UK.
3. Kumar, H.D. 1988. Introductory Phycology. Affiliated East-West Press Ltd. New Delhi.
4. Morris, I. 1986. An introduction to the Algae. Cambridge University Press, UK.
5. Sharma, P.D. 2006. Plant Pathology. Narso Publishing House, New Delhi.
6. Singh, S.K. 2006. Text Book of Bryophyta, Campus Books, New Delhi.
7. Webster, J. 1970. Introduction to Fungi. Cambridge University Press, UK.

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Dr. E. Neelamathi	Dr. R. Kannan		

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY102 Title : PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY	Semester: 1	
Hrs/Week :	5	Credits: 4
Objectives	<ul style="list-style-type: none"> • To define and characterize diversity of lower vascular plants • To understand the dynamics of diversity • To realize the significance of diversity. 	

Unit	Content	Hrs
Unit I	PTERIDOPHYTES: General characteristics of pteridophytes - classification of pteridophytes (Sporne, 1975) – comparative morphology, anatomy, reproduction and life cycle of psilophytosida, psilotopsida, lycopsida, sphenopsida and pteropsida	13
Unit II	Origin of pteridophytes - phylogenetic trends – stellar evolution - sorus evolution - heterospory and seed habit - apogamy and apospory - affinities of various classes of pteridophytes - economic importance of pteridophytes.	13
Unit III	GYMNOSPERMS: General characteristics and classification of gymnosperms (Sporne, 1965) – comparative morphology, anatomy, reproduction and lifecycle of cycadales, coniferales, ginkgoales and gnetales.	13
Unit IV	Affinities of gymnosperms with angiosperms and pteridophytes - phylogenetic considerations of various classes of gymnosperms - economic importance of gymnosperms.	13
Unit V	PALAEOBOTANY: Introduction to palaeobotany - geological time scale - radiocarbon dating- fossil pteridophytes- fossil gymnosperms - fossil fuels - fossil pollen analysis – fossil sites – institute for palaeobotanical studies.	13

TEXT BOOKS

1. Gangulee and Kar, 1970. College Botany Vol. II. New Central Book Agency, New Delhi.
2. Vashishta, P.C. 1991. Gymnosperms. S. Chand & Company Ltd., Ram Nagar, New Delhi.
3. Vashishta, P.C. 1991. Vascular Cryptogams. S. Chand & Company Ltd., Ram Nagar, New Delhi.

REFERENCE BOOKS

1. Arnold, C.A. 1947. An Introduction to Paleobotany. Academic Press, New York and London
2. Biswas, C. and Johrc, B.M. 1977. The Gymnosperms. Narosa publishing House, New Delhi.
3. Bower, F.O. 1923-28. The ferns. Vol 1-3; Cambridge University Press, London.
4. Eames, A.J. 1936. Morphology of Vascular Plants. Lower groups, New York and London.
5. Meyen, S.V. 1987. Fundamentals of Paleobotany. Chapman and Hall, New York.
6. Sporne, K.R. 1965. The Morphology of Pteridophytes. Hutchinson & Co., London
7. Sporne, K.R. 1967. The Morphology of Gymnosperms. Hutchinson & Co., London.

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Dr. E. Neelamathi	Dr. R. Kannan		
Dr. M. Manimuthu			

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY103 Title : MICROBES AND MICROBIAL TECHNOLOGY	Semester: 1	
Hrs/Week :	5	Credits: 4
Objectives	<ul style="list-style-type: none"> • To introduce the techniques involved in microbiology • To study their industrial application • To know the role of microbes in human welfare 	

Unit	Content	Hrs
Unit I	Microbiology – history, branches and scope - classification of microorganism (Bergey's, 1974) – modern trends in bacterial taxonomy - prokaryotic and eukaryotic microbes – ultra structure of Bacterium - microscopy - light, electron and laser optic system - micrometry.	13
Unit II	Culture media – characteristics, types and preparation – microbial cultures – methods of culturing aerobes and anaerobes – methods of isolation and maintenance of pure culture – microbial growth - nutritional types of microorganisms – enumeration and preservation of microbes - staining techniques.	13
Unit III	Bacteria – general characters – bacterial pathogens - <i>Staphylococcus</i> , <i>Streptococcus</i> , <i>Escherichia</i> , <i>Salmonella</i> & <i>Mycobacterium</i> - Viruses – general characters – viral identification – viral transmission and effect of viruses on plants – cucumber mosaic virus, tomato spotted wilt virus, cauliflower mosaic virus. Control of microorganisms - physical and chemical methods - antibiotics and chemotherapeutic agents - anti microbial susceptibility test.	13
Unit IV	Industrial microbiology – fermenters and fermentative microbes – culture preservation – production of microbial products – strain improvement techniques – production of alcohols, malt beverages, organic acids, antibiotics and aminoacids - immobilization of microbes and enzymes - microbial leaching – biodegradation – biosensors.	13
Unit V	Microbial diversity - methods to assess microbial diversity - merits and demerits of culture dependent and culture independent methods - molecular analysis of bacterial community - Denaturing Gradient Gel Electrophoresis (DGGE), Terminal Restriction Fragment Length Polymorphism (T-RFLP), Amplified Ribosomal DNA and Restriction Analysis (ARDRA).	13

TEXT BOOKS

1. Dubey R.C. and D.K. Maheshwari, 1999. Text book of microbiology, S. Chand & Co. Pvt. Ltd., New Delhi.
2. Pelzer Jr. M.J., E.C.S. Chan and N.R. Kreig, 1993. Microbiology, Mc Graw Hill Inc., New York.
3. Prescott, L.M., J.P. Harley and D.A. Klein, 2007. Microbiology, McGraw Hill, Boston.

REFERENCE BOOKS

1. Greenwood, D., R. Slack and J. Peutherer, 1997. Medical Microbiology, ELST with Churchill Livingstone, Hong Kong.
2. Prescott, L.M., J.P. Harley and D.A. Klein, Microbiology, 6/e, 2005. Mc Graw Hill, Boston.
3. Salle, A.J., 1999. Fundamental Principles of Bacteriology, Tata McGraw - Hill Publishing Company Limited, New Delhi.

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Dr. R. Rakkimuthu	Dr. R. Kannan		

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY1E1 Title : ALGAL BIOTECHNOLOGY	Semester:1	
Hrs/Week :	5	Credits: 5
Objectives	<ul style="list-style-type: none"> • To understand the techniques in the culture and processing of algae • To know the economic value and applied aspects of algal biotechnology. 	

Unit	Content	Hrs
Unit I	Introduction to algae and their importance - algae as a source of food and fodder - algal polysaccharides (agar agar, carageenan and alginic acid) - algae in pharmaceutical industries - algal biofertilizer and biofuel - algae as indicator of pollution.	13
Unit II	Introduction to microalgal biotechnology - bioprospecting microalgae for commercial applications - basic microalgal culturing techniques - bioactive and novel chemicals from microalgae - commercial species of industrial production (<i>Chlorella</i> and <i>Dunaliella</i>) - mass cultivation and processing - microalgae for aquaculture - water pollution and bioremediation by microalgae.	13
Unit III	Introduction to blue green algal (BGA) biotechnology – cyanobacteria - diversity, organization and features – harmful algal blooms (<i>Anabaena</i> and <i>Microcystis</i>) - <i>Spirulina</i> – nutritive and therapeutic values – value added biochemicals – <i>Spirulina</i> – culture and mass cultivation – photobioreactors.	13
Unit IV	Introduction to macroalgal biotechnology - biochemical composition of seaweeds – bioactive metabolites of seaweeds - extraction and characterization of bioactive components from seaweeds - commercial uses of seaweeds - seaweed cultivation methods (rope and spore methods) – propagation by protoplast fusion and tissue culture techniques.	13
Unit V	Algal transgenics - production of transgenic algae (selectable marker genes, promoters, reporter genes, and transformation techniques in algal biotechnology) - genetically modified algae and bioprospecting – molecular farming using transgenic algae.	13

TEXT BOOKS

1. Bold, H.C. and Wynne, M.J. 1976. Introduction to Algae structure and reproduction. Prentice-hall.
2. Smith and Wittick. 1987. An introduction of Algae. Blackwell Publication.
3. Tridevi, P. C. 2001. Algal Biotechnology. Point Publisher, Jaipur, India.

REFERENCE BOOKS

1. Becker, S. W. 1994. Micro Algae Biotechnology and Microbiology. Cambridge University Press.
2. Chapman, F.G. and Chapman, D.J. 1973. The Algae. McMillan & Co.
3. Fritsch, F.E. 1935 and 1945. Structure and reproduction in Algae Vol. I& II, Cambridge University press. 9. Marris, I. 1967. An introduction to the Algae Hatchinson University Lab.
4. McCandless, E.L. 1981. Polysaccharides of seaweeds. In The Biology of seaweeds, ed. C.S. Lobban and M.J. Wynne, pp. 559-88. Blackwell, Oxford.
5. Presott, G.W. 1970. How to know freshwater Algae W.C. Braun & Co.
6. Round, F.E. 1966. The Biology of Algae Edward Arnold.
7. Venkatraman, G. S. 1972. Algal Biofertilizers and rice cultivation. Today and Tomorrows Printers and Publishers, New Delhi.
8. Zajic, J. E. 1970. Properties and Products of Algae. Plenum Press, New York.

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Dr. R. Kannan	Dr. R. Kannan		

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY104 Title : CORE PRACTICAL I	Semester: 1	
Hrs/Week :	5	Credits: 4
Objectives	<ul style="list-style-type: none"> • To acquire practical knowledge on thallus organization of lower plants • To get hands on knowledge on microbes and algal culture techniques. 	

Unit	Content	Hrs
Unit I	<p>PHYCOLOGY, MYCOLOGY PATHOLOGY, LICHENOLOGY AND BRYOLOGY</p> <p>Vegetative and reproductive structures of Algae: <i>Cosmarium</i>, <i>Volvox</i>, <i>Caulerpa</i>, Diatoms, <i>Dictyota</i> and <i>Gracilaria</i> Fungi: <i>Rhizopus</i>, <i>Ascobolus</i>, <i>Pleurotus</i> and <i>Cercospora</i> Pathology: Downy mildew of grapes, panama disease of banana, leaf rust of coffee, sheath blight of rice. Bryophytes: <i>Marchantia</i>, <i>Anthoceros</i> and <i>Polytrichum</i>. Lichenology: <i>Usnea</i></p>	13
Unit II	<p>PTERIDOPHYTES, GYMNOSPERMS AND PALAEOBOTANY</p> <p>Vegetative and reproductive structures of Pteridophytes-<i>Selaginella</i>, <i>Equisetum</i>, <i>Ophioglossum</i>, <i>Adiantum</i> and <i>Marselia</i>. Gymnosperms -<i>Pinus</i>, <i>Araucaria</i> and <i>Gingko</i>. Paleobotany - <i>Rhynia</i>, <i>Lepidodendron</i>, <i>Lepidocarpon</i>, <i>Williamsonia</i>, <i>Lagenostoma</i>, <i>Lyngiopteris</i>.</p>	13
Unit III	<p>MICROBES AND MICROBIAL TECHNOLOGY</p> <ul style="list-style-type: none"> • Preparation of non-selective and selective media • Culture methods (pour plate, slant & broth) • Enumeration of bacteria (plate count) from soil and water • Observation of motility of bacteria (hanging drop technique) • Staining methods: simple, negative and Gram staining • Biochemical tests for bacteria • Bacterial growth curve • Test for coliform bacteria • Spoilage of milk by microorganisms (methylene blue test) • Antibiotic assay 	13
Unit IV	<p>ALGAL BIOTECHNOLOGY</p> <ul style="list-style-type: none"> • Introduction to microalgae • Collection of microalgae • Phytoplankton net 	

	<ul style="list-style-type: none"> • Culturing of microalgae (<i>Chlorella or Spirulina</i>) • Enumeration of microalgae • Diversity indices of microalgae • Freshwater quality assessment using Palmer & Nygaard's index 	13
Unit V	<ul style="list-style-type: none"> • Estimation of chlorophyll in algae • Estimation of dissolved oxygen • Estimation of primary productivity • Introduction to macroalgae • Culturing of macro algae / seaweed (demo only) • Commercial products from macroalgae 	13

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Dr. E. Neelamathi	Dr. R. Kannan		
Dr. R. Rakkimuthu			
Dr. M. Manimuthu			

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY205	Semester: 2	
Title : CYTOLOGY, ANATOMY AND EMBRYOLOGY	Credits: 4	
Hrs/Week :	5	
Objectives	<ul style="list-style-type: none"> • To understand the structure of cells in relation to the functional aspects • To study the internal structure of various tissue systems and organs. • To know the mechanisms processes in the reproductive phase of plants 	

Unit	Content	Hrs
Unit I	CYTOLOGY: Structural organization of the plant cell - cell wall - primary and secondary - plasma membrane - structure, models and functions, channels, pumps and receptors - plasmodesmata - ultra structure of chloroplast and mitochondria - chloroplast and mitochondrial genomes - structure and functions of glyosomes, peroxisomes, spherosomes and lysosomes - ultra structure of nucleus - Structure and organisation of chromosomes.	13
Unit II	ANATOMY: General account and theories of organization of shoot apex and root apex - quiescent centre and modern concept on meristems - structural diversity, functional complexity and phylogenetic trends in specialization of complex permanent tissues (xylem and phloem) - cambium - origin - structure, storied and non-storied types - formation of cork cambium, and periderm - anomalous secondary growth in dicot and monocot.	13
Unit III	ANATOMY: Vascular differentiation in primary and secondary structure of root and stem in dicot and monocot - origin of lateral roots - root stem transition - anatomy of dicot and monocot leaves - stomatal types - nodal anatomy - petiole anatomy – trichomes – glands - secretory tissues – nectaries - laticifers and their significance.	13
Unit IV	EMBRYOLOGY: Microsporangium – microsporogenesis - microspores - arrangement - morphology - ultrastructure - microgametogenesis - pollen - stigma - incompatibility - methods to overcome incompatibility - megasporangium - megagametogenesis - female gametophyte - monosporic - bisporic and tetrasporic - nutrition of embryo sac and fertilization.	13
Unit V	EMBRYOLOGY: Endosperm - types - endosperm haustoria - cytology and physiology of endosperms - functions of endosperms - embryo development in dicot and monocot - nutrition of embryo – polyembryony- apomixis - apospory.	13

TEXT BOOKS

1. Bhojwani, S.S. and Bhatnagar, S.P. 1986. The Embryology and Angiosperms. Vikas publishing house pvt. Ltd, New Delhi.
2. Easu, K. 1985. Plant Anatomy, Wiley Eastern Pvt. Ltd., New Delhi.
3. Johri, B.M. (ed) 1983. Embryology of Angiosperms, Springer-Verlag, New York.
4. Pandey, B.P. 1993. Plant anatomy, S. Chand & Co, New Delhi.

REFERENCE BOOKS

1. Baker, J.R. 1966. Cytological Techniques (5th ed.), Methuen, London.
2. Bierhorst, D.W. 1971. Morphology of vascular plants. Macmillan publishers, New York.
3. Maheshwari, P. 1963. Recent Advances in Embryology of Angiosperms. Intl. Soc. Plant Morphologists, New Delhi.
4. Pullaiah, T., Lakshiminarayana, K. and Hanumantha Rao, B. 2006. Text book of Embryology of Angiosperms. Regency Publications, New Delhi.
5. Raghuvanshi, R.K., Chauhan, A.K.S. and Siddiqui, B.A. 1995. Practical exercises in Cytology, genetics, Plant Breeding and Biostatistics. CBS Publishers & Distributors, New Delhi.
6. Swanson, P. and Webster, P. 1977. The Cell. Prentice Hall, Inc. Englewood Cliffs, New Jersey, USA.

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Dr. E. Neelamathi	Dr. R. Kannan		
Dr. Rakkimuthu			

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY206 Title : PLANT PHYSIOLOGY	Semester: 2	
Hrs/Week :	5	Credits: 4
Objectives	<ul style="list-style-type: none"> • To understand the concepts involved in the functions of plants • To study the recent aspects of various physiological processes in plants. 	

Unit	Content	Hrs
Unit I	Water and plant cells - water balance of the plant - mineral nutrition - Uptake, transport and translocation of water, ions, solutes and macromolecules from soil, through cells, across membranes, through xylem and phloem – transpiration - mechanisms of loading and unloading of photoassimilates - Signal transduction: receptors and G-proteins, phospholipids signaling - role of cyclic nucleotides, calcium - calmodulin cascade - protein kinases and phosphatases - specific signaling mechanisms (two component sensor – regulator system).	13
Unit II	Photosynthesis: evolution of photosynthetic apparatus - photosynthetic pigments and light harvesting complexes - photooxidation of water - mechanism of electron and proton transport - carbon assimilation - calvin cycle - photoprotective mechanisms - CO ₂ fixation - C ₃ , C ₄ and CAM pathways - Respiration and photorespiration: citric acid cycle - plant mitochondrial electron transport and ATP synthesis - alternate oxidase - photorespiratory pathway - RUBISCO - significance of photorespiration.	13
Unit III	Nitrogen metabolism: Nitrate and ammonium assimilation - amino acid biosynthesis - Phytohormones: biosynthesis and mechanism of action of phytohormones - auxin, gibberellin, cytokinin, ethylene and ABA – apoptosis - Sensory photobiology: structure, function and mechanisms of action of phytochromes, cryptochromes and phototropins - stomatal movements - photoperiodism and biological clocks.	13
Unit IV	Carbohydrate metabolism – regulation of starch and sucrose biosynthesis, synthesis and degradation of cellulose - pectin biosynthesis and enzymes involved in pectin degradation - organic acid metabolism – metabolism and roles of oxalic acid, ascorbic acid and malic acid - Lipid metabolism: synthesis of membrane lipids, structural lipids and storage lipids and their catabolism - gluconeogenesis.	13

Unit V	Secondary metabolites - Shikimate pathway and its role in biosynthesis of secondary metabolites - biosynthesis of terpenes, phenols and nitrogenous compounds and their roles - Stress physiology: responses of plants to biotic (pathogen and insects) and abiotic (water, temperature and salt) stresses - mechanisms of resistance to biotic stress and tolerance to abiotic stress.	13
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TEXT BOOKS

1. Jain, V.K. 2000. Fundamentals of Plant Physiology (5th ed.), S. Chand & Co Ltd; New Delhi.
2. Pandey, S.N. and Sinha, B.K. 2010. Plant Physiology, Vikas Publishing, New Delhi.

REFERENCE BOOKS

1. Devlin, R.M. and Baker, N.R. 1973. Photosynthesis, Reinhold Affiliated East-West Press Pvt. Ltd, New Delhi.
2. Moore, T.C. 1979. Biochemistry and physiology of plant hormones. Narosa book Distributors, New Delhi.
3. Roberts, E.A. 1987. Plant growth regulators. Kluwer Academic publishers, London.

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Dr. E. Neelamathi	Dr. R. Kannan		
Dr. M. Manimuthu			

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY207		
Title : GENETICS AND PLANT BREEDING	Semester: 2	
Hrs/Week :	5	Credits: 4
Objectives	<ul style="list-style-type: none"> • To understand the heredity and the variation of inherited characteristics • To study the gene behavior its distribution and mutations • To acquire knowledge on various breeding methods • To learn the applications of induced mutations 	

Unit	Content	Hrs
Unit I	Classical genetics: Mendelian genetics – interaction of genes, modified mendelian ratio - genetics of multiple alleles - penetrance and expressivity – pleiotropism, pseudoalleles, and phenocopies - quantitative inheritance - sex linked, sex influenced inheritance (special reference to plants) - genetics of sex determination - chromosome mapping – reverse genetics and epigenetics.	13
Unit II	Extra-nuclear inheritance: cytoplasmic inheritance – chloroplast – mitochondrial genome in higher plants - DNA as genetic material, transposable elements - population genetics - Hardy-Weinberg Law - gene pool, gene frequency and genotype frequency.	13
Unit III	Classification of mutations - gene mutations - spontaneous and induced mutations – physical and chemical mutagens - molecular basis of gene mutation - point and frame shift and suppressor mutation - gene regulatory mechanisms (prokaryotes & eukaryotes) – genetic disorders in human.	13
Unit IV	Modern Genetics: Gene mapping methods based on test-cross and F2 progenies - LOD score analysis - tetrad analysis and its significance - somatic cell genetics and its use in mapping - molecular markers for genome mapping - principles and methods of QTL mapping - RNA interference (RNAi) - PTGS, RNAi and related phenomena - genetic analysis using RNAi - high-throughput small RNA profiling - RNAi microarrays.	13
Unit V	Introduction to breeding of cultivated plants - significance of breeding - polyploidy and haploids in plant breeding – Breeding techniques: Selection techniques: Types of selection -selection in segregating populations – pedigree method, bulk method and back cross method. Hybridization: Intervarietal, interspecific and intergeneric hybridization -	13

	heterosis - hybrid vigour - marker assisted breeding - national and international organizations for crop improvement.	
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TEXT BOOKS

1. Gardener, E.J. 1975. Principles of Genetics (5th ed.), John wiley, New York.
2. Gupta, P.K. 1994. Genetics, Rashtogi Publication, Meerut, India
3. Singh, E.D. 1990. Plant Breeding. Kalyani Publishers, New Delhi.

REFERENCE BOOKS

1. Allard, R.W. 1960. Principles of Plant Breeding, John Wiley and Sons, Inc. New York.
2. Gilber, N.W. 1978. Organellar heredity, Revan press, New York.
3. King, R.C. 1975. A Hand book of Genetics, Plenum Press, New York.
4. Simmonds, N.W. 1979. Principles of Crop improvement. Longman, London.
5. Strickberger, M.V. 1977. Genetics, Macmillan publishers, New York.

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Dr. R. Kannan	Dr. R. Kannan		

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY208 Title : CORE PRACTICAL II	Semester: 2	
Hrs/Week :	5	Credits: 4
Objectives	<ul style="list-style-type: none"> • To study the physiological processes in the plant system • To acquire practical knowledge on cell and tissue development and organization • To know the inheritance in plants and breeding techniques. 	

Unit	Content	Hrs
Unit I	CYTOLOGY 1. Study of cells (Prokaryotic and Eukaryotic) 2. Chromosome morphology 3. Specialized chromosomes 4. Mitotic and meiotic divisions	13
Unit II	ANATOMY 1. Preparation of sections of stem, root and leaf 2. Staining of various plant tissues 3. Anomalous secondary thickening in monocot and dicots. 4. Microtomy 5. Maceration techniques 6. Slide submission (Microtomy – 5, free hand sections – 5)	13
Unit III	EMBRYOLOGY 1. Anther development 2. Female gametophyte 3. Endosperm-types and haustoria 4. Dissection of embryos 5. Polyembryony	13
Unit IV	PLANT PHYSIOLOGY 1. Rate of transpiration under varying climatic factors 2. Rate of photosynthesis under varying CO ₂ concentration in water plants. 3. Rate of respiration using Ganongs respiroscope 4. Separation of plant pigments by thin layer, paper and column chromatography. 5. Estimation of chlorophyll and carotenoid pigments 6. Determination of total antioxidant activity by phosphomolybdenum reduction method.	13

Unit V	GENETICS AND PLANT BREEDING 1. Mendelian inheritance 2. Non – mendelian inheritance 3. Plant breeding techniques	13
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Dr. E. Neelamathi	Dr. R. Kannan		
Dr. R. Rakkimuthu			
Dr. M. Manimuthu			

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY2N1 Title : MUSHROOM CULTIVATION	Semester: 2	
Hrs/Week :	1	Credits: 2
Objectives	<ul style="list-style-type: none"> • To impart skills on mushroom cultivation, an agro based industry • To have an idea on the intricacies of mushroom cultivation 	

Unit	Content	Hrs
Unit I	Introduction – morphology –types of mushroom – identification of edible and poisonous mushroom – nutritive and medicinal values – life cycle of common edible mushrooms.	3
Unit II	Methods of mushroom cultivation (Hanging bag, bed and rack method) – prospects and scope of mushroom cultivation in small scale industry.	3
Unit III	Life cycle of <i>Pleurotus</i> , <i>Agaricus</i> , <i>Volvariella</i> , <i>Calocybe</i> and <i>Lentinus</i> – breeding and genetic improvement of mushroom strains.	2
Unit IV	Cultivation – conditions for tropical and temperate countries, isolation – spawn production – growth media – spawn running and harvesting of mushrooms.	2
Unit V	Diseases and post harvest technology – harvesting - freezing, dry freezing, drying, packaging and marketing - recipes from mushrooms.	2

TEXT BOOKS

1. Hand book of mushroom cultivation, 1999, TNAU publication.
2. Nita Bhal. (2000). Handbook on Mushrooms. 2nd ed. Vol. I and II. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Tripathi, D. P. (2005). Mushroom Cultivation. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

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1. Alice, D., Muthusamy and Yesuraja, M. (1999). Mushroom Culture. Agricultural College, Research Institute Publications, Madurai.
2. Pathak, V. N. and Yadav, N. (1998). Mushroom Production and Processing Technology. Agrobios, Jodhpur.
3. Tewari Pankaj Kapoor, S. C. (1988). Mushroom Cultivation. Mittal Publication, New Delhi.

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Dr. M. Manimuthu	Dr. R. Kannan		

Department	Botany	
Course	M.Sc., Botany	Effective from the Year: 2015
Subject Code : 15PBY2N2 Title : BIOINFORMATICS	Semester: 2	
Hrs/Week :	1	Credits: 2
Objectives	<ul style="list-style-type: none"> • To gain knowledge on Bioinformatics and databases • To understand the applications of bioinformatics tools 	

Unit	Content	Hrs
Unit I	Fundamentals of computers: Introduction and scope of bioinformatics, Introduction to computers - types of hardware and software operating systems - internet - world wide web-search engines - their functions - searching - file formats, telnet, ftp.	3
Unit II	Biological Databases - sequence and structure- data retrieval - searching source data bases - sequence similarity searches - FASTA and BLAST, CLUSTAL and PHYLIP - use of nucleic acids and protein data banks - NCBI, EMBL, DDBJ, SWISSPROT – multiple sequence alignment.	3
Unit III	Data analysis: Sequence analysis, pair wise alignment and data base search - phylogenetic analysis, profiles and motifs - protein structure visualization - prediction of function from a sequence.	2
Unit IV	Chemical composition of biomolecules. - DNA and RNA - Structure of DNA - development of DNA sequence methods - gene finding and feature detection in DNA.	2
Unit V	Sequencing of databases: Pair wise sequence comparison, sequencing proteins, genome sequencing, SAGE, biological data bases - drug designing - Human genome project and gene therapy.	2

TEXT BOOKS

1. Andreas D. Baxevanis and B.F. Francis overlette, 2002. Bio-informatics, John wiley& Sons.
2. Attwood, T. K. and Parry Smith, D. J. 1999. Introduction to bioinformatics Addison Wesley congman Limited, England.
3. Chowdhary, K. R., and Bansal. V. S. 2011. Bioinformatics and computational technologies. 1 stedn. Scientific publishers, New Delhi.
4. Ignacimuthu, S.J. 2005. Basic Bio-informatics, V.K. Mehra, Narosa publishing house.

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1. Des Higgins, Willie Taylor, 2004. Bio-informatics, Oxford university press.
2. Dunn, S. R. and Pennington, M. J. 2002. Proteomics from protein sequences to function 3rdedn. Viva books Pvt., Ltd, New Delhi.
3. Gibas and Jamback. Developing Bioinformatics Computer skills, O- Rielly Associates
4. Harshishtha,D.,2006. Techniques in teaching computers. International book distributor , Dehradun.
5. Irfan alikhan, AtiyaKhanum, 2003. Essentials of Bio-informatics, Ukaaz publications.
6. Primrose, S. B., and Twyman, R. M., 2003. Principles of genome analysis and genomics.
7. Rastpgo, S, N. Mendinatta and P. Rastogi. 2003. Bio-informatics—Concepts, skills and application. CBS. publication, New Delhi

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Dr. E. Neelamathi			