

ANDHRA MAHILA SABHA
Arts & Science College for Women
(AUTONOMOUS), NAAC Re-accredited
O.U. Campus, Hyderabad.
B.Sc (BZC) (CBCS) Botany – I year
Semester – 1 Paper – I
Microbial Diversity of Lower Plants
Theory Syllabus

Sub code: Bot 101

Instruction:	45Hrs (4 hrs./ week)
Duration of End Semester Examination:	3Hrs (80 M)
Duration of Sessional Examination :	1hr (20M)
Semester Examination:	80 M
Sessional Examination :	20 M

UNIT – I **15hrs**

1. Brief account of Archaeobacteria, Actinomycetes. (4h)
2. Cyanobacteria: General characters, cell structure, thallus organization and their significance as biofertilizers with special reference to *Oscillatoria*, *Nostoc* and *Anabaena*. (6h)
3. Lichens: Structure and reproduction: ecological and economic importance. (5h)

UNIT - II **11 hrs**

4. Viruses: Structure, replication and transmission; plant diseases caused by viruses and their control with reference to Tobacco Mosaic and Rice Tungro. (7h)
5. Bacteria : Structure, nutrition, reproduction and economic importance. An outline of Plant diseases of important crop plants caused by bacteria and their control with reference to Angular leaf spot of cotton and Bacterial blight of Rice. (8h)
6. General account of Mycoplasma with reference to Little leaf of brinjal and papaya leaf curl

UNIT - III **10hrs**

7. General characters, structure, reproduction and classification of algae (Fritsch) and thallus organization in algae. (3h)
8. Structure and reproduction of the following:
 - Chlorophyceae – *Volvox*, *Oedogonium* and *Chara*. (5h)
 - Phaeophyceae – *Ectocarpus* (2h)
 - Rhodophyceae - *Polysiphonia*. (3h)
9. Economic importance of algae in Agriculture and Industry. (2h)

UNIT - IV **9 hrs**

10. General characters and classification of fungi (Ainsworth) (3h)
11. Structure and reproduction of the following: (10h)
 - (a) Mastigomycotina – *Albugo*
 - (b) Zygomycotina- *Mucor*
 - (c) Ascomycotina – *Saccharomyces* and *Penicillium*.
 - (d) Basidiomycotina – *Puccinia*
 - (e) Deuteromycotina – *Cercospora*.
12. Economic importance of fungi in relation to mycorrhizae and mushrooms, General account of mushroom cultivation (2h)

References:

1. Alexopolous, J and W.M.Charles.1988. Introduction to Mycology. Wiley Eastern, New Delhi.
2. Mckane, L. and K.Judy. 1996. Microbiology –Essentials and Applications. McGraw Hill, New York
3. Pandey , B.P.2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S Chand & Company Ltd, New Delhi.
4. Pandey, B.P 2007. Botany for Degree students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics . S.Chand & Company Ltd, New Delhi
5. Sambamurhy , A.V.S.S 2006. A Text book of Plant Pathology, I.K International Pvt. Ltd., New Delhi
6. Sambamurthy, A.V.S.S 2006. A Text book of Algae. I.K. International Pvt Ltd., New Delhi
7. Sharma, O.P.1992. Text book of Thallophyta. McGraw Hill Publishing Co., New Delhi
8. Thakur, A.K. and S.K. Bassi, 2008. A Text book of Botany: Diversity of Microbes and Cryptogams. S.Chand & Company Ltd, New Delhi.
9. Vashishta, B.R ., A.K.Sinha and V.P.Singh. 2008. Botany for Degree Students: Algae. S.Chand & Company Ltd, New delhi
10. Vashishta, B R. 1990. Botany for Students: Fungi, S.Chand & Company Ltd, New Delhi
11. Dutta A.C. 2016. Boaty for Degree Students. Oxford University Press.

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O.U. Campus, Hyderabad.
B.Sc (CBCS) Botany – I year

Semester – II Paper – II
Bryophytes, Pteridophytes, Gymnosperms and Paleobotany

Theory Syllabus

Sub code: Bot 151

Instruction: 60Hrs (4 hrs./ week)
Duration of End Semester Examination: 3Hrs (80 M)
Duration of Sessional Examination : 1hr (20M)

UNIT – I

1. Bryophytes : General characters and classification. (3h)
2. Structure, reproduction, life cycle and systematic position of Marchantia, Anthoceros and Polytrichum. (Development stages are not required) (10h).
3. Evolution of Sporophyte in Bryophytes. (2h)

UNIT – II

4. Pteridophytes : General characters and classification (Sporne's) (3h)
5. Structure, reproduction, life cycle and systematic position of Rhynia, Lycopodium, Equisetum and Marsilea. (10h)
6. Stelar evolution, heterospory and seed habit in Pteridophytes. (2h)

UNIT - III

7. Gymnosperms : General characters, structure, reproduction and Classification (Sporne's) (4h)
8. Distribution and economic importance of Gymnosperms. (3h)
9. Morphology of Vegetative and reproductive parts, systematic position and cycle of Pinus and Gnetum. (8h)

UNIT – IV

10. Paleobotany : Introduction, Fossils and fossilization : Importance of fossils. (8h)
11. Geological time scale ; (4h)
12. Bennettitales : General account. (3h)

References :

1. Watson, E.V.1974. The structure and life of Bryophytes, B.I.Publications, New Delhi.
2. Pandey, B.P. 2006. College Botany, Vol.II: Pteridophyta, Gymnosperms and Paleobotany, S.Chand & Company LTD, New Delhi.
3. Sporne, K.R.1965. Morphology of Gymnosperms. Hutchinson Co., Ltd., London.
4. Vashishta, P. C., A.K.Sinha and Anil Kumar. 2006. Botany – Pteridophyta (Vascular Cryptogams). . Chad & Company Ltd, New Delhi.
5. Pandey , B.P.2007. College Botany, Vol I : Algae, Fungi, Lichens, Bacteria, Viruses, Plant pathology, Industrial Micribiology and Bryophyta. S.Chand & Company Ltd, New Delhi
6. Pandey , B.P 2007. Botany for Degree students : Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S.Chand & Company LTD, New Delhi.
7. Thakur, A.K. and S.K.BASSI. 2008. A Text book of Botany ; Diversity of Microbes and Cryptogams. S.Chand & Company Ltd. New Delhi.
8. Vashishta, B R., A.K.Sinha and Adarsha Kumar . 2008. Botany for Degree students: Bryophyta. S.Chand & Company Ltd, New Delhi.
9. Vashishta, P C . K. Sinha and Anil Kumar. 2006. Botany for Degree students: Gymnosperms. S.Chand & Company Ltd, New Delhi.
10. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.

ANDHRA MAHILA SABHA
Arts & Science College for Women
Theory Syllabus
Botany - Semester III
(AUTONOMOUS), NAAC Re-accredited
O.U. Campus, Hyderabad.
Taxonomy of Angiosperms and Medicinal Botany

BOT 201

Instruction	60 Hrs (4 Hrs/Week)
Duration of Semester Examination	3 Hrs
Duration of Sessional Examination	1Hr
Semester Examination	40 Marks
Sessional Examination	10 Marks

Unit – I
(Systematics) (15 hrs)

1. Introduction: Principles of Plant Systematics, taxonomy vs systematics, Types of classification: Artificial, Natural and Phylogenetic. (3hrs)
2. Systems of Classification : Salient features and comparative account of (5hrs)
Bentham & Hooker and Engler & Prantl. An introduction to Angiosperm Phylogeny Group (AGP)
3. Current concepts in Angiosperm Taxonomy: Embryology in relation to taxonomy, Cytotaxonomy, Chemotaxonomy and Numerical taxonomy. (3hrs)
4. Nomenclature and taxonomic resources: An introduction to ICBN, Vienna Code - a brief account: Role of Botanical Gardens, Floras (including E -Florals).
Herbarium Concept, techniques and applications. (4hrs)

UNIT -II
(Systematic Account of Families) (15hrs)

Systematic study and economic importance of plants belonging to the following families:

5. Polypetalae: Annonaceae, Capparidaceae, Rutaceae, Leguminaceae
(Faboideae/Papilionoideae, Caesalpinioideae, Mimosoideae), Cucurbitaceae.
6. Gamopetalae : Apiaceae, Asteraceae, Apocynaceae, Asclepidaceae, Lamiaceae.
7. Monochlamydeae : Amaranthaceae, Euphorbiaceae, Monocotyledons : Orchidaceae and Poaceae

Unit – III
(Traditional Medicinal Botany) (15 hrs)

8. Ethnomedicine: Scope, interdisciplinary nature, distinction of ethnomedicine from Folklore medicine. Outlines of Ayurveda, Siddha, Unnani and Homeopathic Systems of traditional medicine. Role of AYUSH, NMPB, CIMAP and CDRI. (8 Hrs)
9. Plants in primary health care: Common medicinal plants-Tippateega(*Tinospora cordifolia*), Tulsi (*Ocimum sanctum*), Pippallu (*Piper longum*) Karaka (*Terminalia chebula*), Kalabanda (*Aloe vera*), Turmeric (*Curcuma longa*). (4 Hrs)
10. Evaluation of crude drugs. (3 Hrs)

Unit – IV
(Medicinal Botany and Pharmacognosy) (15hrs)

11. Traditional Medicine Vs Modern medicine: study of selected plant examples used in traditional medicine as resource (active principles, structure, usage and pharmacological action) of modern medicine: Aswagandha(*Withania somnifera*), sarpagandha (*Rauwolfia serpentina*), Nela usiri (*Phyllanthus amarus*), Amla (*Phyllanthus emblica*) and Brahmi (*Bacopa monnieri*). (8 hrs)
12. Pharmacognosy: Introduction and scope. Adulteration of plant crude drugs and methods of identification – some examples Indian Pharmacopoeia. (4 hrs)
13. Plant crude drugs:Types, methods of collection,processing and storage practices. (3 hrs)

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Theory Syllabus
Botany - Semester – IV
Plant Anatomy, Embryology and Palynology

Code:BOT 251

Instruction	60Hrs (4 Hrs/Week0
Duration of Semester Examination	3 Hrs
Duration of Sessional Examination	1 Hrs
Semester Examination	80 Marks
Sessional Examination	20Marks

UNIT – I

(Plant Anatomy) (15 Hrs)

1. Meristems: Types, Histological organization of shoot and root apices and theories (2Hrs)
2. Tissues and tissue systems: Simple, complex and special tissues. (6Hrs)
3. Leaf: Ontogeny, diversity of internal structure; stomata and epidermal outgrowths. (7Hrs)

UNIT II

(Plant Anatomy) (15Hrs)

4. Stem and root anatomy, Vascular cambium formation and function, (3Hrs)
5. Anomalous secondary growth of stem – *Achyranthes*, *Boerhaavia*, *Bignonia*, *Dracaena*; *Root-Betavulgaris* . (5Hrs)
6. Wood structure: (General Account) Study of local timbers – teak (*Tectona grandis*), Rose wood (*Dalbergia latifolia*), Red sanders (*Pterocarpus Santalinus*), Nallmaddi (*Terminalia tomentosa* (*T.alata*) and Neem (*Azadirachta indica*) (7Hrs)

UNIT – III

(Embryology) (15 Hrs)

1. Introduction: History and importance of embryology (2Hrs)
2. Anther structure, Microsporogenesis and development of male gametophyte (6Hrs)
3. Ovule structure and types; Megasporogenesis; types and development of female gametophyte. (7 Hrs)

UNIT – IV

(Palynology)

(15Hrs)

4. Pollination – Types; Pollen-pistil interaction, Fertilization. (4Hrs)
5. Endosperm- Development and types, Embryo- development and types; polyembryony and Apomixis – an outline. (5Hrs)
6. Palynology: Pollen morphology, NPC system, Application of palynology (6Hrs)

Suggested Reading:

1. Bhattacharya et. al.2007. A textbook of palynology, central, New Delhi.
2. Bhojwani, S.S. and S.P. Bhatnagar, 2000, The Embryology of Angiosperms (4th Ed.) Vikas Publishing House, Delhi.
3. Esau, K. 1971, Anatomy of seed plants. John wiley and son, USA.
4. Johri, B.M. 1984, Embryology of Angiosperms, Springer – Verlag, Berlin.
5. Kapil, R.P. 1986. Pollination Biology, Inter India Publishers, New Delhi.
6. Maheswari, P. 1971. An Introduction to Embryology of Angiosperms. Mc Graw Hill Book Co., London.
7. Dutta A.C.2016.Botany for Degree students.Oxford University Press.

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O.U. Campus, Hyderabad.
B.Sc Botany- III Year
Semester-V - Paper-V
Cell Biology and Genetics
Theory Syllabus

Sub code: Bot 301

Instruction:	60Hrs (3 hrs./ week)
Duration of End Semester Examination:	3Hrs (80 M)
Duration of Sessional Examination :	1hr (20M)

Unit - I:

1. Plant cell envelopes: Ultra structure of cell wall, molecular organization of cell membranes. (4h)
2. Nucleus: Ultra structure, Nucleic acids - Structure of DNA, types and functions of RNA. (4h)
3. Chromosomes: Morphology, organization of DNA in a chromosome, Euchromatin and Heterochromatin, Karyotype. DNA Replication. Special types of chromosomes (7h)
Lampbrush Polytene and B - chromosomes.

Unit - II:

4. Extra nuclear genome: Mitochondrial and plastid DNA, plasmids (3h)
5. Cell division: Cell and its regulation; mitosis, meiosis and their significance (3h)
6. Mendelism: Laws of inheritance. Genetic interactions - Epistasis, Complementary, Supplementary and inhibitory genes. (5h)

Unit - III:

7. Linkage: A brief account and theories of Linkage. Crossing over: Mechanism and theories of crossing over. (4h)
8. Genetic maps: Construction of genetic maps with Two point and Three point test cross data. (3h)
9. Mutations: Chromosomal aberrations - structural and numerical changes; Gene mutations, Transposable elements. (3h)

Unit IV

10. Gene Organization- Structure of gene, Genetic code, Method of Replication of DNA in Eukaryotes & Prokaryotes (3h)
11. Mechanism of transcription in Prokaryotes and Eukaryotes, translation (4h)
12. Regulation of gene expression in prokaryotes (Lac and Trp. Operons). (2h)

References:

1. Sharma, A. K. and A. Sharma. 1999. Plant Chromosomes: Analysis, Manipulation and Engineering. Harward Academic Publishers, Australia.
2. Shukla, R. S. and P. S. Chandel. 2007. Cytogenetics, Evolution, Biostatistics and Plant Breeding. S.Chand & Company Ltd., New Delhi.
3. Singh, H. R. 2005. Environmental Biology. S. Chand & Company Ltd., New Delhi.
4. Snustad, D. P. and M. J. Simmons. 2000. Principles of Genetics. John Wiley & Sons, Inc., U S A.
5. Strickberger, M. W. 1990. Genetics (3rd Ed.). Macmillan Publishing Company.
6. Verma, P. S. and V. K. Agrawal. 2004. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand & Company Ltd., New Delhi.

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**B.Sc (CBCS) Botany-III Year
Semester-V - Paper VI
Elective I
Ecology & Biodiversity
Theory Syllabus**

Sub code: Bot 151

Instruction:	60Hrs (3 hrs./ week)
Duration of End Semester Examination:	3Hrs (80 M)
Duration of Sessional Examination :	1hr (20M)

UNIT – I (16hrs)

1. Concept and components of Ecosystem. Energy flow, food chains, food webs, ecological pyramids, Biogeochemical cycles - Carbon Cycle (4h)
2. Definition of Environment: Atmosphere (Troposphere, Stratosphere, Mesosphere, Ionosphere), Hydrosphere, Lithosphere & Biosphere. (3h)
3. Plants and environment: Ecological factors - Climatic (Light and Temperature), and biotic. Ecological adaptations of plants. (5h)
4. Edaphic Factors: Soil- Formation- Weathering, mode of formation-residual;Transported: Colluvial, Alluvial, Glacial & Eolian. Soil erosion & Conservation. (4h)

UNIT – II (8hrs)

5. Population ecology: Natality, Mortality, Growth curves, Ecotypes & Ecads. (4h)
6. Community ecology: Frequency, density cover, Life forms & Biological spectrum. (4h)

UNIT- III (8hrs)

7. Community Dynamics: Succession - Serial stages, Modification of physical environment, Climax formation with reference to Hydrosere and Xerosere. (4h)
8. Production ecology: Concepts of productivity - Primary and Secondary Productivity. (4h)

UNIT IV (13hrs)

9. Biodiversity: Concepts, Convention of Biodiversity - Earth Summit (Copenhagen). (4h)
10. Biodiversity- Levels, threats and value (3h)
11. Hot spots of India - North Eastern Himalayas, Western Ghats; Endemism. IUCN categories, RED data book (3h)
12. Principles of conservation – *In situ* and *Ex situ*. Role of organizations in the conservation of Biodiversity - WWF and NBPGR. (3h)

References:

1. Bharucha, E. 2005. Textbook of Environmental Studies for Undergraduate Courses. Universities Press (India) Private Limited, Hyderabad.
2. Khitoliya, R. K. 2007. Environmental Pollution – Management and Control for Sustainable Development. S. Chand & Company Ltd., New Delhi.
3. Michael, S. 1996. Ecology. Oxford University Press, London.
4. Mishra. D. D. 2008. Fundamental Concepts in Environmental Studies. S. Chand & Company Ltd., New Delhi.
5. Odum, E. P. 1983. Basics of Ecology. Saunder's International Students Edition, Philadelphia.
6. Sharma, P. D. 1989. Elements of Ecology. Rastogi Publications, Meerut.
7. Verma, P. S. and V. K. Agrawal. 2006. Genetics. S. Chand & Company Ltd., New Delhi

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**B.Sc (CBCS) BOTANY: III YEAR
Semester-V - Paper VII
Elective II
Horticulture
Theory Syllabus**

Sub code: Bot 301

Instruction: 60Hrs (3 hrs./ week)
Duration of End Semester Examination: 3Hrs (80 M)
Duration of Sessional Examination : 1hr (20M)

UNIT – I (15hrs)

1. Definition, branches, scope and economic importance of horticultural crops (4h)
2. Classification of horticultural crops based on -Climatic requirements, Season of growth, (6h)
3. Manures: Definition, importance of manures FYM (compost), oil cakes, green manure, Organic manures and vermi-compost. (5h)

UNIT – II (12hrs)

- 4.. Natural Propagation : By seeds, Vegetative Structures like Bulbs, Tubers, Corms, Rhizomes, Root stock, runners, Offsets and suckers . (4h)
- 5.. Artificial Propagation: Cutting, Layering, Grafting and Budding (4h)
6. Application of the following plant growth regulators in horticulture - (4h)
Auxins, Gibberellins, Cytokinins, Ethylene and Brassinosteroids.

UNIT – III (8hrs)

7. Green house technology- definition, types, layout, construction, irrigation systems, care and attention, hardening of plants. (3h)
8. Soil and climatic requirements of horticultural crops, Selection of site, planning, training, pruning and Cropping system; Garden implements and their uses. (5h)

UNIT IV (10hrs)

9. Management: Orchard management, Nutrition management, Water management and Weed Management. (4h)
10. Organic Farming; Bonsai techniques. (6h)

References:

1. Bhattacharjee.S.K. 2006. Amenity Horticulture, Biotechnology and Post harvest technology. Pointer publishers. Jaipur
2. Chadha, K.L. 2001, Handbook of Horticulture, ICAR, New Delhi.
3. Chandra, R. and M. Mishra. 2003. Micropropagation of horticultural crops. International Book Distributing Co., Lucknow.
4. Chattopadhyaya, P.K.2001. A text book on Pomology (Fundamentals of fruit growing) Kalyani Publication, New Delhi
5. Christopher, E.P. 2001. Introductory Horticulture, Biotech Books, New Delhi
6. Edmond, J.B. T.L.Senn, F.S. Andrews and P.G.Halfacre, 1975. Fundamentals of Horticulture, Tata MC. Graw Hill Publishing Co.New Delhi
7. George Acquaah, 2002, Horticulture-principles and practices. Prentice-Hall of India pvt. Ltd., New Delhi.
8. Hartman, H.T. and Kester, D.E. 1986. Plant propagation – Principles and Practices – Prentice Hall of India Ltd., New Delhi.
9. Jacob John. P. 2008. A hand book of post harvest management of fruits and vegetables. Daya publishers.
10. Jitendra Singh. 2006. Basic Horticulture. Kalyani Publishers, New Delhi.
11. Rajan, S. and B.L. Markose. 2007. Propagation of horticultural crops. New India Publishing, New Delhi.
12. Shanmugavelu, K.G., N. Kumar and K.V. Peter. 2005. Production technology of spices and plantation crops. Agrobios, Jodhpur.
13. Singh, D.K. 2008. Hi-tech horticulture. Agrotech publishers, Udaipur
14. Singh, N.P. 2005. Basic concepts of fruit science. International Book Distributing Co., Lucknow.
15. Surendra Prasad and U. Kumar. 1999. Principles of horticulture, Agro-botanica, Bikaner, India.
16. Sureshkumar, P. Sagar and Manish Kanwat. 2009. Post harvest physiology and quality management of fruits and vegetables. Agrotech publishers, Udaipur
17. Utpal Banerjee. 2008. Horticulture. Mangal Deep publishers
18. Vijaikumar UmRao. 2008. Horticulture terms – Definitions and Terminology. IBD publishers, Dehradun
19. Adams, C.R. and M. P. Early. 2004. Principles of horticulture. Butterworth –Heinemann, Oxford University Press.
20. Bansil. P.C. 2008. Horticulture in India. CBS Publishers and Distributors, New Delhi.

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B.Sc (CBCS) Botany: III Year
Semester-VI - Paper-VIII
Plant Physiology
Theory Syllabus

Sub code: Bot 151

Instruction: 60Hrs (3 hrs./ week)

Duration of End Semester Examination: 3Hrs (80 M)

Duration of Sessional Examination : 1hr (20M)

UNIT – I (12hr)

1. Water Relations: Importance of water to plant life, physical properties of water, diffusion, imbibition, osmosis; water, osmotic and pressure potentials; absorption, transport of water, ascent of sap; transpiration; Stomatal structure and movements. (7h)
2. Mineral Nutrition: Essential macro and micro mineral nutrients and their role; symptoms Of mineral deficiency. (3h)
3. Stress physiology: concept and plant responses to water, salt and temperature stresses (2h)

UNIT- II (10hr)

4. Translocation of organic substances: Mechanism of phloem transport; source-sink relationships. (2h)
5. Enzymes: Nomenclature, characteristics, mechanism and regulation of enzyme action, Enzyme kinetics, factors regulating enzyme action. (4h)
6. Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect; concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; Factors effecting Photosynthesis, photophosphorylation. (4h)

UNIT – III (14hr)

7. Carbon assimilation pathways: C₃, C₄ and CAM. (4h)
8. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation, pentose phosphate pathway. (6h)
9. Nitrogen Metabolism: Biological nitrogen fixation, nitrate reduction, ammonia assimilation, (GS-GOGAT, transamination) (4h)

UNIT IV (9hr)

10. Lipid Metabolism: Structure and function of lipids. (3h)
11. Growth and Development: Physiological effects of phytohormones–Auxins, gibberellins, cytokinins, ABA, ethylene and Brassinosteroids (3h)
12. Physiology of flowering and photoperiodism. Role of Phytochrome in flowering. (3h)

References:

1. Hopkins, W. G. 1995. Introduction to Plant Physiology. John Wiley & Sons Inc., New York, USA
2. Jain, J.L., S. Jain and Nitin Jain. 2008. Fundamentals of Biochemistry. S. Chand & Company Ltd., New Delhi.
3. Pandey, B. P. 2007. Botany for Degree Students: Plant Physiology, Biochemistry, Biotechnology, Ecology and Utilization of Plants. S. Chand & Company Ltd., New Delhi.
4. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc., USA.
5. Taiz, L. and E. Zeiger. 1998. Plant Physiology (2nd Ed.). Sinauer Associates, Inc., Publishers, Massachusetts, USA.
6. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.

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**B.Sc (CBCS) Botany-III Year
Semester-VI – Paper-IX
Elective III
Tissue Culture and Biotechnology
Theory Syllabus**

Sub code: Bot 151

Instruction:	60Hrs (3 hrs./ week)	
Duration of End Semester Examination:		3Hrs (80 M)
Duration of Sessional Examination :		1hr (20M)

UNIT – I (15hrs)

1. Tissue culture: Introduction, sterilization procedures, explants, culture media – Composition and preparation; Micropropagation. (5h)
2. Organ culture: Vegetative Organs-Root, Shoot, Leaf culture (6h)
Reproductive Organs-Anther, Ovary, Ovule, Embryo culture
3. Callus culture, Cell and Protoplast culture (4h)

UNIT- II(12hrs)

4. Somatic hybrids and Cybrids. (4h)
5. Applications of tissue culture: Production of pathogen free plants and somaclonal variants, production of stress resistance plants, secondary metabolites and synthetic seeds (6h)
6. Production of hairy roots and its applications in production of secondary metabolites. (2h)

UNIT- III(12hrs)

7. Biotechnology: Introduction, history, scope and applications. (3h)
8. rDNA technology: Basic aspect of of gene cloning, Enzymes used in gene cloning- Restriction enzymes, Ligases, Polymerases. (4h)
9. Gene cloning-Vectors – cloning vehicles (Plasmid , Cosmids, Bacteriophages , & Phasmids)application of r DNA technology. (5h)

UNIT IV(11hrs)

10. Gene Libraries: Genomic Libraries, cDNA Libraries, Polymerase chain reaction and its applications. (4h)
11. Method of gene transfer in plants (*Agrobacterium* and Microprojectile) (4h)
12. Production of transgenic plants, Bt –application in cotton and brinjal. Application of Transgenic in crop improvement. (3h)

References:

1. Balasubramanian, D., C. F. A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman. 2004.
2. Biotechnology. Universities Press (India) Private Limited, Hyderabad.
3. Channarayappa. 2007. Molecular Biotechnology – Principles and Practices. Universities Press
Press
4. (India) Private Limited, Hyderabad.
5. Chawala, H. S. 2002. Introduction to Plant Biotechnology. Oxford & IBH Publishing
Company,
6. New Delhi.
7. Dubey, R. C. 2001. A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi
8. Edmond, J. B., T. L. Senn, F. S. Adrews and R. J. Halfacre. 1977..
9. Jha, T.B. and B. Ghosh. 2005. Plant Tissue Culture – Basic and Applied. Universities Press
(India)
10. Private Limited, Hyderabad..
11. Ramawat, K. G. 2008. Plant Biotechnology. S. Chand & Company Ltd., New Delhi.
12. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition),
Wordsworth,
13. Thomson Learning Inc., USA..

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**B.Sc (CBCS) BOTANY: III YEAR
Semester-VI – Paper-X
Elective IV
Seed Technology
Theory Syllabus**

Sub code: Bot 151

Instruction:	60Hrs (3 hrs./ week)
Duration of End Semester Examination:	3Hrs (80 M)
Duration of Sessional Examination :	1hr (20M)

UNIT- I (9hrs)

1. Seed: Structure and types. Seed dormancy: causes and methods of breaking dormancy. (4h)
2. Seed storage: Long term and short term storage. Orthodox and recalcitrant seeds. Packing of seeds – Principles, practices, bagging and labelling. (3h)
3. Physico and Bio-chemical changes during seed storage. (2h)

UNIT-II (15hrs)

4. Seed viability, factors affecting seed viability and genetic erosion. (3h)
5. Cultural practices and harvesting of Seed: Isolation, Sowing, Cultural practices, harvesting and threshing of the following crops: (9h)
a) Rice b) Cotton c) Sunflower
6. Seed Treatment to control seed borne disease –General account (3h)

UNIT-III (13hrs)

7. Structure of pollen and ovule-Types of ovules, Collection and storage of pollen (3h)
8. Principles of hybrid seed production-Cross pollination, Emasculation, Self pollination, role of pollinators and their management. (6h)
9. Seed development in cultivated plants, seed quality concept, importance of genetic purity of seed. Hybrid seed production and Heterosis. (4h)

UNIT IV (6+)

10. Seed production technology; seed testing- Procedures of seed testing, seed testing laboratories and importance of seed testing.
11. Seed certification- History, Seed certification agency, Indian minimum, general and specific seed certification standard. (3h)
12. Seed banks- National, International and Millennium seed banks. (3h)

References:

1. Agrawal, P. K. 1993. Hand Book of Seed Technology. Dept. of Agriculture and Cooperation. National Seed Corporation Ltd., New Delhi
2. Balasubramanian, D., C. F. A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman. 2004. Biotechnology. Universities Press (India) Private Limited, Hyderabad.
3. Bedell, Y. E. Seed Science and Technology. Indian Forest Species. Allied Publishers .Limited, New Delhi.
4. Channarayappa. 2007. Molecular Biotechnology – Principles and Practices. Universities .Press (India) Private Limited, Hyderabad.
5. Chawala, H. S. 2002. Introduction to Plant Biotechnology. Oxford & IBH Publishing Company, New Delhi.
6. Dubey, R. C. 2001. A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi
7. Edmond, J. B., T. L. Senn, F. S. Adrews and R. J. Halfacre. 1977..
8. Hartman, H. T. and D. E. Kestler. 1976. Plant Propagation: Principles and Practices. Prentice & Hall of India, New Delhi.
9. Jha, T.B. and B. Ghosh. 2005. Plant Tissue Culture – Basic and Applied. Universities Press (India) Private Limited, Hyderabad..
10. Ramawat, K. G. 2008. Plant Biotechnology. S. Chand & Company Ltd., New Delhi.
11. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc., USA..
12. Tiwari, G. N. and R. K. Goal. Green House Technology – Fundamentals, Design, Modelling and Application. Narosa Publishing House, New Delhi.
13. Tunwar, N. S. and S. V. Singh. 1988. Indian Minimum Seed Certification Standards. The Central Seed Certification Board, Govt. of India, New Delhi.

