

Year-2023-2024

Syllabus of B.Sc. Programme: [Subject Name: Botany]

In accordance with NEP-2020

Year	Sem.	Course Code	Paper Title	Theory/Practical	Max. Marks.	Credits
1	I	UGBY-101(N)	Cytology and Genetic	Theory	100	2
	I	UGBY-101(N) (P)	Practical Work	Practical Work	100	2
	II	UGBY-102(N)	Plant Physiology	Theory	100	2
	II	UGBY-102(N) (P)	Practical Work	Practical Work	100	2
2	III	UGBY-103(N)	Plant Diversity-I	Theory	100	2
	III	UGBY-103(N) (P)	Practical Work	Practical Work	100	2
	IV	UGBY-104(N)	Plant Diversity-II	Theory	100	2
	IV	UGBY-104(N) (P)	Practical Work	Practical Work	100	2
	Skill Enhancement Course					
IV	SBSBY-02(N)	Ecology	Theory	100	4	
3	Discipline Centric Elective Course					
	V	DCEBY -105(N)	Embryology and Morphogenesis	Theory	100	2
	V	DCEBY-106(N)	Plant Pathology and Microbiology	Theory	100	2
	V	DCEBY-107(N) (P)	Practical Work	Practical Work	100	2
	Discipline Centric Elective Course					
	VI	DCEBY-108(N)	Molecular Genetics and biotechnology	Theory	100	2
	VI	DCEBY-109(N)	Paleobotany, Palynology and Economic Botany	Theory	100	2
	VI	DCEBY-110(N) (P)	Practical Work	Practical Work	100	2
Total Marks/Credit					1500	32

B.Sc.: Subject: Botany

Course prerequisites: To study this course, a student must have qualified 10+2 with Biology		
Programme: B.Sc.	Year: I	Semester: I
Subject: Biology		
Course Code: UGBY-101 (N)	Course Title: Cytology and Genetic	
Course Objectives: The main objective of the course is to make learners aware of- <ul style="list-style-type: none"> • Cell science • Eukaryotic plant cell, various cellular organelles and genetics 		
Course Outcomes: (CO): Knowledge of plant cell and various cellular organelles. <ul style="list-style-type: none"> • Salient features of cell division in plants cell. • Understand the Mendel's laws of Heredity. • Concept of linkage, crossing over and chromosome mapping. • Extranuclear inheritance, structure, numerical abnormalities in chromosome and their effects. • Knowledge of nature and structure of genetic material. • Structure and function of gene. 		
Credits: 02		Type of Course: Core
Max. Marks: 100	Min. Passing Marks: 36	
Block 1	Cytology	
Unit I	Cell structure and cellular organelles-I <ul style="list-style-type: none"> • Chloroplast, Mitochondria, Ribosome, Nucleolus and Nucleus, Plasma membrane 	
Unit II	Cell structure and cellular organelles-II <ul style="list-style-type: none"> • Endoplasmic reticulum, Golgi-body, Lysosome and chromosome. 	
Unit III	Cell cycle, Mitosis and Meiosis	
Block 2	Genetics-I	
Unit IV	Pre-mendelian genetics and Mendel's laws of inheritance	
Unit V	Linkage and crossing over	
Unit VI	Cytoplasmic inheritance, sex linked	
Block 3	Genetics-II	
Unit VII	Pre-Chromosomal aberrations	
Unit VIII	Gene mutation and induced mutation	
Unit IX	Genetics in Plant improvement	
Suggested Text Book Readings: Gardner, E.J., Simmons, M.J., Snustad, D.P. (1991). Principles of Genetics, John Wiley & sons, India. 8th Cell Biology And Genetics (Hindi) 2/e PB....Gupta P K (Hindi) rastogi Publications Cytogenetics, Plant Breeding, Evolution and Biostatistics ISBN #: 978-81-301-0066-1Sunil D Purohit & Gotam K Kukda, Apex Publishing House Genetics and Biotechnology Sunil D Purohit, K. Ahmed & Gotam K Kukda Apex Publishing House		
This course can be opted as an elective by the students of following subjects: NA		
Suggested equivalent online courses (MOOCs) for credit transfer: NA		

Course prerequisites: To study this course, a student must have qualified 10+2 with Biology		
Programme: B.Sc.	Year: I	Semester: II
Subject: Biology		
Course Code: UGBY-102 (N)	Course Title: Plant Physiology	
Course Objectives: The main objective of the course is to make learners aware of- <ul style="list-style-type: none"> Plant water relations, mineral nutrition, photosynthesis, Respiration and growth hormones 		
Course Outcomes (CO): <ul style="list-style-type: none"> Understand different process of plant water relation. Understand process of photosynthesis. Process of biological Nitrogen Fixation. Plant hormones and their role in physiology of plant. 		
Credits: 02	Type of Course: Core	
Max. Marks: 100	Min. Passing Marks: 36	
Block 1	Plant Physiology-I	
Unit I	The Concept of Diffusion, Imbibition, Osmosis and Water Potential	
Unit II	Absorption of Water <ul style="list-style-type: none"> Water absorbing organ, active water absorption theory and passive water absorption theory 	
Unit III	Ascent of Sap <ul style="list-style-type: none"> Concepts, theory of ascent of sap with emphasis on cohesion theory of ascent of sap. 	
Unit IV	Water Loss (Transpiration) <ul style="list-style-type: none"> Stomatal structure, mechanism of stomatal opening and closing, transpiration, guttation, factors controlling transpiration 	
Block 2	Plant Physiology-II	
Unit V	Mineral Nutrition <ul style="list-style-type: none"> Essential elements, macro and micro nutrient, role of essential elements, transport of ion across cell membrane , active and passive transport. 	
Unit VI	Photosynthesis <ul style="list-style-type: none"> Basic concept, equation of photosynthesis, evidence for the existence of light and dark reaction, structure of chloroplast, discovery of two light reactions, quantum yield, red drop, Emerson enhancement effect, photo system I & II, dark reaction-the calvin cycle photorespiration and C₄ plants, CAM plant. 	
Unit VII	Hormones <ul style="list-style-type: none"> Discovery and characteristic of plant hormones, role of auxins, giberellin, cytokinin, ethylene, abscisic acid. Flowering hormones, Phytochrome. 	
Unit VIII	Respiration <ul style="list-style-type: none"> Aerobic and anaerobic respiration, Glycolysis, TCA cycle, Oxidative phosphorylation. 	
Suggested Text Book Readings: Jain, V.K. Fundamental of Plant Physiology (7th ed.) 2004. S. Chand and Company. Salisbury, F.B. & Ross, C.W. Plant Physiology (4th ed.), 1992, Wadsworth Publishing Company. Panday, S.N. & Sinha, B.K. Plant Physiology (4th ed.), 2006, Vikas Publishing House Pvt. Ltd. Mukherjee, S. & Ghosh, A. Plant Physiology (2nd ed.), 2005, New Central Book Agency. Chaudhuri, D., Kar, D.K., and Halder, S.A. Handbook of Plant Biosynthetic Pathways 2008, New Central Book. Agencies. Srivastava, HN. 2006. Pradeep's Botany Vol. V. Pradeep Publications, Jalandhar. Verma, SK. Plant Physiology and Biochemistry. S. Chand & Sons, New Delhi.		
This course can be opted as an elective by the students of following subjects: NA		
Suggested equivalent online courses (MOOCs) for credit transfer: NA		

<p>Electronic media and other digital components in the curriculum: Choose any one or more than one: (Electronic Media: Audio/Video Lectures, Online Counselling/Virtual Classes/E-Contents/e-SLM/OER/supplementary links for reference/Video Conferencing/Radio broadcast/Web Conferencing/ Other electronic and digital contents)</p>	
<p>Name of electronic media Video Lectures https://youtu.be/AXMZ80EePQy https://youtu.be/2W5SKKFNdk https://youtu.be/yEblrxy6mAU https://youtu.be/oElnm3y7Pzw https://youtu.be/Vcs-4Ws/2Q e-SLM</p>	<p>Year of incorporation: 2021-22</p>

Course prerequisites: To study this course, a student must have qualified 10+2 with Biology		
Programme: B.Sc.	Year: I	Semester: III
Subject: Biology		
Course Code: UGBY-103 (N)	Course Title: Plant Diversity-I	
Course Objectives: The main objective of the course is to make learners aware of- <ul style="list-style-type: none"> • Structure, reproduction and economic important of bacteria, virus and lichens. • Morphology and life cycle of important groups of algae, fungi, bryophytes and pteridophytes. 		
Course Outcomes:(CO): <ul style="list-style-type: none"> • Knowledge of microbes and diversity of lower plants. • Understand the diversity of plant. • Knowledge of morphology, cell structure and life cycle of various algae. • Habits, morphology, life cycle of fungi and their economic importance. 		
Credits: 02		Type of Course: Core
Max. Marks: 100		Min. Passing Marks: 36
Block 1	Plant Diversity-I	
Unit I	Bacteria, Virus and Lichen <ul style="list-style-type: none"> • Bacterial-Cell structure, Reproduction, Economic importance • Virus- Biological status of virus, structure of bacteriophage & TMV, replication. • Lichen- Structure and economic importance of lichen. 	
Unit II	Algae – I <ul style="list-style-type: none"> • Morphology and life cycle of algae, unicellular form <i>chlamydomonas</i>, colonial forms <i>Volvox</i>, Filamentous form <i>Nostoc</i>, Heterotrichous forms <i>Ectocarpus</i>, Thalloid form <i>Fucus</i>, Polysiphonoid form <i>Polysiphonia</i>. 	
Unit III	Algae – II <ul style="list-style-type: none"> • Origin and evolution of sex, classification of Algae: Criteria for classification, Economic importance of Algae, Habitats and distribution- Algae, Aquatic algae: Fresh water, Marine habitats Special Habitats; Soil and sub aerial algae. 	
Unit IV	Fungi <ul style="list-style-type: none"> • Introduction; Habitats, morphology, nutrition and reproduction, life cycle of <i>phytophthora</i>, <i>Rhizopus</i>, <i>Puccinia</i>, <i>Cercospora</i>, Economic importance of fungi. 	
Block 2	Plant Diversity-I	
Unit V	Bryophytes-I <ul style="list-style-type: none"> • Introduction, General characteristics, adaptation to land habit, morphology, anatomy and reproduction of Hepaticosida <i>Riccia</i>, <i>Marchantia</i>, <i>Pellia</i>, Anthocerosida <i>Anthoceros</i>, <i>Bryopsida-Sphagnum</i>. 	
Unit VI	Bryophytes-II <ul style="list-style-type: none"> • Evolution of sporophytes in bryophytes. Importance and bio-functional uses of bryophytes (Food, Medicine, Ecological Services, Industrial and Research work) 	
Unit VII	Pteridophytes-I <ul style="list-style-type: none"> • General characteristics, and Life cycle of pteridophytes, Relationship with other groups, stellar structure and evolution, Fern as a system for experimental studies, apogamy and apospory. 	
Unit VIII	Pteridophytes-II <ul style="list-style-type: none"> • Morphology, anatomy and life cycle of <i>Rhynia</i>, <i>Lycopodium</i>, <i>Selaginella</i>, <i>Equisetum</i>, and <i>Marsilea</i>. 	
Suggested Text Book Readings: Parihar, N.S. (1991). An introduction to Embryophyta. Vol. I. Bryophyta. Central Book Depot, Allahabad. Rashid A (1999) An Introduction to Pteridophyta, Vikas Publishing House Pvt. Ltd. New Delhi. Vashishtha BR, Sinha AK and Kumar A (2010) Botany for Degree Students – Pteridophyta, S. Chand and Company Parihar NS (1976) Biology and Morphology of Pteridophytes. Central Book Depot.		

Course prerequisites: To study this course, a student must have qualified 10+2 with Biology		
Programme: B.Sc.	Year: I	Semester: IV
Subject: Biology		
Course Code: UGBY-104 (N)	Course Title: Plant Diversity-II	
Course Objectives: The main objective of the course is to make learners aware of- <ul style="list-style-type: none"> • Gymnosperms & life cycle of Cycas & Pinus. • Various aspects of anatomy of vascular plants. • System of classification and details of important dicot and monocot families. 		
Course Outcomes:(CO): <ul style="list-style-type: none"> • Understand morphology, anatomy, life cycle and economic important genera of gymnosperm. • Anatomy and secondary growth in some angiospermic plants. • General information of flowering plants. • Understand aims, objective and importance of taxonomy. • Various system of plant classification and description of some important families. 		
Credits: 02	Type of Course: Core	
Max. Marks: 100	Min. Passing Marks: 36	
Block 1	Plant Diversity-II	
Unit I	Introduction of Gymnosperms <ul style="list-style-type: none"> • Introduction, characteristic, classification and economic importance of gymnosperm. 	
Unit II	Cycas <ul style="list-style-type: none"> • Structure and reproduction (life cycle) 	
Unit III	Pinus <ul style="list-style-type: none"> • Structure and reproduction (life cycle) 	
Block 2	Plant Diversity-II	
Unit IV	Tissue system <ul style="list-style-type: none"> • simple tissue, complex tissue. 	
Unit V	Root <ul style="list-style-type: none"> • Primary and secondary structure of root 	
Unit VI	Stem <ul style="list-style-type: none"> • Primary and secondary structure 	
Unit VII	Anomalous Secondary Growth <ul style="list-style-type: none"> • Anomalous secondary growth in <i>Bignonia</i> and <i>Boerhaavia</i> (dicot-stem), <i>Dracaena</i> (Monocot-stem) 	
Block 3	Plant Taxonomy	
Unit VIII	Plant Taxonomy-I <ul style="list-style-type: none"> • History of Economic botany with special reference to India, Bentham and Hookers system of classification. 	
Unit IX	Plant Taxonomy-II <ul style="list-style-type: none"> • Details account of following families: Dicot-Family- Asteraceae, Ranunculaceae, Brassicaceae, Solanaceae, Malvaceae, Mimosoideae, Caesalpinioideae, Papilionoideae, Monocot-Family- Liliaceae, Orchidaceae, Poaceae 	
Suggested Text Book Readings: Bhatnagar, S.P. and Moitra, A. (1996). Gymnosperms. New Age International (P) Ltd Publishers, New Delhi, India. Sharma OP (1990) Textbook of Pteridophyta. MacMillan India Ltd. Delhi. Vashishtha BR, Sinha AK and Kumar A (2010) Botany for Degree Students – Gymnosperms, S. Chand Bhatnagar SP (1996) Gymnosperms, New Age International Publisher. E.J.Eames . Morphology of Vascular Plants, Standard University Press. Dickinson, W.C. (2000). Integrative Plant Anatomy. Harcourt Academic Press, USA. Fahn, A. (1974). Plant Anatomy. Pergmon Press, USA. Evert, R.F. (2006) Esau's Plant Anatomy: Meristems, Cells, and Tissues of the Plant Body: Their		

Structure, Function and Development. John Wiley and Sons, Inc.
Plant Systematics. Arun K. Pandey & Shruti Kansana. 2020. Jaya Publishing House
K. B. Anjaria, (2015)“Electronic Herbarium and Digital Database Preparation of Common Trees of Anand District, Gujarat” MRP submitted to UGC, WRO, Pune 2015 (unpublished)
Pandey, B.P. 2007. Botany for Degree Students: Diversity of Seed Plants and their Systematics, Structure, Development and Reproduction in Flowering Plants. S. Chand & Company Ltd, New Delhi.

Course prerequisites: To study this course, a student must have qualified 10+2 with Biology		
Programme: B.Sc.	Year: I	Semester: V
Subject: Biology		
Course Code: SBSBY-02(N)	Course Title: Ecology	
Course Objectives: The main objective of the course is to make learners aware of- <ul style="list-style-type: none"> Ecosystem its various aspects which educate them about environment. 		
Course Outcomes (CO): <ul style="list-style-type: none"> Understand the concept of environment, ecology and ecosystem. Structure and organization of ecosystem with biotic and abiotic component. Energy flow and nutrient cycle in ecosystem. Community, population and role of ecology in human welfare. 		
Credits: 02	Type of Course: Core	
Max. Marks: 100	Min. Passing Marks: 36	
Block 1	Ecology-I	
Unit I	Introduction To Ecology	
Unit II	Structure and function of Ecosystem <ul style="list-style-type: none"> Biotic and Abiotic components, Food chain, Food web, Pyramid, and Energy flow in ecosystem, Biogeochemical cycle. 	
Unit III	Ecological Succession <ul style="list-style-type: none"> Basic concept, succession in water and land (hydrosere and xerosere) 	
Unit IV	Pollution <ul style="list-style-type: none"> Definition, types of pollution: Air pollution, water pollution, Noise pollution, control of pollution. 	
Block 2	Ecology-II	
Unit V	Ecological Adaptations in Plants <ul style="list-style-type: none"> Hydrophytic and xerophytic adaptation. 	
Unit VI	Edaphic Factors <ul style="list-style-type: none"> Definition and composition of soil, soil profile, soil erosion, soil conservation. 	
Unit VII	Phytogeography <ul style="list-style-type: none"> Major plant community of world, soil, climate and vegetation of India. 	
Unit VIII	Environmental Education	
Suggested Text Book Readings: Ecology And Environmental Biology by RBD Publisher Author: Bhatia - Jain - Kohli - Shrivastava - Singh – Verma Environmental Biology and Phytogeography ISBN #: 978-81-301-0064-7B. L. Chaudhary, Gotam K Kukda & Jitendra Kumar Joshi Odum, F.P. Fundamentals of Ecology, Latest Ed., Saunders Sharma, P.D. Elements of Ecology, Latest Ed., Rastogi Publications Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi.		

Course prerequisites: To study this course, a student must have qualified 10+2 with Biology		
Programme: B.Sc.	Year: I	Semester: V
Subject: Biology		
Course Code: DCEBY-105 (N)	Course Title: Embryology and Morphogenesis	
Course Objectives: The main objective of the course is to make learners aware of- <ul style="list-style-type: none"> • Various aspects of angiosperm's embryology and phenomenon of morphogenesis in plant. 		
Course Outcomes (CO): <ul style="list-style-type: none"> • Knowledge about gametogenesis of anther and ovule. • Pollination, fertilization along with development of embryo and endosperm. • Understand Polyembryony, its application and morphogenesis. 		
Credits: 02		Type of Course: Core
Max. Marks: 100	Min. Passing Marks: 36	
Block 1	Plant Embryology-I	
Unit I	Introduction to Embryology	
Unit II	Life Cycle of Angiosperm <ul style="list-style-type: none"> • Structure of flower; process of reproduction 	
Unit III	Microsporogenesis <ul style="list-style-type: none"> • Microsporogenesis and male gametophytes; microsporangium anther wall and sporogenous tissue. Microsporogenesis-Cytokinesis, pollen tetrads. Male gametophyte- Structure of pollen grains, development of male gametophyte. 	
Unit IV	Megasporesogenesis <ul style="list-style-type: none"> • Megaspore and female gametophyte-1. Megaspore - type of ovule, development of ovule, parts of ovule, 2. Megasporesogenesis, Female gametophyte (Embryosac) structure of embryosac and types. 	
Block 2	Plant Embryology-II	
Unit V	Pollination <ul style="list-style-type: none"> • Anther dehiscence, types of pollination, agents and types of cross pollination; artificial pollination. 	
Unit VI	Fertilization <ul style="list-style-type: none"> • Germination of pollen grain, Growth of pollen tube, Entry of pollen tube into Ovule and Embryosac, Movement of sperm towards egg and polar nuclei. pollination and fertilization. 	
Unit VII	Post fertilization Development <ul style="list-style-type: none"> • Endosperm- Types of endosperm, Nuclear types, Cellular types, Helobial types, Function of endosperm, morphological nature of endosperm, embryogenesis – Development of dicot and mono-cot embryo, nutrition of embryo 	
Unit VIII	Polyembryony and Apomixis <ul style="list-style-type: none"> • Origin of polyembryony, causes of polyembryony and role of polyembryony in breeding. apomixis; Types of apomixes and its significance. 	
Block 2	Plant Morphogenesis and Polarity	
Unit IX	Morphogenesis <ul style="list-style-type: none"> • Morphogenesis and Factors Affecting Morphogenesis 	
Unit-X	Polarity <ul style="list-style-type: none"> • Symmetry, Totipotency 	
Suggested Text Book Readings: Bhojwani, S.S. and S. P. Bhatnagar. 2000. The Embryology of Angiosperms (4th Ed.), Vikas Publishing House., Johri, B. M. 1984. Embryology of Angiosperms. Springer-Verlag, Berlin.		

Course prerequisites: To study this course, a student must have qualified 10+2 with Biology		
Programme: B.Sc.	Year: I	Semester: V
Subject: Biology		
Course Code: DCEBY-106 (N)	Course Title: Plant Pathology and Microbiology	
Course Objectives: The main objective of the course is to make learners aware of- <ul style="list-style-type: none"> • Scope and importance of plant pathology. • Know the prevention and control measures of plant diseases. • Life cycle of some important plant diseases. • Soil, water and dairy microbiology. 		
Course Outcomes (CO): <ul style="list-style-type: none"> • Introduction of plant pathology, symptoms, dissemination and various control methods for disease. • Description of some important diseases of plants. • Knowledge of water, soil and dairy microbiology. 		
Credits: 02	Type of Course: Core	
Max. Marks: 100	Min. Passing Marks: 36	
Block 1	Plant Pathology	
Unit I	Introduction of plant pathology	
Unit II	Symptoms of plant diseases caused by fungi, bacteria and virus	
Unit III	Control of plant diseases : various methods used for disease control	
Unit IV	Dissemination of pathogen, epidemiology and disease forecasting	
Unit V	Diseases of plant. <ul style="list-style-type: none"> • White Rust of Crucifer, wilt of arhar, damping off, Late Blight of potato, Early Blight of Potato, Black Rust of wheat, Tikka Disease of Groundnut Loose smut of wheat. 	
Block 2	Microbiology	
Unit VI	Sewage microbiology <ul style="list-style-type: none"> • What is sewage, various process of treatment of sewage. 	
Unit VII	Soil microbiology <ul style="list-style-type: none"> • Humus, Role of microbes in various cycles: Nitrogen, Carbon, Phosphorous and sulphur in soil. 	
Unit VIII	Dairy microbiology	
Suggested Text Book Readings: Microbiology Fundamental and Applications (hindi) (pb) Modern Microbiology (hindi) (hb) ISBN: 9788177543599 Edition : 1 Year : 2018 Author : Dr. Purohit SS , Dr. Singh T Publisher : Agrobios (India) “Plant pathology by R.S. Mehrotra, Tata McGraw-Hill Education” are included in reading resources list Sharma, P. D. 2012, Microbiology and Plant Pathology, Rastogi Publication Pvt Ltd., Meerut, India. Singh, R. P. 2007. Microbial Taxonomy and Culture Techniques, Kalyani Publication, New Delhi.		

Course prerequisites: To study this course, a student must have qualified 10+2 with Biology		
Programme: B.Sc.	Year: I	Semester: VI
Subject: Biology		
Course Code: DCEBY-108 (N)	Course Title: Molecular Genetics and Biotechnology	
Course Objectives: The main objective of the course is to make learners aware of- <ul style="list-style-type: none"> • The genomic organization. • Genetic engineering. • Concept of operon its structure and regulation. • Basic protocols for plant tissue culture. 		
Course Outcomes (CO): <ul style="list-style-type: none"> • Understand DNA, RNA, gene expression and regulation. • Genetic engineering, biotechnology and its applications in human welfare with special reference to agriculture. 		
Credits: 02	Type of Course: Core	
Max. Marks: 100	Min. Passing Marks: 36	
Block 1	Molecular genetics- I	
Unit I	Nucleic acids (DNA & RNA) and Genetic Materials	
Unit II	Structure of DNA, Replication and Types of RNA	
Unit III	Gene Expression, Transcription and Translation in Prokaryotes and Eukaryotes	
Block 2	Molecular genetics- II	
Unit IV	Gene Regulation, Operon Concept and Transposons	
Unit V	Recombinant DNA Technology and Transgenic Plant	
Unit VI	Monoclonal Antibodies, DNA Probe and DNA Fingerprinting	
Block 3	Biotechnology	
Unit VII	Tissue Culture and Its Techniques	
Unit VIII	Culture of Different Tissue, Meristem Culture, Anther Culture Pollen culture, Protoplast culture and Embryo cultures.	
Unit IX	Applications of Biotechnology in human welfare with special reference to agriculture	
Suggested Text Book Readings:		
Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley & Sons. Inc.		
Advanced Methods In Physiology And Biochemistry (pb) ISBN : 9789381191132 Edition : 01 Year : 2016 Author : Padmanaban G , Chandrasekaran CN , Thangavelu AU , Dr. Sivakumar R , Kalimuthu N , Dr. Boominathan P , Dr. Anbarasan P, Agrobios.		
Methods in Plant Biochemistry and Molecular Biology. 1997. Dashek, WV (ed.). CRC Press.		
Thimmaiah, SR. 2004. Standard Methods of Biochemical Analysis. Kalyani Publishers.		
Henry, RJ. 1997. Practical Application of Plant Molecular Biology. Chapman & Hall, London		
M K Raxdan An Introduction to Plant Tissue Culture –; Oxfird & IBH Publishing Co.Pvt. Ltd., New Delhi		
Veer Bala Rastogi (2008), Fundamentals of Molecular Biology Ane Books Pvt. Ltd		
J. Nair Introduction to Genetic Engineering & Biotechnology. Jones & Bartlett Publishers, Boston, USA.		

Course prerequisites: To study this course, a student must have qualified 10+2 with Biology		
Programme: B.Sc.	Year: I	Semester: VI
Subject: Biology		
Course Code: DCEBY-109 (N)	Course Title: Paleobotany, Palynology and Economic Botany	
Course Objectives: The main objective of the course is to make learners aware of- <ul style="list-style-type: none"> Fossils, pollens and various plants of economic use. 		
Course Outcomes (CO): <ul style="list-style-type: none"> Understanding of fossils & Various technology technique used for their study. Palynology and its scope. Economic uses of various plant products. 		
Credits: 02	Type of Course: Core	
Max. Marks: 100	Min. Passing Marks: 36	
Block 1	Paleobotany and palynology	
Unit I	Introduction and techniques to study of fossils, Geological time scale	
Unit II	Kinds of fossils and reconstruction of fossil, form-genera, Organ-genera, Reconstruction of fossil.	
Unit III	Concept and scope of palynology: Pollen units, Pollen preparation, acetolysis method.	
Block 2	Economic botany is divided into five units as under	
Unit IV	Spices and flavoring materials: Ginger, Turmeric, Clove, Saffron, Coriander; Botanical description, cultivation and uses.	
Unit V	Beverages: Tea and Coffee; Botanical description, cultivation and uses.	
Unit VI	Fibers: Jute, Flax, Hemp, Coir, Cotton; Botanical description, cultivation and uses.	
Unit VII	Forest products: Wood, Rubbers, Gum and Resines; botanical description, cultivation and uses.	
Unit VIII	Medicinal plants: Rauwolfia, Belladonna, Quinine, Opium, Ephedrine; botanical description, cultivation and uses.	
Suggested Text Book Readings: P.K.K. Nair- A textbook of Palynology. Kochhar, S.L. (2011). Economic Botany in the Tropics, MacMillan Publishers India Ltd., New Delhi. 4th edition. Sambamurthy, AVSS & Subrahmanyam, NS (2000). Economic Botany of Crop Plants. Asiatech Publishers. New Delhi. Raychudhuri, S.P., 1991. (Ed.) Recent advances in Medicinal aromatic and spice crops. Vol.1, Today& Tomorrow's printers and publishers, New Delhi Raychudhuri, S.P., 1991. (Ed.) Recent advances in Medicinal aromatic and spice crops. Vol.1, Today& Tomorrow's printers and publishers, New Delhi.		