



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr. B.M. Kareppa

Department: Botany

Program: BSc/ FY

Subject: Botany

Course Code: CCB-I(A)

Paper Title: Viruses, Bacteria, Algae, Fungi, Lichens and Mycorrhiza - I

Unit Number	Unit Name	Topics	Unit-wise Outcome
Unit -I	Microbes	Viruses –Introduction, general characters of viruses, replication (general account), and RNA virus (TMV); Economic importance; study of yellow vein mosaic of Bendi Bacteria – Introduction, General characters and cell structure; Reproduction – vegetative, asexual (Binary Fission) and recombination (conjugation,) Study of Citrus Canker and Economic importance of Bacteria.	Differentiate between various groups of Bacteria, Viruses.
Unit-II	Algae	Introduction, General characters, Ecology and distribution; Range of thallus organization and reproduction; Classification of algae (F. E. Fritch's 1935); Morphology and life-cycles of the following: Nostoc, Oedogonium and Ectocarpus. Economic importance of algae	Learn the life cycles of individuals belonging to Algae

Unit -III	Fungi	Introduction- General Characteristics, ecology and significance, cell wall composition, nutrition, reproduction and classification (Alexopolous & Mims 1979); General characteristics, ecology, significance and life cycle of, Penicillium, Alternaria (Deuteromycota), Agaricus (Basidiomycota).	Differentiate between various groups of Fungi, Learn the life cycles of individual to Fungi.
Unit -IV	Lichens and Mycorrhiza	Lichens: General characters, types and economic importance. Mycorrhiza: General characters, ectomycorrhiza and endomycorrhiza and their significance	Learn the life cycles of individuals belonging to Lichens & Mycorrhiza.

Specify Course Outcome: Learn the life cycles of individuals belonging to Bacteria, Fungi, Algae Lichens & Mycorrhiza.

Specify Program Outcome: The student knowledge motivates the various educational institute and universities for conservation of plant Microbes cryptogamic Botany.

Signature of Teacher

Dr. B.M. Kareppa



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr.A.P.Jadhav

Department: Botany

Program: BSc-FY

Subject: Botany

Course Code: CCB-I(B)

Paper Title: Plant Ecology, Phytogeography and Environmental Biology-II

Unit Number	Unit Name	Topics	Unit-wise Outcome
Unit-I	Ecological Factors	Introduction, Scope of Ecology, Ecological Factors: Climatic factors- Light, Temperature, Wind, Humidity. Edaphic factors- Soil moisture, Temperature, Soil pH, Soil formation, Composition and Soil profile.	Able to scope of ecology and there ecological factors
Unit-II	Ecological Adaptations	Morphological and anatomical adaptations in Hydrophytes (Hydrilla stem and Nymphaea petiole), Xerophytes (Nerium leaf and Casuarina stem). General characters of Halophytes and Epiphytes.	To study Morphological and anatomical adaptation in Hydrophytes, Xerophytes, and there General characters
Unit-III	Ecosystem and Plant Communities	Ecosystem: Introduction, Structure, types (Pond ecosystem and Forest ecosystem), Tropic levels, Energy flow in ecosystem, food chain, food web and ecological pyramids. 13	To learn structure and types of Ecosystem and there Energy flow ,food chain, food web, Ecological pyramids in Ecosystem.

		Community ecology: Community characteristics, Frequency, Density, Life forms and ecological succession (Hydrosere), Analysis of Plant communities (quadrant method).	
Unit-IV	Phytogeography and Environmental Biology	Introduction, Bio-geographical regions of India, Bio-diversity hot spots of India Environmental pollution: Air, Water and soil pollution (Causes, effects and control measures), Soil erosion and soil conservation, afforestation , deforestation and Chipko movement, Environmental education and awareness.	To study biological region of india and there Environmental pollution.

Specify Course Outcome: Able to scope of ecology and there ecological factors adoptions and Phytogeography and Environmental Biology

Specify Program Outcome: Enviornmental factors and their knowledge motivates the various educational institute and universities for conservation of plant

Signature of Teacher

Dr.A.P.Jadhav



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr. B.M. Kareppa

Department: Botany

Program: BSc/ FY

Subject: Botany

Course Code: CCB-II(A)

Paper Title: Bryophytes, Pteridophytes, Gymnosperms & Paleobotany -III

Unit Number	Unit Name	Topics	Unit-wise Outcome
Unit-I	Bryophytes	General characters, Classification (N.S.Parihar), morphology, anatomy and reproduction of Marchantia and Funaria. (Developmental study not expected), Economic importance of bryophytes.	Learn the life cycles of individuals to Bryophytes,
Unit-II	Pteridophytes	General characters, classification (N.S.Parihar), morphology, anatomy and reproduction of Lycopodium and Marsilea. (Developmental study not expected), Homospory, Heterospory and seed habit, stelar evolution, economical importance of Pteridophytes.	Learn the life cycles of individuals Pteridophytes

Unit-III	Gymnosperms	General characters, classification (K.R.Sporne, 1964), morphology, anatomy and Reproduction of Cycas and Pinus. (Developmental study not expected), Ecological and Economic importance.	Learn the life cycles of individuals Gymnosperms
Unit-IV	Paleobotany	Introduction to palaeobotany, process of plant fossilization, types of fossils, geological time scale, Study of fossil Gymnosperms -Lyginopteris oldhamia (stem), Bennettites (flower) and General characters of Ginkgo (A living fossil).	Learn about process of fossil formation and fossils plants.

Specify Course Outcome: Learn the life cycles of individuals Bryophytes, Pteridophytes, Gymnosperms and Paleobotany

Specify Program Outcome: Understand the Classification, morphology, anatomy and reproduction and Learn about process of fossil formation and fossils plants.

Signature of Teacher

Dr. B.M. Kareppa



**Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani**

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Miss. Khan Rumana Sadaf

Department: Botany

Program: BSc-FY

Subject: Botany Course Code: CCB-II (B)

Paper Title: Taxonomy of Angiosperms- IV

Unit Number	Unit Name	Topics	Unit-wise Outcome
Unit I:	Introduction	Aims of Taxonomy, Principles of Taxonomy, Identification, Nomenclature and Classification, Principles and rules of ICN (Rank of taxa, typification, author citation) Importance of Herbarium, important herbaria and botanical gardens of the India.	Proficiency with the basic terminology of plant morphology Understand the methods of collecting and preserving plants
Unit II:	Plant Classification	Taxonomic hierarchy, Types of classification-artificial, natural and phylogenetic. Bentham and Hooker, Engler and Prantl (up to family level with reference to families mentioned in the syllabus).	Learn various classification
Unit III:	Morphology of Angiosperms	Root: Definition, characters, types (tap root and adventitious) and functions. Stem: Definition, characters and functions. Leaf:	Proficiency with the basic terminology of plant morphology

		<p>Definition, structure of typical leaf (Hibiscus), functions, types Simple (Hibiscus), Compound (unipinnate, bipinnate, tripinnate, unifoliate, bifoliate, trifoliate, multifoliate), venation- definition, types (reticulate, parallel), Phyllotaxy. Inflorescence: Definition, types- Racemose (characters), Cymose (characters). Flower: Definition, symmetry, actinomorphic, 17 zygomorphic, types (hypogynous, epigynous, perigynous), structure of typical flower (Hibiscus), calyx (polysepalous, gamosepalous), corolla (polypetalous, gamopetalous), Androecium (parts of a stamen), Gynoecium – structure of carpel, apocarpous, syncarpous, placentation (axile, parietal, free central, marginal, basal) Fruit: Definition, forms- simple (dry, legume, fleshy, berry), aggregate (Etario of berries), composite (Sorosis).</p>	
Unit IV	Study of Plant Families	<p>Study of vegetative and floral characters of following families: Brassicaceae, Fabaceae, Solanaceae, Lamiaceae and Poaceae .</p>	<p>Able to identify the major families of plants and their economic importance</p>

Specify Course Outcome: Develop about the knowledge of different Angiospermic plant families, taxonomic tools and the origin of Angiosperm

Specify Program Outcome: Awareness of Plant Biodiversity for teaching and learning of students, Universities, and educational institutes

Signature of Teacher

Miss. Khan Rumana Sadaf



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr.A. P. Jadhav.

Department: Botany

Program: BSc/SY

Subject: Botany

Course Code: CCB III (B)

Paper Title: HISTOLOGY, ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS (P-VII)

Unit Number	Unit Name	Topics	Unit-wise Outcome
Unit-I	HISTOLOGY	Meristematic Tissue: Definition, classification based on position and origin, Histological organization of root and shoot apices, Apical cell theory, Histogen theory and Tunica corpus theory. Simple Tissues: Parenchyma, Collenchyma, Sclerenchyma. Complex tissues: Xylem and Phloem. Secretory tissues: Laticiferous tissues (Latex cells and vessels), Glandular tissues (External glands-digestive glands, nectary glands and internal glands-Oil glands, hydathodes)	Learned Histology and various tissues.
Unit-II	ANATOMY	Vascular Bundles: Definition and types. Primary structures: Root	Understanding description of

		anatomy of Monocotyledons (Maize) and Dicotyledons (Sunflower), Stem anatomy of Monocotyledons (Maize) and Dicotyledons (Sunflower), Leaf anatomy of Monocotyledons (Maize) and Dicotyledons (Sunflower), Secondary Growth- Normal Secondary growth in root and stem of Dicotyledons (Sunflower), Anomalous Secondary growth in Achyranthes stem and Dracaena stem.	Anatomy Dicot & Monocot
Unit-III	EMBRYOLOGY –I	Introduction- Definition and Scope, Microsporangium- Structure (T.S. of typical anther), Microsporogenesis, Structure of Pollen grain, Pollination (self and cross pollination in brief), Development of male gametophyte, Megasporangium- Structure (L.S. of typical ovule), types of ovule	Learned Embryology of Microgenesis and Meghasporogenesis
Unit-IV	EMBRYOLOGY –II	Megasporogenesis, Development of Monosporic (Polygonum type), Bisporic (Allium type) and Tetrasporic (Adoxa type) female gametophytes, Fertilization- Double fertilization and Significance, Endosperm Definition and types (Nuclear, Cellular and Helobial endosperm) , Embryo- Definition, Development of Monocot and Dicot (Crucifer type) embryo, Development of seed and Fruit (Post fertilization changes)	Learned Embryology of Microgenesis and Meghasporogenesis

Specify Course Outcome: Learned about Histology Anatomy Embryology –I& II and various tissues

Specify Program Outcome: Motivate the student's knowledge about Histology, Anatomy And Embryology Of Angiosperms

Signature of Teacher

Dr.A.P.Jadhav



Dnyanopasak Shikshan Mandal's

College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr.A. P. Jadhav

Department: Botany

Program: BSc/ SY

Subject: Botany

Course Code: CCB IV (B)

Paper Title: ECOLOGY AND ENVIRONMENTAL BIOLOGY (P-IX)

Unit Number	Unit Name	Topics	Unit-wise Outcome
Unit-I	ECOLOGICAL FACTORS	Introduction-Definition of ecology and environment, divisions, fields and scope of ecology, Environmental or ecological factors- Climatic factors (Atmosphere, atmospheric humidity, light and temperature), Edaphic factor (Soil components, soil formation and soil profile)	Able to understand the ecological principles ,
Unit-II	ECOLOGICAL ADAPTATIONS IN PLANTS	Morphological, anatomical and physiological responses of plants to water, Morphological and anatomical adaptation in Hydrophytes (Hydrilla stem and Nymphaea petiole),	Learn about different types of adaptation in ecosystem.

		Xerophytes (Casuarina stem and Nerium Leaf), Halophytes (General characters)	
Unit-III	COMMUNITY ECOLOGY	Community Ecology- Community characteristics, frequency, density, life forms and ecological succession (Hydrosere), analysis of plant community (quadrant method), Ecosystem- Introduction and structure (Abiotic and biotic components) of ecosystem, Pond and grassland ecosystems, Energy flow in an ecosystem, Food chain and food web, ecological pyramids.	Able to understand interactions taking place in the Ecosystems and the flow of energy
Unit-IV	ENVIROMENTAL BIOLOGY	Biogeochemical cycles- Water and Nitrogen cycle, Pollution- Causes, effect and control measures of water, soil and air pollution, Soil erosion- Types, methods of soil conservation, Bio geographical regions of India, Aforestation, Deforestation and Chipko movement.	Learn about the concept of phytogeography and its relations with other disciplines

Specify Course Outcome: Able to scope of ecology and there ecological factors adoptions and Phytogeography and Environmental Biology

Specify Program Outcome: Enviornmental factors and their knowledge motivates the various educational institute and universities for conservation of plant

Signature of Teacher

Dr.A.P.Jadhav



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr. A.P. Jadhav

Department: Botany

Program: BSc/TY

Subject: Botany

Course Code: DSEB I (A)

Paper Title: Plant Physiology–XII

Unit Number	Unit Name	Topics	Unit-wise Outcome
Unit-I	PLANT WATER RELATIONS	Importance of water in plant life Different bio-physico-chemical phenomenon: Permeability, Diffusion, Osmosis, Plasmolysis and Imbibition. Ascent of sap: Introduction and mechanism (transpiration pull theory), Transpiration: Definition, types, structure of stomata, mechanism of opening and closing of stomata (starch-sugar theory and K ⁺ pump theory). Plant movements: Introduction, classification, paratonic and nastic movements.	Understand Importance of water in plant life

Unit-II	MINERAL NUTRITION	Major and Minor elements: Introduction, source, deficiency symptoms and their role. Mineral salt absorption: Introduction, mechanism of passive absorption (ion exchange theory) and active absorption (carrier concept theory) Translocation of organic solutes: Introduction, mechanism of translocation (Munch-Mass flow hypothesis)	Learn various types of elements
Unit-III	GROWTH AND DEVELOPMENT	Growth and Plant growth regulators: Introduction, phases of growth, measurement of growth (arc indicator and Pfeiffer's auxanometer), factors affecting growth, Chemical nature and practical applications of Auxins, gibberellins, cytokinins, abscisic acid and ethylene. Seed dormancy: Introduction, causes of seed dormancy and methods of breaking seed dormancy Seed germination: Introduction, types and mechanism of seed germination, Physiology of flowering: Introduction, Photoperiodism (LDP, SDP and DNP), Vernalization and devernalization: Introduction, mechanism and significance,	Learn about Growth and Plant growth regulators
Unit-IV	BIOMOLECULES AND SECONDARY METABOLITES	Biomolecules: Carbohydrates: introduction, structure and classification, Monosaccharides, disaccharides and polysaccharides (starch and cellulose) Protein- Introduction, classification and biological functions of Primary, secondary (α helix and β sheets), tertiary and quaternary structure Lipids: Introduction, structure classification and biological functions of lipids	Learn about Bio molecules And Secondary Metabolites

Specify Course Outcome: Understand Importance of Plant Water Relations , Mineral Nutrition And Biomolecules And Secondary Metabolites

Specify Program Outcome: Learn about Bio molecules And Secondary Metabolites and Motivate the student

Signature of Teacher

Dr.A.P.Jadhav



Dnyanopasak Shikshan Mandal's

College of Arts, Commerce and Science, Parbhani

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Name of Teacher: Dr. A.P. Jadhav

Department: Botany

Program: BSc/ /TY

Subject: Botany

Course Code: DSEB II (A)

Paper Title: Plant Metabolism, Biochemistry and Biotechnology–XIV

Unit Number	Unit Name	Topics	Unit-wise Outcome
Unit-I	PHOTOSYNTHESIS AND RESPIRATION	Photosynthesis: Introduction, significance, ultra structure of chloroplast, photosynthetic pigments, concepts of two Photo systems, Mechanism of photosynthesis, Light reaction, Hill reaction, Cyclic and Non cyclic photophosphorylation, Dark phase, Calvin cycle (C3) and Hatch and Slack (C4) pathway, CAM pathway Respiration: Introduction, significance, ultra structure of mitochondria, structure and functions of ATP, Types of respiration: Aerobic respiration- Glycolysis, Krebs' cycle, Electron Transport System. Anaerobic respiration-	Proficiency with the basic terminology of Photosynthesis And Respiration

		Fermentation (alcoholic and lactic acid)	
Unit-II	ENZYMES AND NITROGEN METABOLISM	<p>Enzymes:</p> <p>Introduction, nomenclature and classification (IUB), mechanism of enzyme action (lock and key model, induced fit model), Concept of holoenzyme, mechanism of regulation of enzyme activity-Feedback and allosteric regulation.</p> <p>Nitrogen metabolism: Introduction, sources and forms of nitrogen, types of nitrogen fixation physical and biological (symbiotic and asymbiotic), Ammonification, nitrification and denitrification</p>	Learn about different types of Enzymes.
Unit-III	BIOTECHNOLOGY	<p>Tissue culture: Introduction and basic aspects of tissue culture, media, culture techniques, cellular totipotency.</p> <p>Applications of tissue culture: Micropropagation, Production of disease free plants, production of secondary metabolites, Anther culture and production of haploids, protoplast culture and somatic hybridization, synthetic seeds</p>	Learn about tissue culture and different application
Unit-IV	GENETIC ENGINEERING	<p>Introduction, tools and techniques of recombinant DNA technology, Cloning vectors, Gene cloning, Genomic library and cDNA library, Agrobacterium mediated gene transfer, transgenic plants.</p> <p>Bioinformatics: Introduction, Biological database, NCBI, BLAST</p>	Able to Understanding Genetic Engineering

Specify Course Outcome: Learn about different types of Enzymes. Enzymes And Nitrogen, Biotechnology Metabolism And Genetic Engineering

Specify Program Outcome: Understand knowledge motivates the various educational institute and universities for Tissue culture and Photosynthesis.

Signature of Teacher

Dr.A.P.Jadhav



Dnyanopasak Shikshan Mandal's

College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr. Dnyaneshwar P. Ghorband

Department: Botany

Program: BSc/ SY

Subject: Botany

Course Code: CCB III (A)

Paper Title: MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS- (P-VI)

Unit Number	Unit Name	Topics	Unit-wise Outcome
Unit-I	MORPHOLOGY OF ANGIOSPERMS	Root: Definition, characters, types (tap root and adventitious) and functions. Stem: Definition, characters, modifications (stem tendrils, phylloclade, tuber, rhizome, corm and runner) and functions. Leaf: Definition, structure of typical leaf (Hibiscus), functions, types- Simple (Hibiscus), Compound (unipinnate, bipinnate, tripinnate, unifoliate, bifoliate, trifoliate, multifoliate), venation- definition, types (reticulate, parallel), Phyllotaxy, Inflorescence: Definition, types- Racemose (characters), Cymose (characters), Flower: Definition, symmetry, actinomorphic,	Proficiency with the basic terminology of plant morphology.

		zygomorphic, types (hypogynous, epigynous, perigynous), structure of typical flower (Hibiscus), calyx (polysepalous, gamosepalous), corolla (polypetalous, gamopetalous), androecium (parts of a stamen), gynoecium –structure of carpel, apocarpous, syncarpous, placentation (axile, parietal, free central, marginal, basal) Fruit: Definition, types (true, false), forms- simple (dry, legume, fleshy, berry), aggregate (etaerio of berries), composite (sorsosis)	
Unit-II	TAXONOMY OF ANGIOSPERMS	Introduction, scope and objectives of angiosperm taxonomy, binomial nomenclature, taxonomic ranks, types of classification (artificial, natural and phylogenetic), salient features of Bentham & Hooker and Engler & Prantl’s system of classification with merits and demerits	Analysing examine information causes and evidences
Unit-III	STUDY OF FAMILIES-I	Distribution, vegetative morphology (habitat, habit, root, stem, leaf), Reproductive morphology (inflorescence, general description of flower, calyx, corolla, androecium, gynoecium, pollination, fruit) floral formula, floral diagram, systematic position (as per Bentham & Hooker’s system), distinguishing characters and economic importance of plants (at least two) of the Families-Annonaceae, Brassicaceae, Malvaceae, Meliaceae, Caesalpinaceae, Fabaceae, Apiaceae	Able to identify the major families of plants and their economic importance
Unit-IV	STUDY OF FAMILIES-II	Distribution, vegetative morphology (habitat, habit, root, stem, leaf), Reproductive morphology (inflorescence, general description of flower, calyx, corolla, androecium, gynoecium, pollination, fruit), floral formula, floral diagram, systematic position (as per Bentham & Hooker’s system), distinguishing characters and economic	Able to identify the major families of plants and their economic importance

		importance of plants (at least two) of the Families-Asteraceae, Solanaceae, Euphorbiaceae, Lamiaceae, Liliaceae and Poaceae	
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Specify Course Outcome: Understand the different morphological characters, Taxonomy of Angiospermic plant and their families of plant kingdom.

Specify Program Outcome: The student knowledge motivates the various educational institute and universities for conservation of plant.

Signature of Teacher
Dr. Dnyaneshwar P. Ghorband



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr. Dnyaneshwar P. Ghorband

Department: Botany

Program: BSc/ SY

Subject: Botany

Course Code: CCB IV (A)

Paper Title: GYMNOSPERMS AND PALAEOBOTANY (P-VIII)

Unit Number	Unit Name	Topics	Unit-wise Outcome
Unit-I	GYMNOSPERMS	Introduction, general characters and classification of Gymnosperms (as per D. D. Pant, 1957), Morphology of vegetative structures, anatomy of stem (primary and secondary growth) and anatomy of leaf, reproductive structures and life cycle and economic importance of Cycas	Learn the life cycles of individuals belonging to Gymnosperms
Unit-II	PINUS	Morphology of vegetative structures, anatomy of stem (primary and secondary growth) and anatomy of leaf, reproductive structures and life	Learn about process of fossil formation and fossils plants.

		cycle(Developmental stages are not expected) and economic importance of Pinus	
Unit-III	GNETUM	Morphology of vegetative structures, anatomy of stem (primary and secondary growth) and anatomy of leaf, reproductive structures and life cycle(Developmental stages are not expected) and economic importance of Gnetum .	Learn about the characters, structure and reproduction.
Unit-IV	PALAEOBOTANY	Introduction to palaeobotany, process of plant fossilization, types of fossils, geological time scale, Study of fossil Gymnosperms- Lyginopteris oldhamia (stem), Bennettites (flower) and General characters of Ginkgo (A living fossil)	Learn the characters of taxa belonging to fossil plants.

Specify Course Outcome: Learn about Gymnosperms and palaeobotany concepts, classification identification anatomy and description.

Specify Program Outcome: Motivate the student's attitude towards cultivation, Conservation and observation of different plants among the student community.

Signature of Teacher

Dr. Dnyaneshwar P. Ghorband



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College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr. Dnyaneshwar .P. Ghorband

Department: Botany

Program: BSc/ TY

Subject: Botany

Course Code: DSEB I (B)

Paper Title: Systematic Botany- I (P-XIII)

Unit Number	Unit Name	Topics	Unit-wise Outcome
UNIT –I:	CLASSIFICATION	Introduction- Definition, aims, scope and application of angiosperms taxonomy, Types of classification- Artificial, Natural and Phylogenetic, Outline of Bentham and Hooker, Engler and Prantl and Hutchinson's systems of classification of angiosperms with merits and demerits	Learn about different types of classification
UNIT –II:	PRINCIPLES OF TAXONOMY	ICN (International Code of Nomenclature)-Brief history, principle of priority, effective and valid publication, typification and author citation, Species concept- Morphological and biological, Role of phytochemistry, cytology, anatomy and palynology in relation to taxonomy. Pollen morphology with reference to pollen grains of Hibiscus, Ipomoea and Grasses.	Proficiency with the basic terminology, principle of plant taxonomy

UNIT – III	STUDY OF DICOT FAMILIES (Polypetalae)	Study of following families according to Bentham and Hooker’s system of classification with reference to general characters, pollination, floral formulae, floral diagrams, systematic position, distinguishing features and economic importance. Papaveraceae, Mimosaceae, Combretaceae, Myrtaceae, Rutaceae, Cucurbitaceae, Nyctaginaceae (Monochlamydeae).	Able to identify the major families of plants and their economic importance
UNIT –IV	STUDY OF DICOT FAMILIES-II (Gamopetalae)	Study of following families according to Bentham and Hooker’s system of classification with reference to general characters, pollination, floral formulae, floral diagrams, systematic position, distinguishing features and economic importance. Rubiaceae, Apocynaceae, Convolvulaceae, Bignoniaceae, Acanthaceae, Verbenaceae,	Previously Able to identify the major families of plants and their economic importance

Specify Course Outcome: Develop knowledge regarding Classification, Principles of Taxonomy and different dicot and monocot families.

Specify Program Outcome: Create the awareness of Systematic Botany and its identification description and classification of plants among the students

Signature of Teacher

Dr. Dnyaneshwar P. Ghorband



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr. Dnyaneshwar P. Ghorband

Department: Botany

Program: BSc/ TY

Subject: Botany

Course Code: DSEB II

Paper Title: SYSTEMATIC BOTANY-II (B-II) (P-XV)

Unit Number	Unit Name	Topics	Unit-wise Outcome
UNIT –I	STUDY OF MONOCOT FAMILIES-I	Study of following families according to Bentham and Hooker's system of classification with reference to general characters, pollination, floral formulae, floral diagrams, systematic position, distinguishing features and economic importance. Musaceae, Zingiberaceae, Cannaceae, Amarylidaceae.	Previously Able to identify the major families of plants and their economic importance
UNIT –II	STUDY OF MONOCOT FAMILIES-II	Study of following families according to Bentham and Hooker's system of classification with reference to general characters, pollination, floral formulae, floral diagrams,	Previously Able to identify the major families of plants and their economic importance

		systematic position, distinguishing features and economic importance. Orchidaceae, Commelinaceae, Cyperaceae, Palmaceae.	
UNIT –III	TAXONOMIC TOOLS	Herbarium- Techniques of plant preservation, Importance of herbarium, Botanical gardens Role in plant taxonomy, Important Botanical gardens, Plant identification key-Types and use	Understand the methods of collecting and preserving plants
UNIT –IV	ORIGIN OF ANGIOSPERMS	Place and Time of origin of angiosperms, Probable ancestors of Angiosperms: Bennettitalean theory, Gnetalean theory, Pteridosperm theory	Learn the characters of taxa belonging to Angiosperms and their comparative account of families

Specify Course Outcome: Develop about the knowledge of different Angiospermic plant families, taxonomic tools and the origin of Angiosperm

Specify Program Outcome: Awareness of Plant Biodiversity for teaching and learning of students, Universities, and educational institutes

Signature of Teacher

Dr. Dnyaneshwar P. Ghorband

