DEPARTMENT OF BOTANY

PRANANATH COLLEGE (AUTONOMOUS) COLLEGE, KHORDHA

COURSE/ PROGRAMME NAME: B.Sc. BOTANY

(STATE MODEL SYLLABUS FOR UNDERGRADUATE COURSE-2019)

SPECIFIC PROGRAMME OUTCOME OF B.Sc. BOTANY

1. Imparting knowledge and understanding:

- Able to compare and contrast the characteristics, their occurrence, morphological differences, lifecycles of plant diversity ranging from virus, prokaryotic to eukaryotic complex forms.
- Able to explain the ecological interrelation of life on the earth by tracing energy and nutrient flow through the environment in different strata related to the structure of populations, communities and ecosystems.
- Able to know the functional aspects of plants from gene to organ level.
- To learn the socioeconomic values of natural resources for a sustainable development of the society.
- Gain detailed knowledge about the economically important plants.
- The field and the laboratory works enhance the implementation of theoretical knowledge and their intellectual skills to construct and test hypothesis, to plan, conduct and write a report on an independent project.

2. Skill development:

- To study and analyze any plant form by applying the basic knowledge of plant sciences
- To analyze the various problems related to project works
- Communication of scientific ideas
- Team work efficacy
- Use of library resources
- Career planning and time management
- Learn to use appropriate techniques, equipments and their applications

COURCE OUTCOME

B.Sc 1st Year

SEMESTERS	COURSE	COURSE CODE	COURSE OUTCOME
I	**Microbiology and Phycology**	**BOT-CC I -TH**	• Gain knowledge about the systematic position the occurrence, distribution, morphology, anatomy, method of reproduction, life history and the economic importance of microbes and algae.
	Microbiology and Phycology	**BOT-CC I -PR**	• Microscopic observation and Identification of various algal plants. • Gram staining procedure
	Biomolecules and Cell Biology	**BOT-CC II -TH**	• To know the plants at cellular level i.e. the chemical composition, structural and functional aspects of the biomolecules, structural organization of the cells. • Study of the various organelles, their functions and cell division.
	Biomolecules and Cell Biology	**BOT-CC II -PR**	• Qualitative study of the organic molecules • Structure and Physiological processes and cell divisions within the cell by cytological study
II	**Mycology and Phytopathology**	**BOT-CC III -TH**	• Gain knowledge about the the Kingdom-Fungi including their systematic status, occurrence, mode of nutrition, structural variations and lifecycle. • Study the Lichen, a symbiotic association of fungi with algae and their economic significance. • Gain knowledge about the diseases caused by the viruses, bacteria and fungi in plants.
	Mycology and Phytopathology	**BOT-CC III -PR**	• Morphological and cytological studies of fungi through slides and photographs. • To identify various plant diseases through herbarium specimens, infected fresh specimens etc.
	Archegoniatae	**BOT-CC IV -TH**	• Gain knowledge about the Kingdom-Plantae, the land plants, their origin and adaptation • Learn to know about rang of thallus organization, structure, reproduction, evolutionary trends and economic importance in bryophytes, petridophytes and gymnosperms • Able to know palaeobotany- geological time scale, fossils and fossilization processes taking some examples from petridophytes and gymnosperms.
	Archegoniatae	**BOT-CC IV -PR**	• Learn to prepare anatomical slides of the land plants. • Observe and identify the plants from various groups under microscope. • Study the fossil slides.

B. Sc. 2nd Year

III	**Anatomy of Angiosperms**	**BOT-CC V -TH**	• Learn the internal structures like cell, tissue, organs of the angiosperms • Learn the tissue organization and their structural comparison in leave, roots and stem of both dicot and monocot plants. • Normal and anomalous secondary growth of angiospermic plants
	Anatomy of Angiosperms	**BOT-CC V -PR**	• Learn the permanent slide preparation techniques, observe the tissue organization and identify the parts of the plant with appropriate reasons. • Learn the tissue organization according to the plant adaptations.
	Economic Botany	**BOT-CC VI -TH**	• Gain knowledge about the origin, evolution, domestication, cultivation and extraction or utilization of economically important plants which are indispensable for life like cereals, legumes, sugar, spices, drugs, oils and fat, essential oils, rubber, timber, fiber etc.
	Economic Botany	**BOT-CC VI -PR**	• Acquaint with the parts of the plants that are economically important • Micro chemical test procedure to know the presence of major organic components like carbohydrates, proteins and fats in the crop plants
	Genetics	**BOT-CC VII -TH**	• Gain knowledge about the laws of inheritance, extra chromosomal inheritance, linkage and crossing over, gene mapping, variation in chromosome structure and number, mutation, fine structure of gene, population and evolutionary genetics
	Genetics	**BOT-CC VII -PR**	• Analyze the allelic and genotypic frequencies • To prove the Mendelian laws of inheritance through probability and Chi-square analysis • Pedigree analysis • Chromosomal anomaly and blood grouping
IV	**Molecular Biology**	**BOT-CCVIII -TH**	• **Learn the historical perspective and the proof of nucleic acids as genetic material.** • **structure of DNA and RNA, replication and their organization within the cell** • **Detailed functions of nucleic acids related to protein synthesis (gene expression)**
	Molecular Biology	**BOT-CCVIII -PR**	• Study the estimation of Nucleic Acids in bacteria through systematic techniques of culture media preparation, raising bacteria and isolating the genomic DNA • Study of Barr body and buccal smear preparation
	Plant Ecology & Phytogeography	**BOT-CC IX -TH**	• Know the detailed structure of various ecosystems (abiotic and biotic components) and their functions. • Various edaphic factors in relation to plant

			adaptations • Interrelationships of the living world and the environment • concepts Population and community • phyto-geography
	Plant Ecology & Phytogeography	**BOT-CC IX -PR**	• learn the techniques for qualitative and quantitative estimation of various components present in soil, water • morphological and anatomical study of plants to study their adaptive modifications • statistical quantitative analysis of distribution of herbaceous plants • students gain practical knowledge on the phyto-diversity after a field study
	Plant Systematics	**BOT-CC X -TH**	• gain knowledge on plant systematic, herbarium and its preparation, e-flora • taxonomic hierarchy, binomial nomenclature • systems of classification, their merits and demerits • phylogeny of angiosperms • descriptive studies of a number of families of taxonomic importance.
	Plant Systematics	**BOT-CC X -PR**	• To gain proficiency in the use of keys and identification manuals for identifying any unknown plants to species level. • Field study for the students to a floristic rich area under supervision to observe, collect the plants from their natural habitats and preparing herbaria through a series of procedures.

B. Sc. 3rd Year

V	**Reproductive Biology of Angiosperms**	**BOT-CC XI -TH**	• Gain knowledge on variations in the structures, developments, functions of reproductive parts of the angiospermic flower and their involvement in the process of reproduction. • Learn the types of pollinations and their significance • Fertilization and embryogenesis
	Reproductive Biology of Angiosperms	**BOT-CC XI -PR**	• Observe microscopic studies on pollen grains, ovules and their accessory parts • Experimental test procedures to study pollen viability, germination, pollen wall, tracing the path of pollen tube and endosperm development
	Plant Physiology	**BOT-CC XII -TH**	• Gain knowledge about the plant water relationships • Mineral nutrition and their uptake • Plant growth regulators and their physiological roles in plant growth and developments • Physiology of flowering and involvement of phytochromes
	Plant Physiology	**BOT-CC XII -PR**	• Learn the experimental procedures, observation and tabulating the data on various physiological processes in the plants like transpiration plasmolysis, water potential, stomatal index and frequency, seed germination, enzyme activities etc.
	Analytical Techniques in Plant Sciences	**BOT-DSE I-TH**	• Gain knowledge about principles and operation of various types of microscopes, spectrophotometer, chromatography, electrophoresis • Various methods for cell fractionation • Radioisotopes and their uses • Learn the statistical methods and formulas to represent data
	Analytical Techniques in Plant Sciences	**BOT-DSE I-PR**	• Gain skill on working principles of PCR, chromatography, separation and estimation of proteins, separation of marker DNA, spectrophotometer • Analysis of Chi-square test and T-test
	Natural Resource Management	**BOT-DSE II-TH**	• Gain knowledge about the natural resources, their significance and sustainable use • Able to know the Bioresources, their types, threats, control and management • Learn various types of energy resources, their contemporary practices in management and resource accounting
	Natural Resource Management	**BOT-DSE II-PR**	• Gain skill on estimation of solid waste generated by a domestic system, measurement of dominance woody species, calculation and analysis of ecological footprint

			• Learn the procedures for the estimation of moisture content, texture, porosity, water holding capacity, organic matter and carbon content of soil.
VI	**Plant Metabolism**	**BOT-CC XIII -TH**	• Gain knowledge on the concept of metabolism and signal induction • Various types of carbon assimilation • Carbon oxidation and ATP synthesis • Lipid metabolism: synthesis and breakdown and its significance • Nitrogen metabolism: nitrogen fixation and ammonia assimilation
	Plant Metabolism	**BOT-CC XIII -PR**	• Learn the practical procedures and to draw the conclusion for various metabolic path ways in plants like pigment isolation and quantification, hill reaction, rate of photosynthesis, rate of respiration, Catalase activity test, chloroplast photo reduction of dye tests etc.
	Plant Biotechnology	**BOT-CC XIV -TH**	• Gain Knowledge about the techniques of genetic engineering like tissue culture and recombinant DNA technology and their applications
	Plant Biotechnology	**BOT-CC XIV -PR**	• Gain Knowledge about Concepts, tools and techniques related to *in vitro* propagation of plants. • Learn the methods of preparation of MS medium and various sterilization procedures for equipments and explants • Learn the procedures for artificial seed production, isolation of plasmid DNA. • Methods and operation of gel electrophoresis etc
	Horticultural Practices and Post-Harvest Technology	**BOT-DSE III -TH**	• Gain knowledge about the importance and scope of horticulture • Able to know various horticultural plants like ornamental, fruits and vegetable, crops, their salient features, production, cultivation, irrigation, harvesting, marketing and management. • Details about Landscaping and garden designing • Know the post harvest techniques in horticultural crops like evaluation of quality traits, harvesting, preservation, storage and transportation • Field and post-harvest diseases, their control and management
	Horticultural Practices and Post-Harvest Technology	**BOT-DSE III -PR**	• Learn the identification of ornamental plants by their salient features, horticultural techniques, plant vegetative propagation, planning and lay out of the parks and avenues through field study • Know the techniques of tissue culture and fruit preservation etc. •

	Dissertation / Project Work	**BOT-DSE IV**	• Learn the basics of research, literature recession, analysis and expression of their understanding of the topic in their own words. • Design the experiments of his interest and execute it • Trained in handling of the basic and advance instruments • Generate the data, compile and analyze and interpret the data. • Presentation skill is developed in the students • The student is ready to work in any R&D setup

GENERIC ELECTIVE

I & III	**Biodiversity (Microbes, Algae, Fungi and Archegoniates)**	**GE 1A & 1B -TH**	• Able to compare and contrast the characteristics of plant diversity ranging from virus, prokaryotic to eukaryotic complex forms, their occurrence, morphological differences, lifecycles and their ecological and economic importance •
	Biodiversity (Microbes, Algae, Fungi and Archegoniates)	**GE 1A & 1B -PR**	• Learn about the microscopic observation and identification of algae, fungi, bryophytes, lichens, pteridophytes and gymnosperm. • Gram staining of bacteria.
II & IV	**Plant Physiology and Metabolism**	**GE 2A and 2B -TH**	• Gain knowledge about the plant water relations, Physiological, metabolic processes, enzyme structure and functions, plant growth and developments
	Plant Physiology and Metabolism	**GE 2A and 2B -PR**	• Learn the methods and determination of plasmolysis, transpiration, photosynthesis, enzyme activities etc.