COURSE SPECIFIC OUTCOME B.SC.-BOTANY GENERAL SYLLABUS-

DSC-PAPER-1(THEORY)

BIODIVERSITY (MICROBES, ALGAE, FUNGI AND ARCHEGONIATE)

Enable the students to understand:-

- Discovery, general structure, replication (general account), DNA virus (T-phage); Lytic and lysogenic cycle, RNA virus (TMV); Economic importance; Bacteria – Discovery, General characteristics and cell structure; Reproduction – vegetative, asexual and recombination (conjugation, transformation and transduction); Economic importance.
- General characters, structure, reproduction in bacteria, algae, fungi, and archaebacteria, bryophytes, Pteridophytes and gymnosperm.
- Basics of microbiology, different types of microbes and their reproduction and recombination by transformation, transduction and conjugation process.

DSC-PAPER-2(THEORY)

PLANT ECOLOGY AND TAXONOMY LECTURES

Enable the students to understand:-

- Ecological Factors & Plant Communities Soil: Origin, formation, composition, soil profile. Water: States of water in the environment, precipitation types. Light and temperature: Variation Optimal and limiting factors; Shelford law of tolerance. Adaptation of hydrophytes and xerophytes.
- Characteristics of Plant communities: Ecotone and edge effect; Succession; Processes and types.
- Ecosystem & Phytogeography Structure; energy flow trophic organisation; Food chains and food webs, Ecological pyramids production and productivity; Biogeochemical cycling; Cycling of carbon and nitrogen Principle biogeographical zones; Endemism
- Introduction to plant taxonomy &Identifications Identification, Classification, Nomenclature. Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access Taxonomic evidencesfrom palynology, cytology and phytochemistry Ranks, categories and taxonomic groups
- Taxonomic hierarchy& Botanical nomenclature Ranks, categories and Taxonomic groups.

DSC-PAPER-3 (THEORY)

PLANT ANATOMY AND EMBRYOLOGY

Enable the students to understand:-

- Meristematic and permanent tissues Root and shoot apical meristems; Simple and complex tissues. Structure of dicot and monocot root stem and leaf.

- This paper enables the students to acquire knowledge on tissue morphology and plant anatomy. It develops a better understanding for the students on adaptive features on xerophytes and hydrophytes. Students get a vivid idea on structural organization of flower and its internal parts, followed by pollination and fertilization processes. A clear concept on embryo and endosperm is enabled through this paper.
- Secondary Growth Vascular cambium – structure and function, seasonal activity. Secondary growth in root and stem, Wood (heartwood and sapwood). Adaptive and protective systems: Epidermis, cuticle, stomata; General account of adaptations in xerophytes and hydrophytes.
- Structural organization of flower Structure of anther and pollen; Structure and types of ovules; Types of embryo sacs, organization and ultrastructure of mature embryo sac.
- Pollination and fertilization Pollination mechanisms and adaptations; Double fertilization; Seed-structure appendages and dispersal mechanisms. Unit V: Embryo and endosperm, Apomixis and polyembryony Endosperm types, structure and functions; Dicot and monocot embryo; Embryoendosperm relationship. Apomixis and polyembryony:Definition, types and practical applications.

DSC-PAPER-4 (THEORY)

PLANT PHYSIOLOGY AND METABOLISM

Enable the students to understand**:-**

- It enhances and develops the basic knowledge of students on plant relations, essential nutrients, including micro and macro nutrients, transport of ions across cell membranes. Students learn in detail about fundamental processes of plants like Photosynthesis, Respiration and nitrogen metabolism. A good concept on structure of enzymes, its properties, study of plant hormones like auxin, gibberellins, cytokinins, ABA and ethylene is elaborated in this part. Students come to know about plants response to light and temperature through phenomenon like Photoperiodism, Photomorphogenesis and Vernalization .
- Plant-water relations & Mineral nutrition Importance of water, water potential and its components; Transpiration and its significance; Factors affecting transpiration; Root pressure and guttation. Essential elements, macro and micronutrients; Criteria of essentiality of elements; Role of essential elements; Transport of ions across cell membrane, active and passive transport, carriers, channels and pumps.
- Translocation in phloem & Photosynthesis Composition of phloem sap, girdling experiment; Pressure flow model; Phloem loading and unloading. Photosynthetic Pigments (Chl a, b, xanthophyll's, carotene); Photosystem I and II, reaction centre, antenna molecules; Electron transport and mechanism of ATP synthesis; C3, C4 and CAM pathways of carbon fixation; Photorespiration.

- Respiration Glycolysis, anaerobic respiration, TCA cycle; Oxidative phosphorylation, Glyoxylate, Oxidative Pentose Phosphate Pathway.
- Enzymes & Nitrogen metabolism Structure and properties; Mechanism of enzyme catalysis and enzyme inhibition. Biological nitrogen fixation; Nitrate and ammonia assimilation.
- Plant growth regulators & Plant response to light and temperature Discovery and physiological roles of auxins, gibberellins, cytokinins, ABA, ethylenPhotoperiodism (SDP, LDP, Day neutral plants); Phytochrome (discovery and structure), red and far red light responses on photomorphogenesis; Vernalization.

PROGRAM SPECIFIC COURSE OUTCOMES B.SC-BOTANY SYLLABUS-

- Knowledge and understanding of: 1.The range of plant diversity in terms of structure, function and environmental relationships. 2. The evaluation of plant diversity. 3. Plant classification and the flora of Maharashtra. 4. The role of plants in the functioning of the global ecosystem. 5. A selection of more specialized, optional topics. 6. Statistics as applied to biological data.

- Intellectual skills – able to: 1. Think logically and organize tasks into a structured form. 2. Assimilate knowledge and ideas based on wide reading and through the internet. 3. Transfer of appropriate knowledge and methods from one topic to another within the subject. 4. Understand the evolving state of knowledge in a rapidly developing field. 5. Construct and test hypothesis. 6. Plan, conduct and write a report on an independent term project.

- Practical skills: Students learn to carry out practical work, in the field and in the laboratory, with minimal risk. They gain introductory experience in applying each of the following skills and gain greater proficiency in a selection of them depending on their choice of optional modules. 1. Interpreting plant morphology and anatomy. 2. Plant identification. 3. Vegetation analysis techniques. 4. A range of physiochemical analyses of plant materials in the context of plant physiology and biochemistry. 5. Analyses data using appropriate statistical methods and computer packages. 6. Plant pathology to be added for sharing of field and lab data obtained.

- Transferable skills: 1. Use of IT (word-processing, use of internet, statistical packages and databases). 2. Communication of scientific ideas in writing and orally. 3. Ability to work as part of a team. 4. Ability to use library resources. 5. Time management. 6. Career planning.

- Scientific Knowledge: Apply the knowledge of basic science, life sciences and fundamental process of plants to study and analyse any plant form.

- Problem analysis: Identify the taxonomic position of plants, formulate the research literature, and analyse non reported plants with substantiated conclusions using first principles and methods of nomenclature and classification in Botany.

- Design/development of solutions: Design solutions from medicinal plants for health problems, disorders and disease of human beings and estimate the phytochemical content of plants which meet the specified needs to appropriate consideration for the public health

- Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and development of the information to provide valid conclusions.

- Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern instruments and equipment's for Biochemical estimation, Molecular Biology, Biotechnology, Plant Tissue culture experiments, cellular and physiological activities of plants with an understanding of the application and limitations.

- The Botanist and society: Apply reasoning informed by the contextual knowledge to assess plant diversity, its importance for society, health, safety, legal and environmental issues and the consequent responsibilities relevant to the biodiversity conservation practice.

- Environment and sustainability: Understand the impact of the plant diversity in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- As a whole the B.Sc syllabus helps the students to prepare for competitive examinations (like WBFS and IFS, WBCS) for their career development.