**POLBA MAHAVIDYALAYA**

**DEPARTMENT OF BOTANY**

**COURSE WISE & SUBJECT WISE OUTCOME**

**UNDER NEP & CHOICE BASED CREDIT SYSTEM**

**SUBJECT: BOTANY (GENERAL)**

**2023-2024**

**COURSE OUTCOME:** The course outcomes of the different papers offered by University of Burdwan and followed by this college are as below. After completion of the course, students will be able to-

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| --- | --- | --- | --- | --- |
| Semester | Course Code | Course title | Credit | Outcome |
| I | Major: BOTN1011 | Major: Plant Diversity and Evolution | 4 |  Identify and classify major plant groups (e.g., bryophytes, ferns, gymnosperms, angiosperms) based on structure and reproduction. Understand evolutionary processes like natural selection, mutation, and genetic drift that shape plant diversity. Learn to interpret plant **evolutionary relationships** and construct phylogenetic trees. Study plant **adaptations** to various environments and ecological niches. Understand plant **reproductive strategies** and life cycles, including alternation of generations. Explore the genetic and molecular basis of key plant traits and their evolution. Learn about major events in plant evolution, such as the origin of vascular plants and flowering plants. Appreciate the importance of plant diversity for ecosystem health and the need for conservation efforts. Understand how **fossil plants** provide insights into plant evolution. Study factors that influence the **distribution of plant species** across different environments. |
|  | Minor: BOTN1021 | Minor: Plant Diversity and Evolution | 4 |  Identify and classify major plant groups (e.g., bryophytes, ferns, gymnosperms, angiosperms) based on structure and reproduction. Understand evolutionary processes like natural selection, mutation, and genetic drift that shape plant diversity. Learn to interpret plant **evolutionary relationships** and construct phylogenetic trees. Study plant **adaptations** to various environments and ecological niches. Understand plant **reproductive strategies** and life cycles, including alternation of generations. Explore the genetic and molecular basis of key plant traits and their evolution. Learn about major events in plant evolution, such as the origin of vascular plants and flowering plants. Appreciate the importance of plant diversity for ecosystem health and the need for conservation efforts. Understand how **fossil plants** provide insights into plant evolution. Study factors that influence the **distribution of plant species** across different environments |
|  | Multi/Interdisciplinary:BOTN1031 | Biodiversity and conservation | 3 |  Comprehend the concept and importance of biodiversity at the **genetic, species**, and **ecosystem** levels. Recognize major threats to biodiversity, such as **habitat loss**, **climate change**, and **overexploitation**. Learn about **in situ** and **ex situ** conservation methods, including the creation of **protected areas** and **biodiversity hotspots**. Understand the benefits provided by biodiversity, like **pollination**, **climate regulation**, and **soil health**. Explore the principles of **sustainable resource management** to protect biodiversity while supporting human development. Familiarize with key **national and international conservation policies**, like the **CBD** and **species protection laws**. Learn techniques for **restoring ecosystems** and rehabilitating endangered species. Appreciate the role of **indigenous communities** in conservation. Understand the **ethical**, **social**, and **economic dimensions** of biodiversity conservation. |
|  | Skill Enhancement Course (SEC): BOTN1051 | SEC: Biofertilisers | 3 |  Students will learn about different types of bio-fertilizers, role of microbes as Biofertilizer and their uses. Students will also learn about the organic farming and recycling of different kinds of biodegradable wastes. |
|  | Ability Enhancement Course (AEC) | AEC | 2 | . Course outcome with respective subject |
|  | Value Added Course (VAC): CVA1061 | Environmental Science | 4 |  Course outcome with respective subject |
| II | Major: BOTN2011 | Major: Biomolecules and Cell Biology | 4 |  Comprehend the structure and function of key biomolecules (carbohydrates, proteins, lipids, nucleic acids) and their roles in cellular processes. Understand enzyme structure, kinetics, regulation, and their role in metabolism. Learn the structure and function of cellular organelles and the processes like protein synthesis, energy production, and transport within cells. Grasp the basic principles of cell communication and signal transduction pathways. Study mechanisms of mitosis, meiosis, cell cycle regulation, and their implications in cancer biology. |
|  | Minor: BOTN2021 | Minor: Biomolecules and Cell Biology | 4 |  Comprehend the structure and function of key biomolecules (carbohydrates, proteins, lipids, nucleic acids) and their roles in cellular processes. Understand enzyme structure, kinetics, regulation, and their role in metabolism. Learn the structure and function of cellular organelles and the processes like protein synthesis, energy production, and transport within cells. Grasp the basic principles of cell communication and signal transduction pathways. Study mechanisms of mitosis, meiosis, cell cycle regulation, and their implications in cancer biology. |
|  | Multi/Interdisciplinary:BOTN2031 | Medicinal Plants and Phytochemistry | 3 |  Identify common medicinal plants, their uses, and their therapeutic properties. Learn about key phytochemicals (e.g., alkaloids, flavonoids) and their biological activities. Develop skills in extracting, isolating, and analyzing plant compounds using laboratory techniques. Study the pharmacological properties (e.g., antimicrobial, anti-inflammatory) of plant-derived compounds. Understand the safety, toxicity, and adverse effects associated with medicinal plants. Learn the process of developing herbal medicines, from extraction to clinical use and regulation. Explore the cultural significance of plants and the importance of conserving medicinal plant species. Evaluate the efficacy and clinical evidence for plant-based therapies. Understand the ethical, legal, and regulatory issues surrounding medicinal plants. Integrate knowledge from pharmacology, botany, and chemistry to advance medicinal plant research and applications. |
|  | Skill Enhancement Course (SEC): BOTN2051 | SEC: Organic Cultivation and Protected Agriculture | 3 |  Gain knowledge of **principles and practices** of organic farming, including soil health, crop rotation, and the use of organic inputs (e.g., compost, natural pesticides). Learn about sustainable farming techniques, **eco-friendly pest management**, and ways to reduce the environmental impact of agriculture. Understand **soil fertility**, organic soil amendments, and **water management** practices for sustainable crop production. Study **greenhouses**, **polyhouses**, and **net houses**, and understand their role in improving crop yield and quality by controlling environmental conditions. Learn to select suitable crops for organic and protected cultivation systems, focusing on **crop diversification** and **integrated pest management (IPM)**. Understand the process of **organic certification** and compliance with national and international standards for organic produce. Gain insights into the **market dynamics** of organic produce and the economic benefits of organic and protected agriculture. Learn about modern technologies and innovations in **protected agriculture**, including **hydroponics**, **aeroponics**, and **automated systems**. Understand the role of **organic and protected agriculture** in promoting long-term agricultural sustainability and reducing the ecological footprint. Develop skills to start and manage an **organic farming business** or venture in protected agriculture, focusing on profitability and sustainability. |
|  | Ability Enhancement Course (AEC): ENGL2041 | English | 2 |  Course outcome with respective subject |
|  | Value Added Course (VAC): CVA2061 | Understanding India | 4 |  Course outcome with respective subject  |
| III | CC-1C | Plant Anatomy and Embryology | 6 |  The course Plant Anatomy and Embryology deal with internal structures and various cell types of different parts of higher plants. Students will gather the practical knowledge about the different internal structures of higher plants and their drawing skill. |
|  | SEC-1 | Biofertilisers | 2 |  Students will learn about different types of bio-fertilizers, role of microbes as Biofertilizer and their uses. Students will also learn about the organic farming and recycling of different kinds of biodegradable wastes. |
| IV | CC-1D | Plant Physiology and Metabolism | 6 |  To understand different kinds of physiological processes like absorption and transpiration of water and food, mineral nutrition, deficit symptoms and role of nutrient in plants. Roles of plant growth regulators (PGR) in their different physiological processes like growth, cell division, flowering, fruit ripening and abscission will be learn by the students. Students will learn concepts of metabolism including catabolic as well as anabolic pathways, role of enzymes in regulation of metabolism. Entrapment of solar energy through carbon assimilation process and their modification in different climatic conditions, Biochemical processes of respiration along with their regulations and mechanism of ATP synthesis within the cell will be learn by them. Nitrogen metabolism to maintain nitrogen cycle through leguminous and non-leguminous plants as well as physiology and biochemistry of nitrogen fixation and signal transduction within cells will be learnt by the students. |
|  | SEC-2 | Medicinal Botany | 2 |  Recognize and classify **medicinal plants** and their therapeutic uses. Learn about key **bioactive compounds** (e.g., alkaloids, flavonoids) and their medicinal properties. Develop skills in identifying medicinal plants based on **morphology** and **chemicals**. Understand the process of making **herbal medicines** (extracts, tinctures, etc.). Study the **pharmacological actions** of medicinal plants on body systems. |
| V | DSE-1A (BOT) | Economic Botany and Biotechnolgy | 6 |  Students will learn about the economic importance of various types of plants like cereals, legumes spices, beverage yielding plants, oil and rubber yielding plants, timber yielding plants and their cultivation. Students will learn techniques of plant tissue culture to improve the quality of plant as well as industry level production of crop within laboratory to fulfill food demand. Introduction of new qualities (pest resistant, herbicide resistant etc) in a transgenic crop to produce/include plant based vaccines, improvement of size, taste, texture, colour of different fruits to recombinant technology along with gene cloning and gene transfer methods. |
|  | SEC-3 | Nursery and Gardening | 2 |  Understand the basics of **nursery setup** and plant propagation techniques. Learn methods like **seeds**, **cuttings**, and **grafting** for growing plants. Understand soil types and **fertilization** practices for healthy plant growth. Develop skills in **watering**, **pruning**, and managing **pests** and **diseases**. Identify and select **suitable plants** for various garden types (ornamental, edible, etc.). Understand the **tools** and infrastructure needed for nurseries and gardens. Explore **eco-friendly** gardening techniques like composting and water conservation. Learn about the **business** side of nurseries, including marketing and customer service. Understand the **environmental advantages** of gardening, like improving air quality and biodiversity. |
| VI | DSE- 1B (BOT) | Cell and Molecular Biology | 6 |  They will a learn the process of eukaryotic cell formation different kinds of enzymes involve in cellular process, hereditary unit i.e. DNA and RNA, processes of cell division, cellular dynamics and role of cell organelles. Students will learn historical perspective of nucleic acid as a unit and types of genetic carrier, their organization and function in cell. Formation of protein through RNA and their regulations also studied under this course. |
|  | SEC-4 | Mushroom Cultivation Technology | 2 |  Students will learn about the medicinal value of edible mushroom and mushroom culture technology. They will also know about the storage and nutritional value of mushroom. |

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**PROGRAMME OUTCOME (PO)**

Our College is affiliated to The University of Burdwan (BU) and hence follows the same Course Programme offered by BU from time to time. It, therefore, adheres and strives towards achieving the goal as enumerated by BU through its programme outcome. These are as follows—

**PO-1: CRITICALTHINKING**:Curricular management is strategically implemented to cultivate precise understanding of the thematic concepts enabling the students for cognitive attainment. The process of curricular management is monitored by formal assessment procedure. Thus, a consistent evaluation of critical thinking ability of the students is pursued.

**PO-2: ENVIRONMENT AND SUSTAINABILITY**: After the completion of graduate degree,students will be able to develop environment consciousness and strives for the development of the ecosystem and works towards attaining the goals of sustainable development.

**PO-3: SELF DIRECTED AND LIFE-LONG LEARNING**: The programme endeavours to develop skill for engagement in life-long learning in the broadest context of social changes.

**PO-4: ETHICS**: Recognize own value system and ability to deal along the path, accepting responsibility for his/her actions and rectify them as and when necessary.

**PO-5: EFFECTIVE COMMUNICATION**: Regular interface between teacher and students empowers the students to express their conceptual attainment through regular communication system both conventional and being IT enabled. Proficiency in communicating through English is being emphasized upon in order to imparting interactive capacity to professional domain.Attaining capacity in vernacular communication is also being emphasized to establish social accountability of students as a preparatory citizen.

**PO-6: SOCIAL INTERACTION**: Students will be able to develop social communication skill through interaction with different peer groups and mediated disagreement.

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**PROGRAMME SPECIFIC OUTCOME (PSO)**

* + Systematic and fundamental understanding of Botany as a discipline
	+ Skill and related development for acquiring specialization in Botany
	+ Identifying Botany related problem, analyzing and application of data using appropriate methodologies
	+ Applying knowledge of Botany and skill to solve complex problems with defined solution
	+ Finding opportunity to apply Botany related skills for acquiring jobs and self-employment
	+ Understanding new frontiers of knowledge in Botany for professional development
	+ Applying subject knowledge for solving societal problems related to application of that subject in day today life
	+ Applying subject knowledge for sustainable environment friendly green initiatives
	+ Students in Botany will have an exposure in various skills enhancement in different fields’viz. Mushroom cultivation, herbal drugs and medicinal plant, conservation and ecosystem ,tissue culture. These will create new avenue ands and job opportunities for the students of Botany