

**DEPARTMENT OF BOTANY****GOVERNMENT GENERAL DEGREE COLLEGE AT KALIGANJ**

## PROGRAMME OUTCOME &amp; COURSE OUTCOME

PROGRAMME NAME: BSc Botany Honours

**PROGRAMME OUTCOME**

- **PO1. Critical Thinking:** Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
- **PO2. Effective Communication.** Ability to speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
- **PO3. Social Interaction:** Elicit views of others, mediate disagreements and help reach conclusions in group settings.
- **PO4. Effective Citizenship.** Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
- **PO5. Ethics.** Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
- **PO6. Environment and Sustainability.** Understand the issues of environmental contexts and sustainable development.
- **PO7. Self-directed and Life-long Learning.** Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

**PROGRAMME SPECIFIC OUTCOMES:**

- **PSO1.** Comprehend and understand the nature and basic concepts of plant science with all of its branches and comprehend the relationships among different plant groups such as algae, fungi, bryophyte, pteridophyte, gymnosperms and angiosperms.
- **PSO2.** Perform experiments and laboratory procedures in different domains such as Taxonomy, Evolution, Biochemistry, Genetics, Cell Biology, Plant Physiology, Plant Tissue Culture etc.
- **PSO3.** Understand the value of plant wealth and their utilization from nature and understand environmental issues, sustainable development, global food security, healthcare and wellbeing which will motivate them to solve some of them using plant science as a weapon leading to the growth and prosperity of human civilization.



HEAD,  
DEPT. OF BOTANY,  
GGDC, KALIGANJ

HEAD  
DEPARTMENT OF BOTANY  
GOVERNMENT GENERAL DEGREE  
COLLEGE, KALIGANJ

**COURSE OUTCOMES (COs)****SEMESTER-I****CC01 COURSE TITLE: BIOMOLECULES AND CELL BIOLOGY**

CO1. Ability to classify and describe nomenclature of biomolecules and gain the knowledge on structures of biomolecules.

CO2. Ability to elucidate the laws of thermodynamics and translation of reaction mechanisms within cells into their final expression.

CO3. Ability to understand and discuss the origin of Cells.

CO4. Ability to understand structural as well as the functional aspects of cell and cell organelles.

CO5. Ability to explain the process of cell division.

CO6. Ability to explain functional aspects of cells including the individual functions of cell organelles.

**CC02 COURSE TITLE: PLANT MORPHOLOGY AND ANATOMY**

CO1. Ability to demonstrate the knowledge on morphology of reproductive parts of angiosperms.

CO2. Ability to discuss the vegetative morphology of plants with emphasis on leaves and its modification.

CO3. Ability to explain developmental patterns of both vegetative and reproductive organs of plants.

CO4. Ability to understand the anatomical organization of plant body and the anatomical protective mechanism of Plant.

CO5. Ability to demonstrate the anatomical aspects of plant growth and the processes associated with it to analyse and comprehend wood structure.

CO6. Ability to assess the scope of anatomy in forensics and pharmacognosy.

**SEMESTER-II****CC03 COURSE TITLE: DIVERSITY OF MICROBES AND ALGAE**

CO1. Ability to classify and describe general traits of viruses with special reference to their morphology, reproduction and ecology.

CO2. Ability to classify and describe general traits of bacteria with special reference to their morphology, reproduction and ecology.

CO3. Ability to classify and describe general traits of algae with special reference to their morphology, reproduction and ecology.

CO4. Ability to explain function and roles of microbes in environment, human welfare and in industrial applications.

CO5. Ability to understand and discuss the origin of Cells.

CO6. Ability to apply the knowledge in understanding the evolutionary significance of these organisms.



HEAD,  
DEPT. OF BOTANY,  
GGDC, KALIGANJ

HEAD  
DEPARTMENT OF BOTANY  
GOVERNMENT GENERAL DEGREE  
COLLEGE, KALIGANJ

**CC04 COURSE TITLE: DIVERSITY OF FUNGI AND PLANT PATHOLOGY**

- CO1. Ability to describe general traits of fungi with special reference to their morphology.
- CO2. Ability to classify, morphology, reproduction, symbiosis and applied aspects.
- CO3. Ability to describe fungi with reference to their morphology reproduction, symbiosis etc.
- CO4. Ability to apply the knowledge in understanding applied aspects of these organisms
- CO5. Ability to explain pathogen interactions.
- CO6. Ability to apply the knowledge of control of plant pathogens and plant diseases.


**SEMESTER-III**

**CC05 COURSE TITLE: DIVERSITY OF BRYOPHYTES AND PTERIDOPHYTES**

- CO1. Ability to describe bryophytes with special reference to their classification, morphology, reproduction, distribution and ecology.
- CO2. Ability to describe pteridophytes with special reference to their classification, morphology, reproduction, distribution and ecology.
- CO3. Ability to explain their role of bryophytes in environment and human welfare as well as in industrial applications.
- CO4. Ability to explain their role of pteridophytes in environment and human welfare as well as in industrial applications.
- CO5. Ability to apply the knowledge in understanding the evolutionary significance of bryophytes.
- CO6. Ability to apply the knowledge in understanding the evolutionary significance of pteridophytes.

**CC06 COURSE TITLE: DIVERSITY OF GYMNOSPERMS AND PALEOBOTANY**

- CO1. Ability to determine the concepts of progymnosperms along with its evolutionary history.
- CO2. Ability to describe gymnosperms with special reference to their classification, morphology, reproduction, distribution and ecology.
- CO3. Ability to explain their role in environment, economic utilization along with understanding their evolutionary significance.
- CO4. Ability to describe primordial life forms, their evolution through geological ages along with rate of diversification with special emphasis to continental drift and plate tectonic theory.
- CO5. Ability to describe fossils with reference to their type, preservation & understand the. time scale.
- CO6. Ability to understand and describe fossil flora with reference to Gondwana.



HEAD,  
DEPT. OF BOTANY,  
GGDC, KALIGANJ

HEAD  
DEPARTMENT OF BOTANY  
GOVERNMENT GENERAL DEGREE  
COLLEGE, KALIGANJ

**CC07 COURSE TITLE: REPRODUCTIVE BIOLOGY OF PLANTS**

CO1. Ability to describe reproductive morphology and its components in angiosperms.

CO2. Ability to gain knowledge of pollen grains and ovules as reproductive units.

CO3. Ability to explain the process of pollination and fertilization in flowering plants.

CO4. Ability to apply the knowledge to comprehend self-incompatibility in plants and applying methods for overcoming it.

CO5. Ability to describe embryo development and seed formation.

CO6. Ability to understand the implications of Palynology in different areas of human welfare such as aeropalynology, melissopalynology etc.

**CC08 COURSE TITLE: PLANT DIVERSITY AND HUMAN WELFARE**

CO1. Ability to explain the concepts of biodiversity including different levels of biodiversity.

CO2. Ability to understand the reasons for loss of biodiversity at different levels.

CO3. Ability to gain knowledge of different authorities and organization for management of plant biodiversity.

CO4. Ability to understand the requirement of conservation and environmental stewardship.

CO5. Ability to know the roles of different plants in relation to human welfare.

CO6. Ability to apply and implement conservation strategies for biodiversity management.

**SEMESTER-IV**

**CC08 COURSE TITLE: TAXONOMY OF ANGIOSPERMS AND PLANT SYSTEMATICS**

CO1. Ability to classify the plant kingdom with identification and fixing its rank under any system of classification.

CO2. Ability to apply concepts of alpha taxonomy, omega taxonomy and application of mathematical approaches in case of numerical taxonomy to assess the relationships among taxa.

CO3. Ability to identify different plant families by the diagnostic features and know their systemic position.

CO4. Ability to gain knowledge on economically important plants and parts used for different purposes.

CO5. Ability to apply the knowledge in postulating evolutionary trends and tracing of phyletic lines.

CO6. Ability to find different germplasms, new distributional records and new taxa and contribute to plant resource documentation (herbarium technique) for identification and description of pattern shift in floristic diversity in an area.



HEAD,  
DEPT. OF BOTANY,  
GGDC, KALIGANJ

HEAD  
DEPARTMENT OF BOTANY  
GOVERNMENT GENERAL DEGREE  
COLLEGE, KALIGANJ

**CC09 COURSE TITLE: PLANT ECOLOGY AND PHYTOGEOGRAPHY**

- CO1. Ability to elucidate the interaction between biotic and abiotic components of the ecosystems.
- CO2. Ability to explain the interactions at inter and intra-specific levels and at different trophic levels.
- CO3. Ability to analyse and describing the community structure of different biomes.
- CO4. Ability to describe the dynamics of ecosystems.
- CO5. Ability to analyse and describe the dynamics of population ecology.
- CO6. Ability to develop understanding on principles of phytogeography with special emphasis on India and vegetation of India including local vegetation.

**CC10 COURSE TITLE: ECONOMIC BOTANY AND PHARMACOGNOSY**

- CO1. Ability to comprehend the basics of crop origin and domestication.
- CO2. Ability to identify plant parts of economic importance and their usage as food and food products.
- CO3. Ability to identify plant parts of economic importance and their usage as natural rubber, timber and fibre.
- CO4. Ability to identify the medicinal plants from the pharmacognostic preparations.
- CO5. Ability to distinguish between the adulterants and authentic pharmacognostic preparations.
- CO6. Ability to Elucidate the chemical constituents of medicinal plants.

**SEC 01 COURSE TITLE: MEDICINAL BOTANY**

- CO1. Ability to discuss the history, scope and importance of plants as source of medicines.
- CO2. Ability to describe the methods for sustainable utilization of plant herbal resources.
- CO3. Ability to gain knowledge for propagation of medicinal plants by nurseries and know different methods associated with it.
- CO4. Ability to apply the knowledge of utilization of plants used as traditional/folk medicines
- CO5. Ability to gain knowledge and discuss different strategies in relation to conservation of medicinal plants.
- CO6. Ability to gain knowledge on application of natural products for different diseases.



HEAD,  
DEPT. OF BOTANY,  
GGDC, KALIGANJ

HEAD  
DEPARTMENT OF BOTANY  
GOVERNMENT GENERAL DEGREE  
COLLEGE, KALIGANJ

**SEMESTER-V**

**CC11 COURSE TITLE: PLANT PHYSIOLOGY**

CO1. Ability to discuss plant water relations and mineral nutrients requirements of plants and their metabolism, transport and roles.

CO2. Ability to discuss the methods of nutrient uptake in and out of the cells.

CO3. Ability to discuss translocation in the phloem.

CO4. Ability to explain the roles of plant growth regulator in regulating growth and development of plants.

CO5. Ability to describe the physiology of flowering.

CO6. Ability to develop understanding light responses and seed dormancy in plants.

**CC12 COURSE TITLE: PLANT METABOLISM**

CO1. Ability to describe the concepts of different types of metabolisms and their regulation in plants.

CO2. Ability to apply the knowledge gained regarding physiological and biochemical details of photosynthesis their organization and regulation of plants.

CO3. Ability to apply the knowledge gained regarding physiological and biochemical details of respiration and their organization and regulation of plants.

CO4. Ability to discuss bioenergetics with reference to ATP.

CO5. Ability to understand mechanism of Nitrogen metabolism

CO6. Ability to explain Signal transduction in plants.

**DSE01 COURSE TITLE: INDUSTRIAL AND ENVIRONMENTAL MICROBIOLOGY**

CO1. Ability to apply the basics of microbiology to build a foundation for studies in industrial microbiology to manufacturing of food or product of large quantities.

CO2. Ability to gain knowledge about fermentation process and fermenters

CO3. Ability to apply knowledge to utilization of microbes to produce different products.

CO4. Ability to apply knowledge for utilization of microbial enzymes.

CO5. Ability to gain knowledge about existence of microbes in relation to quality of environment

CO6. Ability to apply knowledge to utilization of microbes as tools in environmental remediation.

HEAD,  
DEPT. OF BOTANY,  
GGDC, KALIGANJ

HEAD  
DEPARTMENT OF BOTANY  
GOVERNMENT GENERAL DEGREE  
COLLEGE, KALIGANJ

**DSE02 COURSE TITLE: PLANT BREEDING AND BIOMETRY**

CO1. Ability to gain knowledge or get an overview of hybridization techniques.

CO2. Ability to understand role of biotechnology in crop development

CO3. Ability to gain knowledge about quantitative inheritance

CO4. Ability to explain inbreeding depression and heterosis.

CO5. Ability to analyse statistical data.

CO6. Ability to understand the nature of inheritance

**SEMESTER-VI**

**CC13 COURSE TITLE: GENETICS**

CO1. Ability to explain Mendel's theory of inheritance and its extension.

CO2. Ability to understand the extranuclear inheritance.

CO3. Ability to construct chromosome map

CO4. Ability to demonstrate knowledge on Structural and conceptual aspects of gene with reference to classical and modern approaches, Chromosome and nucleic acids.

CO5. Ability to comprehend the underlying mechanisms of gene mutation.

CO6. Ability to describe DNA replication and protein synthesis.

**CC14 COURSE TITLE: PLANT MOLECULAR BIOLOGY AND BIOTECHNOLOGY**

CO1. Ability to explain the principles, technical requirements, of plant tissue and cell culture.

CO2. Ability to comprehend different gene transfer techniques.

CO3. Ability to state the scientific and commercial applications of plant tissue and cell culture.

CO4. Ability to apply the knowledge for exploitation of the recombinant DNA technology for development of transgenic plants.

CO5. Ability to demonstrate knowledge historical development on Recombinant DNA technology.

CO6. Ability to gain knowledge on effect of Recombinant DNA Technology in present world.

HEAD,  
DEPT. OF BOTANY,  
GGDC, KALIGANJ

HEAD  
DEPARTMENT OF BOTANY  
GOVERNMENT GENERAL DEGREE  
COLLEGE, KALIGANJ

**DSE03 COURSE TITLE: BIODIVERSITY AND CONSERVATION**

CO1. Ability to demonstrate the knowledge on fundamentals of Natural Resources.

CO2. Ability to discuss the knowledge on important natural resources such as Land, Water, Forest and Energy, their Significance and utilization in practice.

CO3. Ability to demonstrate the understanding of fundamental principles of ecological studies for conservation of biodiversity.

CO4. Ability to discuss and cite theories and case studies for success in sustainable utilization and effective species conservation.

CO5. Ability to translate theoretical aspects of contemporary practices to recommendations for environmental management.

CO6. Ability to gain knowledge regarding the National and international efforts in resource management and conservation.

**DSE04A COURSE TITLE: RESEARCH METHODOLOGY**

CO1. Ability to define and explaining the concept of research and the scope of research in plant science.

CO2. Ability to differentiate, apply and practice different laboratory practices in plant science research.

CO3. Ability to observe, document and interpret data.

CO4. Ability to write research related documents viz. proposal, report, dissertation etc.

CO5. Ability to apply the knowledge of research ethics gained in maintaining professional ethics and avoiding conflicts.

CO6. Ability to present his or her work clearly through the written document as well as by oral presentations.

**DSE04B COURSE TITLE: DISSERTATION/PROJECT**

CO1. Ability to apply the knowledge gained through different courses in practical aspects.

CO2. Ability to solve problems related to his/her course of study.

CO3. Ability to document, calculate analyse and interpret data and deduce findings from different studies.

CO4. Ability to deduce findings and draw conclusion from them.

CO5. Ability to write report in standard academic format.

CO6. Ability to present his or her work clearly through the written document as well as by oral presentations.



HEAD,  
DEPT. OF BOTANY,  
GGDC, KALIGANJ

HEAD  
DEPARTMENT OF BOTANY  
GOVERNMENT GENERAL DEGREE  
COLLEGE, KALIGANJ