

**Metric 2.6.1**

**Programme Outcomes**

**Programme Specific Outcomes**

**And**

**Course Outcomes**

**FOR**

**2020 – 21**

## **Programme Outcomes of Bachelor of Science programme offered by Dept. of Botany, Gurucharan College, Silchar.**

We offer a three year undergraduate Bachelor of Science programme in Botany. Being an affiliated College, it follows the Syllabus prescribed by Assam University, Silchar. However the college has its own set of targets and outcomes prescribed for its students. A student upon completion of the three years Bachelor of Science Programme should attain the following attributes:

### **SEMESTER – I [HONOURS]**

**NOTE:** **CC** indicates Core Course, **DSE** indicates Discipline Specific Elective and **SEC** indicate Skill Enhancement Course. **BOTH** indicates Botany Honours course and **BOTP** indicates Botany Pass Course.

#### **BOTHCC-101 T & L [Phycology and Microbiology]**

Students on completion of this course has both theoretical and practical knowledge about the microbial world, their economic importance, various roles, Viruses, Bacteria, Algae and their systematic study and economic importance.

#### **BOTH CC-102 T & L [Biomolecules and Cell Biology]**

Students on completion of this course has both theoretical and practical knowledge about Biomolecules like Carbohydrate, Proteins, Fats & Lipids, Nucleic Acid and their various types. Also knowledge about Bioenergetics and Enzymes alongwith Cell and their organelle is imbibed. The students also get a clear hands on knowledge about cell division both mitosis and meiosis.

### **SEMESTER – II [HONOURS]**

#### **BOTH CC-201 T & L [Mycology and Phytopathology]**

Students on completion of this course has both in depth, theoretical and practical knowledge about Fungi and their major divisions, symbiotic association and their role in Biotechnology. Various plant diseases of fungal nature are thoroughly studied.

#### **BOTH CC-202 T & L [Archegoniate]**

A student on completion of this course has both in depth, theoretical and practical knowledge about the Cryptogams like Bryophytes and Pteridophytes, their systematic study of some important species. In addition, Gymnosperms

and their systematic knowledge is also imbibed alongwith ecological and economic importance.

## **SEMESTER – III [HONOURS]**

### **BOTH CC-301 T & L [Anatomy of Angiosperms]**

A student on completion of this course has both in depth, theoretical and practical knowledge about the scope of plant anatomy, details study of tissues, apical meristems, vascular cambium and wood. Adaptive and protective systems of angiospermic plants are also thoroughly studied by the students.

### **BOTH CC-302 T & L [Economic Botany]**

A student on completion of this course has both in depth, theoretical and practical knowledge about the economic importance [cultivation, processing and uses] of cereals, legumes, spices, beverages, sugars, oils, fats and fibres; rubber, timber and medicinal plants.

### **BOTH CC-303 T & L [Genetics]**

A student on completion of this course has both in depth, theoretical and practical knowledge about Mendelian genetics, extra chromosomal inheritances, linkage, chromosome mapping, polyploidy, gene mutations and evolutionary genetics. Population genetics are also thoroughly studied by the students.

### **BOTSEC-301 T [Biofertilizer]**

A student on completion of this course has thorough knowledge on various microbes like *Rhizobium*, *Azospirillum* and *Azotobacter* used as biofertilizer. They gain knowledge of about the isolation, identification and mass multiplication of these microbes. Also, blue green algae as nitrogen fixers, and their association with *Azolla* are learnt by the students. In addition, mycorrhizal association, VAM and its application on the yield of crop plants, green manuring, vermicompost's field application are learnt by the students.

## **SEMESTER – IV [HONOURS]**

### **BOTH CC401 T & L [Molecular Biology]**

On completion of this course a students will have imbibed theoretical and practical knowledge about Nucleic acids, replication, central dogma and the genetic code. RNA, its processing and modifications; Translation and its various aspects.

### **BOTH CC402 T & L [Plant Ecology and Phytogeography]**

On completion of this course a students will have imbibed theoretical and practical knowledge about the basic concepts, abiotic and biotic factors, biotic interactions and plant community. Also Ecosystem energetics, population ecology and phytogeography is also studied.

### **BOTH CC403 T & L [Plant Systematics]**

A student on completion of this course has both in depth, theoretical and practical knowledge about the significance of Plant Systematics, botanical nomenclature, taxonomic hierarchy and systems of classification. Also numerical taxonomy, biometrics and phylogeny of Angiosperms are also studied.

### **BOTSEC-301 T [Herbal Technology]**

A student on completion of this course has thorough knowledge on history of herbal medicine, role of medicinal plants in Siddha systems, harvesting, processing, storage and marketing of medicinal plants; concepts of pharmacognosy, phytochemistry of medicinal herbs, its active principles. Also, they gather knowledge on experimental analysis of herbal drugs, medicinal plant bank, herbal foods.

## **SEMESTER – V [HONOURS]**

### **BOTH CC501 T & L [Reproductive Biology of Angiosperms]**

On completion of this course a students will have imbibed theoretical and practical knowledge about the contribution of renowned embryologists, reproductive development, anther, ovule, pollen biology and fertilization. Also basic concepts of self incompatibility, embryo, endosperm and seed are also studied.

### **BOTH CC502 T & L [Plant Physiology]**

On completion of this course a students will have imbibed theoretical and practical knowledge about the plant water relations, mineral nutrition and their uptake and translocation in the phloem. Also plant growth hormones and physiology of flowering are studied by the students.

## **Discipline Specific Elective [DSE]**

### **BOTDSE 501 T & L [Analytical Techniques in Plant Sciences] Pass**

**V**

On completion of this course a students will have imbibed theoretical and practical knowledge about imaging techniques of various types of microscopes,

cell fractionation, radioisotopes, spectrophotometry and chromatography; characterization of proteins and nucleic acids. Also Biostatistics and its various aspects is also inculcated by the students.

### **BOTDSE 502 T & L [Plant Breeding]**

On completion of this course a students will have imbibed theoretical and practical knowledge about the various aspects of plant breeding, methods of crop improvement, quantitative inheritance, inbreeding depression, heterosys and crop improvement.

## **SEMESTER – VI [HONOURS]**

### **BOTH CC601 T & L [Plant Metabolism]**

On completion of this course a students will have imbibed theoretical and practical knowledge about various concepts of plant metabolism in cluding carbon assimilation, carbohydrate, lipid and nitrogen metabolism. Also carbon oxidative pathways, ATP synthesis and its mechanism is also known by the students.

### **BOTH CC602 T & L [Plant Biotechnology]**

A student on completion of this course has both in depth, theoretical and practical knowledge about Plant tissue culture, techniques, culture media, germplasm conservation, cryo preservation and various applications of plant tissue culture. Also recombinant DNA technology, gene cloning, methods of gene transfer and application of plant biotechnology is also imbibed by the students.

## **Discipline Specific Elective [DSE]**

### **BOTDSE 601 T & L [Industrial and Environmental Microbiology]**

#### **Pass VI**

A student on completion of this course has both in depth, theoretical and practical knowledge about Microbial production, fermenters and fermentation process, microbial enzymes and their immobilization. Also Microbial flora of water, agriculture and bioremediation of contaminated soils is studied.

### **BOTDSE 602 T & L [Research Methodology]**

A student on completion of this course has both in depth, theoretical and practical knowledge about the basic concepts of research, general laboratory practices, data collection and documentation of surveys. Also the students are given projects under the guidance of faculty members to have clear knowledge

of scientific writing, computer usage and softwares like MS Word, MS Excel, MS Powerpoint. They also learn about public speaking and project presentation of review papers or their experimental study. In addition they learn about future research areas, when they study about various biological problems and their overview.

## SEMESTER – I [B.Sc. General with Botany]

### **BOTPGE-101 T & L [Microbes, Algae, Fungi and Archegoniate]**

Students on completion of this course has both theoretical and practical knowledge about the microbial world, their economic importance, various roles, Viruses, Bacteria, Algae and their systematic study and economic importance. Also concepts of Fungi and their major divisions, symbiotic association and their role in Biotechnology are imbibed. Various plant diseases of fungal nature are thoroughly studied. Besides, information about the Cryptogams like Bryophytes and Pteridophytes, their systematic study of some important species. In addition, Gymnosperms and their systematic knowledge is also imbibed alongwith ecological and economic importance.

## SEMESTER – II [B.Sc. General with Botany]

### **BOTPGE-201 T & L [Plant Ecology and Taxonomy]**

On completion of this course a students will have imbibed theoretical and practical knowledge about the basic concepts, abiotic and biotic factors, biotic interactions and plant community. Also Ecosystem energetics, population ecology and phytogeography are also studied. Besides, knowledge about the significance of Plant Systematics, botanical nomenclature, taxonomic hierarchy and systems of classification [artificial, natural and phylogenetic; Bentham and Hooker (upto series), Engler and Prantl (upto series)]. Also numerical taxonomy, biometrics, cluster analysis; phenograms, cladograms and phylogeny of Angiosperms are also incorporated in their knowledge.

## SEMESTER – III [B.Sc. General with Botany]

### **BOTPGE-301 T & L [Plant Anatomy and Embryology]**

A student on completion of this course has both in depth, theoretical and practical knowledge about the scope of plant anatomy, details study of tissues, apical meristems, vascular cambium and wood. Adaptive and protective systems of angiospermic plants are also thoroughly studied by the students.

Concepts about reproductive development, anther, ovule, pollen biology, fertilization, Endosperm types [structure and functions]; Dicot and monocot embryo; Embryo- endosperm relationship, Apomixis and polyembryony are imbibed by the students. Also basic concepts of self incompatibility, embryo, endosperm and seed are also studied.

## SEMESTER – IV [B.Sc. General with Botany]

### **BOTPGE-401 T & L [Plant Physiology and Metabolism]**

On completion of this course a students will have imbibed theoretical and practical knowledge about the plant water relations, mineral nutrition and their uptake and translocation. Also Photosynthesis & Respiration, ETS, Nitrogen metabolism, plant growth hormones and physiology of flowering are studied by the students. Besides, concepts of Photoperiodism, Phytochrome and Vernalization is studied.

## **SEMESTER – V [B.Sc. General with Botany]**

### **BOTSEC-501 T [Ethnobotany]**

A student on completion of this course has thorough knowledge on concepts, scopes and objectives of ethnobotany, lifestyle of tribal people, plant used by tribals; methodology of ethnobotanical studies, ethnobotanical practices of some important medicinal plants. Role of ethnobotany in modern medicine and legal aspects of ethnobotany are also learnt by the students.

### **BOTDSE 501 T & L [Analytical Techniques in Plant Sciences]**

On completion of this course a students will have imbibed theoretical and practical knowledge about imaging techniques of various types of microscopes, cell fractionation, radioisotopes, spectrophotometry and chromatography; characterization of proteins and nucleic acids. Also Biostatistics and its various aspects is also inculcated by the students.

## **SEMESTER – VI [B.Sc. General with Botany]**

### **BOTSEC-601 T [Mushroom Culture Technology]**

A student on completion of this course has thorough knowledge on history, nutritional and medicinal value of edible mushrooms, types of edible mushroom found in India, idea about poisonous mushrooms, detailed cultivation procedures of edible mushroom, storage procedure of mushrooms, nutritional value of mushroom. Also students gain knowledge on various types of food preparation from mushroom, marketing and export of mushroom, research centres at national and regional level.

### **BOTDSE 601 T & L [Industrial and Environmental Microbiology]**

A student on completion of this course has both in depth, theoretical and practical knowledge about Microbial production, fermenters and fermentation process, microbial enzymes and their immobilization. Also Microbial flora of water, agriculture and bioremediation of contaminated soils is studied.