Department of Botany

Government Degree College, Kanda

Programme Outcome as Per NEP 2020

B.Sc. Botany

B.Sc. I Year Certificate Course in Basic Botany

- This certificate course will provide knowledge on various fields of basic Botany.
- The syllabus is prepared to enable students for competitive exams in frontier areas ofplant sciences.
- Students will be able to know about habit, habitat, morphology, anatomy andreproduction of various plant groups.
- The students will have presentation and communication skills in life sciences.

Semester I

Paper 1: Microbes, Algae, Fungi and Bryophytes

Course outcome:

After the completion of the course the students will be able to:

1. Develop understanding about the classification and diversity of different microbes includingviruses, Algae, Fungi & Lichens & their economic importance.
2. Develop conceptual skill about identifying microbes, pathogens, biofertilizers & lichens.
3. Gain knowledge about developing commercial enterprise of microbial products.
4. Learn host –pathogen relationship and disease management.
5. Gain Knowledge about uses of microbes in various fields.
6. Understand the structure and reproduction of certain selected bacteria algae, fungi and lichens
7. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes.

Paper 2: Practical/Lab

After the completion of the course the students will be able:

1. Understand the instruments, techniques, lab etiquettes and good lab practices for working in a microbiology laboratory.

2. Develop skills for identifying microbes and using them for Industrial, Agriculture and Environment purposes.

3. Practical skills in the field and laboratory experiments in Microbiology and Pathology.

4. Learn to identify algae, lichens and plant pathogens along with their symbiotic and parasitic associations.

5. Students would learn to create their small digital reports where they can capture the zoomed inand zoomed out pictures as well as videos in case they are able to find some rare structure or phenomenon related to Bryophytes.

Semester II

Paper 1: Pteridophytes, Gymnosperms and Angiosperms

Course outcome:

After the completion of the course the students will be able to:

1. Develop critical understanding on morphology, anatomy and reproduction of Pteridophytes,Gymnosperms and Angiosperms.

2. Understanding of plant evolution and their transition to land habitat.

3. To learn the major patterns of diversity among plants, and the characters and types of dataused to classify plants.

4. To compare the different approaches to classification with regard to the analysis of data.

5. To become familiar with major taxa and their identifying characteristics, and to develop in depth knowledge of the current taxonomy of a major plant family.

6. To discover and use diverse taxonomic resources, reference materials, herbarium collections,publications.

Paper 2: Practical/Lab Course

Course outcome:

1. The students will be made aware of the group of plants that have given rise to land habit and the flowering plants. Through field study they will be able to see these plants growing in nature and become familiar with the biodiversity.

2. Develop an understanding by observation and table study of representative members of phylogenetically important groups to learn the process of evolution in a broad sense.

3. Understand morphology, reproduction and developmental changes therein through typologicalstudy and create a knowledge base in understanding the basis of plant diversity, economic values& taxonomy of plants.

B.Sc. II Year/ Diploma Course in DevelopmentalBotany

- This programme will provide knowledge on plant anatomy, embryology andcytogenetics.
- Laboratory sessions following theory will provide easy understanding of internalstructure of various plant parts, structural organization, reproductive biology andgenetics.
- This course will help students to become a plant morphologist.
- The students will able to understand Scientific and systematic knowledge on plant biodiversity.

Semester III

Paper 1: Morphology and Anatomy

Course outcome:

1. Understand morphology and anatomy.
2. Understand role of tissues in plant functions.
3. Understand the composition, modifications, internal structure & architecture of plants.

Paper 2: Practical/ Lab Course

Course outcome:

1. Understand cell structure in monocot and dicot plants.
2. Understand cell structure, secondary growth and adaptive anatomy in plants.

Semester IV

Paper 1: Embryology and Cytogenetics

Course outcome:

1. Understand reproduction and developmental changes in plants.
2. Understand the structure and chemical composition of chromatin and concept of cell division.
3. Interpret the Mendel's principles; acquire knowledge on cytoplasmic inheritance and sex-linked inheritance.

Paper 2: Practical/Lab Course

Course outcome:

1. Understand the pollination and seed dispersal mechanism.
2. Study the structure of ovules and female gametophytes.
3. Interpret the Mendel's principles; and understand the monohybrid and dihybrid crosses andtheir ratio and chromosomal changes.

B.Sc. III Year/ Bachelor of Science

- The three-year learning outcome of graduation will provide understanding of plant systematic, developmental biology, ecology, statistics, physiology, biochemistry, anatomy, and plant genetics.
- It will provide expertise in conservation biology and reproduction biology.
- After completing this course successfully students will be able to contribute in the field of plant sciences. The research project will help to develop research aptitude for higher education and scientific research.
- The students will have practical knowledge on applications of plant science in day-to-day life.
- The students will be able to understand Scientific knowledge about Biodiversity conservation and exploration.
- The students will be able to understand plant diversity and economic importance of plant species.
- The students will be able to teach biology in schools after completion of B.ed.
- The students may become online tutor, opt M.Sc. for higher education.
- The students may apply for various graduate level jobs in forest department, horticulture department, nursery and green house management.

Semester V

Paper 1: Cell and Molecular Biology, and Biotechnology

Course outcome:

1. Understand cell structure, nucleic acids, organization of DNA in prokaryotes and Eukaryotes, DNAreplication mechanism, genetic code and transcription process.

2. Know about processing and modification of RNA and translation process, function and regulationof expression.
3. Understand the basic tools and techniques used in Plant tissue culture.

Paper 2: Economic Botany and Plant Breeding

Course outcome:

1. Know about the importance of medicinal plants and its useful parts, economically importantplants in our daily life and also about the traditional medicines and herbs, and its relevance in modern times.
2. Understand the plant breeding systems and heterosis and mutation in plant breeding.

Paper 3: Lab Course

Course outcome:

1. Learn the basic structure and function of cells and instruments used in molecular biology,
2. Know about the commercial products produced from plants.
3. Understand about the ethnobotanical details of plants.
4. Learn about the chemistry of plants and herbal preparations.

Paper 4: Project in Botany for Pre-graduation

(Based on Local Plant Diversity)

Semester VI

Paper 1: Plant Physiology and Biochemistry

Course outcome:

1. Understand the role of physiological and metabolic processes for plant growth anddevelopment.
2. Learn the symptoms of mineral deficiency in crops and their management.
3. Assimilate knowledge about Biochemical constitution of plant diversity.
4. Know the role of plants in development of natural products, nutraceuticals, dietarysupplements, antioxidants.

Paper 2: Ecology and Biostatistics

Course outcome:

1. Acquaint the students with complex interrelationship between organisms and environment;
2. Make them understand methods for studying vegetation, community patterns and processes,ecosystem functions, and principles of phytogeography.
3. Understanding the strategies for sustainable natural resource management and biodiversityconservation.
4. Practical knowledge of the different statistics tools and techniques.

Paper 3: Practical/Lab Course

Course outcome

1. Understand the role of different physiological and metabolic processes of plants.
2. Gaining practical knowledge implemented in the biodiversity assessment and conservation.
3. Practical knowledge of the different statistics tools and techniques.

Paper 4: Project in Botany for Pre-graduation

(Based on local ecosystem studies)

Vocational/Skill Enhancement Course in Botany

(i) Bio-fertilizers

Course outcome

1. Develop conceptual skill about identifying microbes, and bio-fertilizers.
2. Gain knowledge about developing commercial enterprise of bio-fertilizers.

(ii) Herbal Technology

Course outcome

1. Develop conceptual skill about traditional Indian medicinal system, herbal medicines, theirprocessing, storage and marketing.
2. Gain knowledge about developing commercial enterprise of herbal medicines.
3. Learn the basic tools and techniques for phytochemical analysis and propagation of themedicinal plants.

(iii) Nursery and Gardening

Course outcome

1. Develop conceptual of nursery and gardening.
2. Gain knowledge about developing commercial enterprise of nursery.

(iv) Floriculture

Course outcome

1. Develop conceptual skill about floriculture.
2. Gain knowledge about developing commercial enterprise of commercial floriculture.

(v) Medicinal Botany

Course outcome

1. Understand the traditional Indian medicinal systems and their importance.
2. To learn the strategies for the conservation of medicinal plants.
3. Gain knowledge about developing commercial enterprise of herbal medicines.

(vi) Conservation and Management of Biodiversity

Course outcome

1. Understand the importance, benefits and services of biodiversity.
2. To learn the strategies for the conservation of biodiversity.

(vii) Ethnobotany

Course outcome

1. To learn the proper documentation and presentation of traditional knowledge about plants.

2. To use important plants by the tribal communities for various purposes.

3. To learn the conservation of wild growing plants and their socioeconomic impacts.

(viii) Mushroom Cultivation

Course outcome

1. Understand the economic importance of mushroom cultivation.

2. To learn the basic tools and techniques used in mushroom cultivation.

3. To learn the skills for developing commercial enterprise of mushroom cultivation.

(ix) Intellectual Property Rights

Course outcome

1. Understand the basic concepts of intellectual property rights.

2. To learn the procedure for obtaining the intellectual property rights.

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