Radhey Hari Govt. P. G. College, Kashipur, Uttarakhand

Department of Botany

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Department of Botany

Programme and Course outcomes

B.Sc. (Botany) NEP:

Sr. No.	Semester	Course Code	Paper Name
01	1st	BOT101T	Microbes, Algae, Fungi and Bryophytes
02	2nd	BOT201T	Pteridophytes, Gymnosperms and Angiosperms
03	3rd	BOT301T	Morphology, Anatomy and Embryology
04	4th	BOT401T	Cytogenetics and Plant Breeding
05	5th	BOT501T	Molecular Biology and Plant Biotechnology
06		BOT502T	Economic Botany
07		BOT504R	Project-I, Local Plant Diversity
08	6th	BOT601T	Physiology and Biochemistry
09		BOT602T	Ecology and Biostatistics
10		BOT604R	Project-II, Local Ecosystem Studies

Programme Outcome –

The B.Sc. Botany (NEP) programme is designed to provide comprehensive understanding of the various fields of Botany, from microbial world to higher angiospermic plants. It covers academic activities within the classroom sessions along with practical concepts at laboratory sessions and field studies. Students will be able to understand the interdisciplinary nature of Botany and its connection with other elective subjects such as zoology, chemistry, biotechnology, environmental science etc. Students would also become aware of the social and environmental importance of plants and their relevance to the national building.

Course Outcome –

1. **Microbes, Algae, Fungi and Bryophytes (BOT101T)** – After the successful completion of course, student will be able to understand classification, diversity andcharacteristic features of microbes, algae, fungi and bryophytes and also able to differentiate these plant groups.
2. **Pteridophytes, Gymnosperms and Angiosperms (BOT201T)** - After the successful completion of course, student will be able to understand distinguishing features, diversity, structure, reproduction and various other aspects of pteridophyta, gymnosperm and taxonomical studies of angiosperms.
3. **Morphology, Anatomy and Embryology (BOT301T)** - After the successful completion of course, student will be able to understand morphological characteristics of flower, anatomical characteristics of stem, root and leaf and various reproduction and developmental stages of plants.
4. **Cytogenetics and Plant Breeding (BOT401T)**- After the successful completion of course, student will be able to understand the Mendelian concepts of genetics and modern breeding methods for improving crop varieties.
5. **Molecular Biology and Plant Biotechnology (BOT501T)** - After the successful completion of course, student will be able to understand the basic molecular concepts and process of tissue culture and biotechnology.
6. **Economic Botany (BOT502T)**- After the successful completion of course, student will be able to understand the economic values of plants and their role in social and national development.
7. **Project-I Local Plant Diversity (BOT504R)** - After the successful completion of Project students will be able to identify and classify local plant species and write understand local plant diversity in terms of structure, function and conservation.
8. **Physiology and Biochemistry (BOT601T)** - After the successful completion of course, student will be able to understand the concepts of plant physiological process like, transpiration, translocation, photosynthesis, respiration etc. and also to understand the structure and function of biochemical compounds.
9. **Ecology and Biostatistics (BOT602T)** - After the successful completion of course, student will be able to understand ecosystem, its structure and functions, Community structure, plant adaptation, Phytogeography, biodiversity conservation and concept and application of statistics tools.
10. **Project-II Local Ecosystem Studies (BOT604R)** - After the successful completion of Project, student will be able to understand various concepts of ecology and their interactions and develop the ability to evaluate and write paper and reports on ecological parameters.

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Department of Botany

Programme and Course outcomes

M.Sc. (Botany) CBCS:

Sr. No.	Semester	Course Code	Paper Name
01	1st	BOT/I/CC/01	Microbiology
02		BOT/I/CC/02	Phycology
03		BOT/I/CC/03	Mycology
04		BOT/I/CC/04	Bryophyta and Pteridophyta
05	2nd	BOT/II/CC/06	Gymnosperms and Paleobotany
06		BOT/II/CC/07	Diversity and Taxonomy of Angiosperms
07		BOT/II/CC/08	Plant Development and Reproductive Biology
08		BOT/II/CC/09	Cytogenetics and Plant Breeding
09	3rd	BOT/III/CC/11	Plant Ecology
10		BOT/III/CC/12	Plant Resource Utilization and Conservation
11		BOT/III/CC/13	Biotechnology
12		BOT/III/CC/14	Plant Physiology and Biochemistry
13	4th	BOT/IV/EC/16(ii)	Plant Pathology
14		BOT/IV/EC/16(iii)	Taxonomy of Angiosperms
15		BOT/IV/CC/18	Dissertation

Programme Outcomes

The M.Sc. in Botany program (I – IV semester) is meticulously designed to equip students with comprehensive knowledge and advanced technical skills in plant sciences. Students of a Master's program in Botany will be able to develop a deep understanding of plant biology, ecology, genetics, and physiology, plant diseases and its control measures. They will be equipped with advanced research skills, enabling them to conduct independent scientific studies and contribute to biodiversity conservation, agriculture, and biotechnology. Through hands-on laboratory work and field studies, they will gain expertise in modern techniques such as molecular biology and bioinformatics. This holistic approach not only prepares students for careers in academia, environmental consultancy, botanical gardens, and government agencies but also lays a solid foundation for pursuing further studies at the doctoral level.They will also be skilled in scientific communication, critical thinking, and problem-solving, essential for addressing global challenges.

Course Outcomes

Paper 1 – Microbiology

After the completion of the course the students will be able to understand microbial diversity and characteristic features of microbes like bacteria and viruses. Also able to isolate and culture bacteria and understand the morphology of bacterial & viral cell.

Paper 2 – Phycology

After the completion of the course the students will be able to understand diversified habitat of algae, concept of cyanophage, characteristic features of all representative genera,its beneficial & harmful aspects.

Paper 3 – Mycology

After the completion of the course the students will be able to identify and classify fungi. Also understand the evolution and importance of fungi.

Paper 4 – Bryophyta and Pteridophyta

After the completion of the course the students will be able to differentiate bryophytes and pteridophytes and its origin. Also able to understand Air pollution indicator, characteristics features and importance of bryophytes and pteridophytes. They will be able to identify all the genera of bryophytes and pteridophytes as per syllabus.

Paper 5 – Gymnosperms and Paleobotany

After the completion of the course the students will be able to describe detailed account of Gymnosperms like classification, history, distribution and evolution and also able tounderstand fossil forms ofGymnosperms.

Paper 6 – Diversity and Taxonomy of Angiosperms

After the completion of the course the students will be able to understand principles of taxonomy and major systems of classification and also able to describe ICBN, plant exploration, taxonomic tools, origin and evolution of angiosperms. They will also be able to understand origin of intra-population variation and species concept and characteristic features of important families described in the syllabus.

Paper 7 – Plant Development and Reproductive Biology

After the completion of the course the students will be able to understand morphology and anatomical features of plants and their parts and also able to describe anomalous secondary growth and various developmental stages of plant life cycle.

Paper 8 – Cytogenetics and Plant Breeding

After the completion of the course the students will be able to apply Mendelian concepts of genetics and also able to understand chromosomal aberrations and their role in genome evolution with special reference to crop plantsand modern breeding methods in improving agricultural crop varieties.

Paper 9 – Plant Ecology

After the completion of the course the students will be able to understand environmental factors, concepts of ecosystems,process of ecological succession, biogeochemical cycle and biological diversity and also able describe IUCN categories, hot spots, pollution and climate change.

Paper 10- Plant Resource Utilization and Conservation

After the completion of the course, students will be able to discuss concepts of sustainable development, green revolution and use of economically important plants. Students will also able to describe conservation of plant biodiversity, strategies for *ex* and *in-situ* conservation.

Paper 11- Biotechnology

After the completion of the course the students will be able to understand the principle and scope of biotechnology and concept of tissue culture, DNA sequencing techniques and biological databases.

Paper 12- Plant Physiology and Biochemistry

After the completion of the course the students will be able to explain various physiological mechanisms like water transport, enzymes, photosynthesis, respiration, nitrogen fixation, plant hormones, photoperiodism, stress physiology etc. Students will also able to understand biochemical molecules like carbohydrates, lipid, proteins etc.

Paper 13- Plant Pathology

After the completion of the course the students will be able to describe plant pathology, plant microbe interaction, host-parasitic interactions, plant defence mechanism, disease cycle, disease control etc.

Paper 14- Taxonomy of Angiosperms

After the completion of the course the students will be able to understand concept, scope and importance of taxonomy. Students will also be able to identify and classify angiospermic plants and to understand herbarium techniques.

Paper 15- Dissertation

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

1. Develop the ability tocritically evaluate scientific literature, formulate hypothesis and solve complex biological problems.
2. Acquire hands on experience with advanced botanical techniques and instruments including microscopy, chromatography & molecular biological tools.
3. Understand the interdisciplinary nature of biology and its connection with other scientific fields such as biochemistry, microbiology and environmental science.
4. Able to effectively communicate scientific information through written reports, research papers and oral presentation to other scientific audiences.
5. Students will be prepared for continuous learning and professional development, staying update with advancements in botanical science and related fields.

Principal

Head of the Department

प्रभारी
वनस्पति विज्ञान विभाग
राधे हरि रा० स्ना० महाविद्यालय
काशीपुर (उ०सिं० नगर)

Principal
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