Vivekananda Mission Mahavidyalaya

Department of Botany

❖ Programme:- B. Sc. (G), BOTANY & GE

➢ Programme Outcomes (POs):

- **Scientific Knowledge:** Use of principles of basic science and fundamental process to study and Analyze the plant forms.

- **Critical Thinking**: Apply the knowledge of biology to make scientific queries and Enhance the comprehension potential.

- **Effective Communication:** Successful transfer of scientific knowledge both orally and In writing.

- **Environment and Sustainability**: Insist the significance of conserving a clean Environment for perpetuation and sustainable development.

PO5. Ethics: Convey and practice social, environmental and biological ethics.

- **Practical skills:** Giving opportunities to students to conduct experiments practically both in field and Laboratory. Hands on practical helps the students to gain proficiency and skills in different topics of

Modules offered to them. 1. Study of plant morphology and anatomy. 2. Character correlation for Plant identification. 3. Study of structure and composition of vegetations. 4. Study of economic crops.

- **Self-directed and Life-long Learning**: study incessantly by self to cope with growing Competition for higher studies and employment.

Programme Specific Outcomes (PSOs):

By the end of this course, the students will be able to -

- Understand the basic concepts and morphology of lower group and higher group plants.
- Identify the bacteria, viruses.
- Understand the basic concepts of ecology.
- Understand the evolution, classification, anatomical details of plants.
- Student will be able to knowing about different economical plant and their uses.
- Analyze metabolic activities of plants.
- Understand the application of genetic engineering for the improvements of plants.
- Analyze the cellular details and application of genetics, molecular biology in plant breeding
- Perform the laboratory techniques in anatomy, physiology, biochemistry, biotechnology, ecology and utilization of plants.

➢ COURSE OUTCOME :

Semester- I

Course Type - DSC-1A

Course Title - **Biodiversity (Microbes, Algae, Fungi and Archegoniate)**

Course Learning Outcomes:

After completion of this course students will be able to -

Theory Outcome:-

1. Gain knowledge about microbial diversity.
2. Learn about the pigmentation, thallus organization and food reserves of Algae.
3. Learn about the structure, pigmentation, food reserves and methods of reproduction of Fungi.
4. Know about the Economic importance of algae, Fungi, Bryophyte, Pteridophyte, Gymnosperm, Mycorhyza and lichen.

5. Study and impart knowledge about the occurrence, distribution, morphology, anatomy, method of reproduction and life history of lower plants such as Algae, Fungi, Lichens, Bryophytes, Pteridophytes and Gymnosperms.
6. Learn the phylogeny and evolutionary concepts in lower group of organisms.
7. To understand the stelar evolution and seed formation habit in Pteridophytes.
8. Learn symbiotic association in Lichens and Mycorhyza.

Practical Outcome:-

1. Learn the microscopic technique.
2. Learn about Gram staining method of bacteria.
3. Learn about the microscopic observation and identification of algae, Fungi, bryophytes, pteridophytes , gymnosperm , lichens and mycorhyza .
4. Learn about different microbe's structure and Reproduction.

Semester- I

Course Type – GE-1

Course Title - <u>Biodiversity (Microbes, Algae, Fungi and Archegoniate)</u>

Course Learning Outcomes:

After completion of this course students will be able to -

Theory Outcome:-

1. Gain knowledge about microbial diversity.
2. Learn about the pigmentation, thallus organization and food reserves of Algae.
3. Learn about the structure, pigmentation, food reserves and methods of reproduction of Fungi.
4. Know about the Economic importance of algae, Fungi, Bryophyte, Pteridophyte, Gymnosperm, Mycorhyza and lichen.
5. Study and impart knowledge about the occurrence, distribution, morphology, anatomy, method of reproduction and life history of lower plants such as Algae, Fungi, Lichens, Bryophytes, Pteridophytes and Gymnosperms.
6. Learn the phylogeny and evolutionary concepts in lower group of organisms.
7. To understand the stelar evolution and seed formation habit in Pteridophytes.
8. Learn symbiotic association in Lichens and Mycorhyza.

Practical Outcome:-

1. Learn the microscopic technique.

2. Learn about Gram staining method of bacteria.
3. Learn about the microscopic observation and identification of algae,
Fungi, bryophytes, pteridophytes , gymnosperm , lichens and mycorhyza .
4. Learn about different microbe's structure and Reproduction.

Semester- II

Course Type - DSC-1B

Course Title - <u>Plant Ecology and Taxonomy</u> .

Course Learning Outcomes:

After completion of this course students will be able to -

Theory Outcome:-

1. Students learned about the interaction between biotic and abiotic components of the environment.
2. Learn about plant community and Phytogeography.
3. To identify diversity of life forms in an ecosystem.
4. Know about the concept of energy flow in the ecosystem.
5. Know about different pollutions, consequences in the environment and its mitigation.
6. Learn the types of classifications- artificial, Natural and phylogenetic.
7. Know about the National and International Herbaria and Botanical gardens.
8. Learn about system of classification with merits and demerits.

9. Learn the taxonomic evidences from molecular, numerical and chemicals.
10. Learn rules of ICBN and Binomial nomenclature.
11. Study of the some families of plant.
12. Familiarize with the methods of plant Identification.
13. Learn the types of classifications- Artificial, Natural and Phylogenetic.

Practical Outcome:-

1. Students will develop field skill pertaining to vegetation analysis.
2. Student will know about different instruments used to measure microclimatic variables.
3. Student will be able to determination of pH, and analysis of two soil samples for carbonates, chlorides, nitrates, sulphates and organic matter.
4. Student will be able to learn about plant adaptation on different environment.
5. Student will be able to gain practical knowledge about measurement of soil bulk density, porosity and rate of infiltration of water in soil.
6. Student will be able to gain practical knowledge about identification of different plant family.
7. Student will be able to prepared herbarium sheet.

Semester- II

Course Type – GE-2

Course Title - <u>Plant Ecology and Taxonomy</u>.

Course Learning Outcomes:

After completion of this course students will be able to -

Theory Outcome:-

1. Students learned about the interaction between biotic and abiotic components of the environment.
2. Learn about plant community and Phytogeography.
3. To identify diversity of life forms in an ecosystem.
4. Know about the concept of energy flow in the ecosystem.
5. Know about different pollutions, consequences in the environment and its mitigation.
6. Learn the types of classifications- artificial, Natural and phylogenetic.
7. Know about the National and International Herbaria and Botanical gardens.
8. Learn about system of classification with merits and demerits.
9. Learn the taxonomic evidences from molecular, numerical and chemicals.
10. Learn rules of ICBN and Binomial nomenclature.
11. Study of the some families of plant.
12. Familiarize with the methods of plant Identification.
13. Learn the types of classifications- artificial, Natural and phylogenetic.

Practical Outcome:-

1. Students will develop field skill pertaining to vegetation analysis.

2. Student will know about different instruments used to measure microclimatic variables.
3. Student will be able to determination of pH, and analysis of two soil samples for carbonates, chlorides, nitrates, sulphates and organic matter.
4. Student will be able to learn about plant adaptation on different environment.
5. Student will be able to gain practical knowledge about measurement of soil bulk density, porosity and rate of infiltration of water in soil.
6. Student will be able to gain practical knowledge about identification of different plant family.
7. Student will be able to prepared herbarium sheet.

Semester- III

Course Type - DSC-1C

Course Title - <u>Plant Anatomy and Embryology</u>

Course Learning Outcomes:

After completion of this course students will be able to -

Theory Outcome:-

1. On Completion of this Course students will be able to gain knowledge of plant cells, meristems and non meristematic tissues and their functions.
2. Understand external and internal structure of plants.

3. Student will be able to learn about Adaptive and protective systems of plant.
4. Student will be able to know about Structural organization of flower.
5. Student will be able to know about Embryo & Endosperm of plant.
6. Student will be known about pollination and fertilization mechanism of plant.
7. Student will be able to learn about Apomixes and polyembryony.

Practical Outcome:-

1. Students able to understand the external and internal structure of monocot and dicot plant (stem leaf and root).
2. Student will be able to learn about Adaptive anatomy of plant.
3. Students get knowledge in internal structure of anther, types of ovule, and types of pollination, female gametophyte and isolation of embryo.
4. Student will be able to learn about Structural organization of flower.

Semester- III

Course Type – GE-3

Course Title - Economic Botany and Biotechnology

Course Learning Outcomes:

After completion of this course students will be able to –

Theory Outcome:-

1. Student will be able to know about Origin of Cultivated Plants.
2. Student will be able to know about different Economic plants and their uses.
3. Student will be learning about different plant tissue culture technique.
4. Student will be able to know about various tools & technique of biotechnology.
5. Will be able to gain knowledge about different aspects of the application of biotechnology in different areas of our life.

Practical Outcome:-

1. Student will be able to gain practical knowledge about different Economic plants and their micro chemical test.
2. Student will be Familiarization with basic equipments in tissue culture.
3. Student will be able to know about different tissue culture method.
4. Students will be able to know about different molecular technique that's use to different aspects of our life.
5. Student will able to skill about different molecular technique.

Semester- IV

Course Type - DSC-1D
Course Title - Plant Physiology and Metabolism

Course Learning Outcomes:

After completion of this course students will be able to –

Theory Outcome:-

1. To become knowledgeable in plant and its water relations.
2. Students will able to gain knowledge on role of Mineral nutrition in plant growth.
3. Students will be able to learn about **Translocation in phloem.**
4. To understand the process of Photosynthesis, Respiration and Nitrogen metabolism.
5. To understand the mechanism of enzyme action and inhibition.
6. To acquire knowledge in plant growth regulator and its uses, understand the physiology of flowering and photoperiodism.

Practical Outcome:-

1. Students are capable to become practical knowledgeable in Determination of osmotic potential of plant cell sap, to study the effect of environmental factors on transpiration , Calculation of stomatal index and stomatal frequency & Separation of amino acids by paper chromatography.
2. Students will be able to know about Hill reaction, effect of light intensity and bicarbonate concentration on O2 evolution in photosynthesis, Mechanism of enzyme catalysis and enzyme inhibition & Comparison of the rate of respiration in parts of a plant.

3. Students will be able to know about Bolting, Effect of auxins on rooting, Suction due to transpiration, R.Q. & Respiration in roots.

Semester- IV

Course Type – GE-4

Course Title - Plant Anatomy and Embryology

Course Learning Outcomes:

After completion of this course students will be able to -

Theory Outcome:-

1. On Completion of this Course students will be able to gain knowledge of plant cells, meristems and non meristematic tissues and their functions.
2. Understand external and internal structure of plants.
3. Student will be able to learn about Adaptive and protective systems of plant.
4. Student will be able to know about Structural organization of flower.
5. Student will be able to know about Embryo & Endosperm of plant.
6. Student will be known about pollination and fertilization mechanism of plant.
7. Student will be able to learn about Apomixes and polyembryony.

Practical Outcome:-

1. Students able to understand the external and internal structure of monocot and dicot plant (stem leaf and root).
2. Student will be able to learn about Adaptive anatomy of plant.
3. Students get knowledge in internal structure of anther, types of ovule, and types of pollination, female gametophyte and isolation of embryo.
4. Student will be able to learn about Structural organization of flower.

Semester- V

Course Type – DSE-1A

Course Title - <u>Economic Botany and Biotechnology.</u>

Course Learning Outcomes:

After completion of this course students will be able to –

Theory Outcome:-

1. Student will be able to know about Origin of Cultivated Plants.

2. Student will be able to know about different Economic plants and their uses.
3. Student will be learning about different plant tissue culture technique.
4. Student will be able to know about various tools & technique of biotechnology.
5. Will be able to gain knowledge about different aspects of the application of biotechnology in different areas of our life.

Practical Outcome:-

1. Student will be able to gain practical knowledge about different Economic plants and their micro chemical test.
2. Student will be Familiarization with basic equipments in tissue culture.
3. Student will be able to know about different tissue culture method.
4. Students will be able to know about different molecular technique that's use to different aspects of our life.
5. Student will able to skill about different molecular technique.

Semester- VI
Course Type – DSE-1B
*Course Title - **Genetics and Plant Breeding***

Course Learning Outcomes:

After completion of this course students will be able to –

Theory Outcome:-

1. Students will be able to learn about mandelian and non mandelian inheritance.
2. To have knowledge on the organization of genes and chromosomes of the nature and function of genes, processes of inheritance, extra chromosomal inheritance.
3. To describe linkage,crossing over and mutations,the role of mutations in plant breeding.
4. Know in detail about breeding systems, techniques of Hybridization.
5. Learn about the selection methods for self pollinated, cross pollinated plants and vegetatively propagated plants.
6. Student will be able to learn about Role of mutations, Polyploidy, Distant hybridization and role of biotechnology in crop improvement.

Practical Outcome:-

1. Student will be able to gain practical knowledge about Chromosome mapping using point test cross data.
2. Student will be able to learn about Down's, Klinefelter's , Turner's syndromes ,Translocation Ring, Laggards and Inversion Bridge.
3. Students will be able to learn about mandelian and non mandelian inheritance.
4. Student will be able to gain practical knowledge about Hybridization technique.
5. Students will be able to know about polyploidy conditions in plants.

Semester- VI

Course Type – SEC-4

Course Title – <u>Medicinal Botany</u>

Course Learning Outcomes:

After completion of this course students will be able to –

Theory Outcome:-

1. Know about history and relevance of herbal drugs in Indian system of medicine.
2. Student will be able to learn about Ethnobotany and Folk medicines.
3. Student will be able to learn about different endangered and endemic medicinal plants and their conservation.

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