**Savitribai Phule Pune University**

**Akole Taluka Education Society**

 **Agasti Arts, Commerce and Dadasaheb Rupwate Science College,**

 **Akole, Dist-A’Nagar**

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**Department of Botany**

**Format for PSO and CO for academic year 2019-20**

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| Name of Faculty | Science & Technology |
| Name of Department | Botany |
| UG Programme | B.Sc. Botany |

**PROGRAMME SPECIFIC OUTCOME [P.S.O]:-**

1: Understand the importance of plants, their diversity and its conservation.

2: Achieve   knowledge of pure and applied botany.

3: Understand contribution of botany in increase and improve our supply of medicines, food,

 Fibers and other plant products.

4: Understand health and environmental protection and to solve the pollution problems.

5: Understand knowledge of botany is an essential pre-requisite for the pursuit of many applied

 Sciences like Agriculture, Horticulture, Sericulture, Forestry, Pharmacology and Medicine.

6: Understand to care Nature.

7: Understand experiments in botany.

8: Fundamentals, principles& practical skills and recent development in subject area.

9: Inspire and boost interest of student towards the botany as a main subject & understand global

 Issue.

10: Create foundation for advance studies, research & development in botany.

**COURSE OUTCOME [C.O]: F.Y.B.Sc. Semester Pattern:-**

 **[SEMESTER-I]**

**BO-111 PLANT LIFE AND UTILIZATION –I**

-Understand the diversity among Algae, Lichens, Fungi, and Bryophytes

-General Outline of plant kingdom

-Lower Cryptogam, Algae, Fungi, &Lichene.

-Higher Cryptogam, Bryophyte and Pteridophyte.

-Distinguishing character of these group

**BO-112 PLANT MORPHOLOGY AND ANATOMY**

-Understand the habit of the angiosperm plant body.

- Know the vegetative characteristics of the plant.

-Learn about the reproductive characteristics of the plant.

-Understand the scope & importance of Anatomy

-Know various tissue systems

-Perform the techniques in anatomy

-Understand the normal and anomalous secondary growth in plants and their causes

**BOT. 113: PRACTICAL COURSE BASED ON BO111 & BO 112**

- Study of diversity of Bryophytes and Pteridophytes w.r.t systematic position and morphology.

- Study of life cycle of *Riccia,* Spirogyra, Agaricus.

-Morphology of root and stem with its modification.

-Morphology of Leaf and its modification.

- Study of Flower morphology , Inflorescence and its types of Inflorescence.

- Study fruit Morphology and types.

-Study of internal primary structure of Dicot & Monocot.

**[SEMESTER-II]**

**BO-121 PLANT LIFE AND UTILIZATION –II**

-Understand the morphological diversity of Pteridophytes, Gymnosperm, and Angiosperm.

- Understand the economic importance.

- Know the vegetative characteristics of the plant

- Learn about the reproductive characteristics of the plant.

-Understand Gymnosperms, distinguishing characters, economic importance and classification.

**BO-122PRINCIPLE OF PLANT SCIENCE [Physiology &Cell Biology]**

-Know importance and scope of plant physiology.

- To understand the plants and plant cells in relation to water.

-Understand the process of Diffusion, Osmosis, Plasmolysis, Plant growth& growth regulators.

-Understand the Structure, types of plant cell, cellwall, plasma membrane& cell cycle in plants.

- Understand the Molecular biology ,Structure& types of DNA, DNA replication.

**BOT. 123: PRACTICAL COURSE BASED ON BO121 & BO 122**

- Study of Life Cycle of Nephrolepis,Cycas

- Study of utilization and economic importance of Pteridophytes and Gymnosperms.

- Study of comparative account of Dicotyledonous and Monocotyledonous plants

-Study of utilization and economic importance of Angiosperms- food, fodder, fibers, horticulture and

 Medicines.

- Study of mitosis, Meosis.

-Estimation of chlorophyll-a and chlorophyll-b

- Plasmolysis- endosmosis, exosmosis Demonstration of Osmosis

**COURSE OUTCOME [C.O]: S.Y.B.Sc. Semester Pattern:-**

 **[SEMESTER-I]**

**BO-211 TAXONOMY OF ANGIOSPERMS & PLANT COMMUNITY**

-Understand the diversity of angiosperms.

-Understand the comparative account among the families of angiosperms.

-Know the economic importance of the angiosperm plants.

-Understand the distinguishing features of. Angiosperm families

- Understand the Ecology and ecological grouping of plant.

**BO- 212: PLANT PHYSIOLOGY**

-Know importance and scope of plant physiology.

-To understand the plants and plant cells in relation to water.

-Understand the process of photosynthesis in higher plants with particular emphasis on light

 and dark reactions, C3 and C4 pathways.

-Understand the respiration in higher plants with particular emphasis on aerobic and

 anaerobic respiration.

-Learn about the movement of sap and absorption of water in plant body.

-Understand the plant movements.

**[SEMESTER-II]**

**BO- 221: ANATOMY AND EMBRYOLOGY**

-Understand the scope & importance of Anatomy and Embryology.

-Know various tissue systems.

-Understand the normal and anomalous secondary growth in plants and their causes.

- Perform the techniques in anatomy.

-Understand structure and development in microsporangium and mega sporangium.

-Understand Microsporogenesis and megasporogenesis.

-Understand male and female gametophytes.

-Know fertilization, endosperm and embryogeny

**BO- 222: PLANT BIOTECHNOLOGY**

**-** Understand the Biotechnology, Interdisciplinary nature of biotechnology,Nano-biotechnology

- Understand theEnzyme Technology,Fermentation Technology.

- Understand theSingle cell protein, Environmental Biotechnology.

-Study of plant genetic engineering,Methods of gene transfer in plants.

**-** Application of plant genetic engineeringin crop improvement.

**PRACTICAL COURSE BASED ON BO211, BO212& BO221,BO222**

Students should understand,

-Determine the DPD by using the potato tuber

-To determine the rate of photosynthesis

-Determination of RQ using Ganong’srespirometer

-Osmosis by curling experiment, Imbibition

Pressure, Thistle funnel, ringing experiment,

Relative transpiration, CO2 Necessary for

Photosynthesis, Kuhen’s Tube experiment,

Cyclosis in Hydrilla

-Study of Plant families w.r.t Systematic position, Morphological characters, floral formula

 And floral diagram.

-Preparation of artificial key.

**COURSE OUTCOME [C.O]: T.Y.B.Sc. Semester Pattern:-**

**[SEMESTER-III]**

**BOT. 331 CRYPTOGAMIC BOTANY**

-Know the salient features of Cryptogams plants.

-Become aware of the status of cryptogams as a group in plant kingdom.

-Understand the life cycles of selected genera.

-Learn about the economic and ecological importance of Cryptogams plants

**BOT. 332 CELLS AND MOLECULAR BIOLOGY**

-Gain knowledge about “Cell Science.

-Understand Cell wall Plasma membrane, Cell organelles and cell division

- Learn the scope and importance of molecular biology.

-Understand the biochemical nature of nucleic acids, their role in living systems, experimental

 Evidences to prove DNA as a genetic material.

-Understand the process of synthesis of proteins and role of genetic code in polypeptide formation.

**BOT. 333 - GENETICS AND EVOLUTION**

-Understand the “Science of Heredity”.

-Realize the role of genes in evolution of species.

-To understand linkage, segregation and mutation of genes during evolution.

-To study the evolution in living organisms

**BOT. 334 – SPERMATOPHYTA AND PALEOBOTANY**

-Understand Gymnosperms with respect to Angiosperm and Paleobotany.

-Angiosperms, economic importance and distinguishing characters, comparison with

 Classification

**-** Understand the important fossil types in different groups of plants and Indian fossil records

-Realize the applied aspects of Paleobotany

-Learn about the characters of biologically important families of angiosperms.

**BOT. 335 – HORTICULTURE AND FLORICULTURE**

-To understand scope, importance & disciplines of horticulture.

- To familiar with horticultural zone of Maharashtra & India.

-To understand different horticultural practices & methods.

-To study role played by green & playhouses in horticulture.

- To understand production technology, harvesting technique

.

-To understand Flower industry, Dry flower, cut flower

**BOT. 336 – COMPUTATIONAL BOTANY**

**-** To understand Biostatistics, Sample and sampling.

- To understandCollection and representation of data.

-To understandMeasures of central tendency of grouped and ungrouped data.

- To understandMeasures of dispersion, Correlation and regression.

- To understandProbability and types of theoretical probability distribution

**[SEMESTER-IV]**

**BOT. 341 – PLANT PHYSIOLOGY AND BIOCHEMISTRY**

**-**To understand Photosynthesis, Respiration, Translocation of organic solute.

-Understand the stress physiology.

-Understand the current status of Biochemistry.

-Realize the industrial application of Biochemistry

-Understand the importance of Bio-molecules.

**BOT. 342 – PLANT ECOLOGY AND BIODIVERSITY**

-Know the scope and importance of the discipline.

-Understand plant communities and ecological adaptations in plants.

-Learn about conservation of biodiversity, Nonconventional Energy and Pollution.

-Discover botanical regions of India and vegetation types of Maharashtra.

-Understand Bioremediation, Global warming and climate change.

**BOT. 343 – PLANT PATHOLOGY**

-Know the terminologies in plant pathology.

-Understand the scope and importance of Plant Pathology.

-Know the control measures of plant diseases

-Know the Disease development, defense mechanism.

**BOT. 344 – MEDICINAL AND ECONOMIC BOTANY**

-Student will understand the Pharmacognosy Ayurvedic botany, Analytical Medicinal botany

-Understand the Cultivation, collection, processing of herbal drugs.

-Know the medicinally important plant.

-Understand the economic botany and its scope

-Know the evolution, uses, source of various economically important plant.

**BOT. 345 – PLANT BIOTECHNOLOGY**

-Understand the fundamentals of totipotency plant tissue culture techniques.

-Know the transgenic technology for the improvement of quality and quantity of plant

 And thereby product.

-Understand the advantages of in vitro propagation in various areas.

-Realize the application and importance of plant tissue culture and transgenic plants.

**BOT. 345 – PLANT BREEDING AND SEED TECHNOLOGY**

-Understand the science of plant breeding.

-To introduce the student with branch of plant breeding for the survival of human being from

 Starvation.

-To study the techniques of production of new superior crop verities.

-To understand the seed technology.

-Know seed certification, Processing, sampling, storage and packaging.

**PRACTICAL COURSE BASED ON THEORY CORSES**

1. To understand Study of **Algae, Fungi, Bryophytes, Pteridophyteswith** respect to systematic position thallus structure and reproduction [*Nosotc, Chara, Sargassum and Batrachospermum; Rhizopus, Saccharomyces* and *Puccinia.Marchantia, Anthoceros and Polytrichum; Psilotum, Selaginella* and *Marsilea.]*

2. Know Cytological techniques-preparation of Fixatives, preparation of stains (Acetocarmine and Aceto-orcein).

3. To understand Study of Chromosomes Morphology, various stages of mitosis and meiosis

4. Extraction and estimation of RNA& DNA.

5**.** To understandStudy of structural heterozygotes, Induction of tetraploidy, observation of

 Tetraploid cells

6.To solve Genetic problems on gene mapping.

7. Study of *Pinus& Gnetum* with the help of permanent slides and plant material.

8. To know Study of garden tools and implements, Methods of cutting, layering, budding and

 Grafting, training and pruning, cutting flowers, making dry flowers

9. To know Computation of mean, mode, median, variance and standard deviation

 Representation of data, Statistical problem solving, correlation and regression

10. Germination of various seed, Analysis of vegetation data, quadrat method for frequency,

 Analysis of satellite data,

11.Estimation of chlorophyll & proteins, Separation of photosynthetic pigments

12. Demonstration of

 Ringing experiment, Hill reaction, Qualitative tests for alkaloids, tannins,

 Glycosides, starch, lipids and proteins

13. Study of polluted water body, physicochemical properties of water,

 Application of diversity indices to suitable ecosystem

14. Preparation of any one culture, Culture technique, Koch’s Postulates

15. Study of any two of fungal, viral, non-parasitic, fungicides and microbial

 Pesticides

16. To know any six drug plants, of Plant extraction methods, Study and preparation

 Of Ayurvedic formulations.

17. Understand the Qualitative analysis of Alkaloid, Glycoside and Tannin

18. Study of stomatal index and vein islet number using suitable plant material using

 Micrometer and camera Lucida.

19. Get an idea about Survey of local flora with respect their medicinal and economic

 Importance and submission.

20. Preparation of Visit report or Tour report.