Maratha Vidya Prasarak Samaj's

Karmaveer Shantarambapu Kondaji Wavare Arts, Science and Commerce College, CIDCO, Nashik

Uttamnagar, Nashik- 422 008 (Maharashtra)

Affiliated to Savitribai Phule Pune University Id. No. PU/NS/ASC/047/1993

AISHE C-42086 NAAC Re-accredited 'A' Grade (III Cycle 2017-22, CGPA 3.20)

Best College Award of Savitribai Phule Pune University Pune in 2009-10 and 2021-22

Internal Quality Assurance Cell

Programme Outcomes (PO's)

Programme Specific Outcomes (PSO's)

Course Outcomes (CO's)

Syllabus: 2013 Pattern

Programme Outcome (PO's), Programme Specific Outcome (PSO's), Course Outcome (CO's)

Department: Botany

Syllabus: 2013 Pattern

Sr. No.	Name of the Programme	Year of introduction of programme	Duration of introduction of Programme
1	B.Sc Botany	2000-2001	3 Years

Programme Specific Outcome (B.Sc Botany)

Sr. No.	Programme Specific Outcome (B.Sc Botany)
PSO 1	Students would acquire fundamental Botanical knowledge through theory and practical's.
PSO 2	To explain basis plant of life, morphology, reproduction and their survival in nature.
PSO 3	Help to understand role of living and fossil plants in our life.
PSO 4	Understand good laboratory practices and safety.
PSO 5	Students acquired knowledge through practical work in fields as well as in laboratory.
PSO 6	To create awareness about conservation and sustainable utilization of biodiversity.
PSO 7	To know advance techniques in plant sciences like molecular, genetic, Phytoremediation, tissue culture, formulation of new herbal drugs, plant disease control, etc.
PSO 8	Students will be able to start nursery, horticultural practices and seed production.

Course Outcome (B.Sc Botany)

Class	Subject code	Title	Cos: After successful completion of This course, student will be able to
F.Y.B.Sc Sem-I	BO-111	Plant Diversity	CO1: Understand difference between Higher cryptogams and Lower cryptogams.
			CO2: Know the systematic, morphology and structure, of Algae. Understand the life cycle pattern of Algae.
			CO3: Know the various types of lichen.
			CO4: Understand general characters, reproduction of Fungi.
			CO5: Understand the morphological diversity of Bryophytes.
			CO6: Understand the economic importance of the Bryophytes.
	BO- 112	Industrial Botany I	CO1: Know the various concepts and methods in taxonomy.
			CO2: Know the various parts of flowers.
			CO3: Understand the types of fruits.
	BO – 113	Practical Botany -I	CO1: Study of life cycle of Spirogyra, *Agaricus* and *Riccia*.
			CO2:Study of Lichens and its types.
			CO3:Practical knowledge of mushroom cultivation.
			CO4: Basic Structure of monocot and dicot.
F.Y.B.Sc Sem-II	BO-121	Plant Morphology and Anatomy	CO1: Know the evolutionary trends and affinities of living gymnosperms with respect to external and internal features
			CO2: Know the economic importance of the gymnosperm and angiosperms.
	BO – 122	Industrial botany II	CO1:Understand the process of translocation of solutes in plants.
			CO2: Understand the factors affecting growth of plants.
			CO3: Know the cell cycle process in plants.
			CO4: Learn the Structure and types of DNA and RNA.
	BO – 123	Practical Botany -II	CO1:Demonstrate structure of Dicotyledonous and Monocotyledonous plants
			CO2: Observe characteristic features of prokaryotic and eukaryotic plant cell.
			CO3: Preparation of slides using onion root tips.
			CO4: Study about chlorophyll-a and chlorophyll-b.
S.Y.B.Sc Sem-III	BO 211	Taxonomy of Angiosperms and Plant Comunity	CO1: Trace the history of development of systems of classification emphasizing angiosperm taxa.
			CO2: Understand various rules, principles and recommendations of plant nomenclature produces in plant identification.
			CO3: Learn and understand about interdisciplinary

Class	Subject code	Title	Cos: After successful completion of This course, student will be able to
			approach of ecology.
			CO4: Understand ecological grouping of the plants.
	BO 212	Plant Physiology	CO1:Understand the process of translocation of solutes in plants
			CO2:Know the nitrogen metabolism and its importance.
			CO3 :Know about phytohormones and vernalization in plants
	BO 213	Practical Based on BO211 & BO212	CO1: Know the morphological and reproductive characters of plant family.
			CO2: Study about ecological adaptations in Hydrophytes and Xerophytes.
			CO3:Demonstration of various instruments.
S.Y.B.Sc Sem IV	BO 221	Plant Anatomy and Embryology	CO1: Know Epidermal tissue system and Mechanical tissue system.
			CO2: Understand the Microsporangium and male gametophyte.
			CO3:Understand the Megasporangium and female gametophyte.
	BO 222	Plant Biotechnology	CO1: Understand the principle and basic protocols for Plant Tissue Culture.
			CO2: Know about the Genetic Engineering.
			CO3: Know about the biofuel technology.
	BO 223	Practical based on BO 221 & BO 222	CO1: Understand various plant tissue.
			CO2: Study the preparation of permanent slide.
			CO3: Understand the Preparation & sterilization of MS medium.
			CO4: Study about transgenic crops.
.Y.B.Sc Sem-V	BO 331	BO: 331 Cryptogamic Botany	CO1: Understand the cryptogamic diversity.
			CO2: Know life cycle pattern of cryptogams.
			CO3:Know economic importance of cryptogams.
			CO4: .Know thallus structure and reproduction of algae, fungi, bryophytes and Pteridophytes.
	BO 332	BO.332: Cell and Molecular Biology	CO1: Gain knowledge about cell and its function.
			CO2: Learn the scope and importance of molecular biology.
			CO3: Understand ultra-structure of cell wall, plasma membrane and cell organelles.
			CO4: Understand the biochemistry of cell.
			CO5:Understand the biochemical nature of nucleic acid and their role in living systems.
	BO 333	BO: 333:	CO1: Understand the Mendelian and neo-Mendelian

Class	Subject code	Title	Cos: After successful completion of This course, student will be able to
		Genetics and Evolution	genetics.
			CO2: Know about interaction of genes, multiple alleles and linkage and crossing over.
			CO3: Know about sex linked inheritance, chromosomal aberrations.
			CO4: Know the evolutionary sequence of various groups of plants.
	BO 334	BO.334: Spermatophyta and Palaeobotany	CO1: Understand the Systematic study of gymnosperms and angiosperms.
			CO2: Understand the morphological and reproductive character of spermatophytic plant
			CO3: To bring investigation of palaeobotanical study in India.
			CO4: Know types of fossils, geological time scale.
	BO 335	Horticulture and Floriculture	CO1: Understand economic importance of plant and plant product.
			CO2: Know the methods of plant propagation.
			CO3: Understand the fruit & vegetables production technology.
			CO4: Understand the scope & importance of floriculture.
			CO5: Understand the methods of cultivation of different flowering plants.
	BO 336	Computational Botany	CO1: Understand the scope & importance of biostatistics.
			CO2: Understand the scope and some basic commonly used terms like sampling, data, dispersion, population, central tendency etc.
			CO3: Knowledge to apply statistical analysis to biological data for testing different hypothesis
T.Y.B.Sc Sem VI	BO 341	BO. 341: Plant Physiology	CO1: Know scope and importance of plant physiology.
			CO2: Understand plant & water relation.
			CO3: Understand process of photosynthesis, C3, C4, CAM pathways.
			CO4: Understand the process of respiration, growth and developmental process in plant.
			CO5: Understand the biochemistry of cell.
	BO 342	BO.342: Plant Ecology and Biodiversity	CO1: Know the biotic and abiotic components of ecosystem.
			CO2: Food chain & food web in ecosystem.
			CO3: Understand plant community & ecological adaptation in plants.
			CO4: Scope, importance and management of biodiversity.
	BO 343	BO.343: Plant	CO1: Understand scope and importance of plant pathology.

Class	Subject code	Title	Cos: After successful completion of This course, student will be able to
		Pathology	CO2: Know disease cycle and disease development.
			CO3: Know the effect of plant diseases on economy of crops.
			CO4: They can identify the plant diseases like bacterial, nematodal, and fungal.
			CO5: Know the disease forecasting.
			CO6: Know the prevention and control measures of plant diseases.
	BO 344	BO.344: Medicinal and Economic Botany	CO1: Understand scope and importance of pharmacognosy.
			CO2: Know the cultivation, collection, processing & importance of various herbal drugs.
			CO3: Understand the scope of economic botany and ayurvedic pharmacy.
			CO4: Know the botanical resources like non wood forest products.
			CO5: Understand scope and importance of pharmacognosy.
			CO6: Know the cultivation, collection, processing & importance of various herbal drugs.
	BO 345	BO. 345: Plant Biotechnology	CO1: Understand the fundamental of recombinant DNA technology.
			CO2: Understand tissue culture techniques.
			CO3: Role of microbes in agriculture, medicine & industry.
			CO4: Understand the concept of bioinformatics, genomics & proteomics.
			CO5: Understand technical germplasm & cryopreservation.
	BO 346	BO346: Plant Breeding and Seed Technology	CO1: Understand the scope & importance of plant breeding.
			CO2: Know the technique of production of new superior crop varieties.
			CO3: Know the about heterosis, hybrid vigour etc.
			CO4: Know the process of hybrid variety, development & their release.
			CO5: Know about seed germination, processing, production, storing etc.
T.Y.B.Sc Sem IV	BO 347	Botany Practical Paper I	CO1: The range of thallus structure in algae, fungi, bryophytes and pteridophytes.
			CO2: Study of Chromosomes Morphology.
			CO3: Estimation of Plant DNA by DPA Method
			CO4: Extraction and estimation of RNA by Orcinol Method
	BO 348	Botany Practical Paper II	CO1: Solving of problems on gene mapping using three-point test cross data

Class	Subject code	Title	Cos: After successful completion of This course, student will be able to
			CO1: Study of the families with respect to morphological characters using botanical terms, floral formula, floral diagram and classification giving.
			CO2: Study of *Pinus* & *Gnetum.*
			CO3: Study of different types of fossils.
			CO4: Demonstration of Hybridization Techniques.
			CO5: Study of polluted water body with ref. to BOD.
			CO6: Study the Polyploidy induction in Allium cepa by colchicine.
	BO 349	Botany Practical Paper III	CO1: Study of Garden tools and Equipment's.
			CO2: Study techniques in Horticulture and floriculture like cutting, Layering, Budding, Grafting.
			CO3: Solving of problem on mean, mode, median, variance and standard deviation.
			CO4: Study of Koch's Postulates.
			CO5: Study the different Culture technique.
			CO6: Study of Bacterial Disease w.r.t. Causal organism, Symptoms and control measures.
			CO7: Study of viral diseases w.r.t. Causal organism and Symptoms.
			CO8: Study of Plant extraction methods.

HoD, Botany

IQAC Coordinator

IQAC

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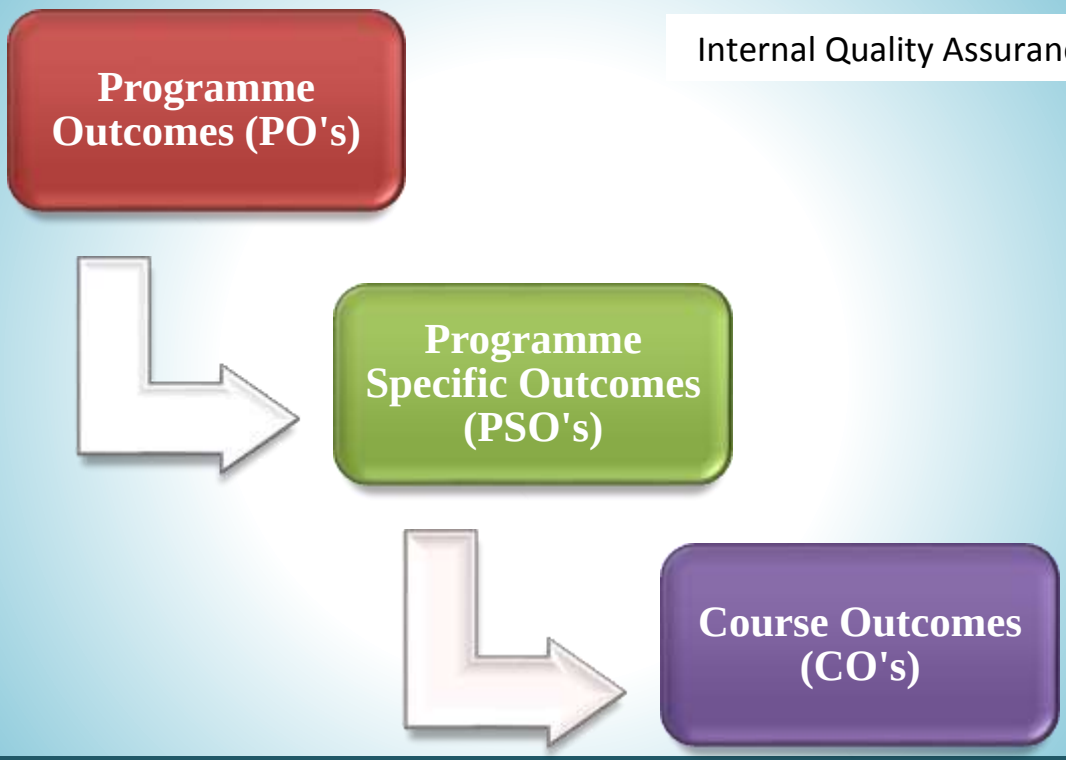
Internal Quality Assurance Cell



Syllabus: 2019 Pattern

Programme Outcome (PO's), Programme Specific Outcome (PSO's), Course Outcome (CO's)

Department: Botany

Syllabus: 2019 Pattern

Sr. No.	Name of the Programme	Year of introduction of programme	Duration of introduction of Programme
1	**B.Sc Botany**	**2000-2001**	**3 Years**

Programme Specific Outcome (B.Sc Botany)

Sr. No.	**Programme Specific Outcome (B.Sc Botany)**
PSO 1	Students would acquire fundamental Botanical knowledge through theory and practical's.
PSO 2	To explain basis plant of life, morphology, reproduction and their survival in nature.
PSO 3	Help to understand role of living and fossil plants in our life.
PSO 4	Understand good laboratory practices and safety.
PSO 5	Students acquired knowledge through practical work in fields as well as in laboratory.
PSO 6	To create awareness about conservation and sustainable utilization of biodiversity.
PSO 7	To know advance techniques in plant sciences like molecular, genetic, Phytoremediation, tissue culture, formulation of new herbal drugs, plant disease control, etc.
PSO 8	Studentswill be able to start nursery, horticultural practices and seed production.

Course Outcomes B.Sc.

Class	Subject code	Title	Cos:After successful completion of This course, student will be able to
F.Y.B.Sc Sem-I	**BO-111**	**Plant life and utilization I**	CO1: Understand difference between Higher cryptogams and Lower cryptogams.
			CO2: Know the systematic, morphology and structure, of Algae. Understand the life cycle pattern of Algae.
			CO3: Know the various types of lichen.
			CO4: Understand general characters, reproduction of Fungi.
			CO5: Understand the morphological diversity of Bryophytes.
			CO6: Understand the economic importance of the Bryophytes.
	BO- 112	**Plant morphology and Anatomy**	CO1: Know the various concepts and methods in taxonomy.
			CO2: Know the various parts of flowers.
			CO3: Understand the types of fruits.
	BO – 113	**Practical Botany -I**	CO1:Study of life cycle of Spirogyra, Agaricus and Riccia.
			CO2: Study of Lichens and its types.
			CO3: Practical knowledge of mushroom cultivation.
			CO4: Basic Structure of monocot and dicot.
F.Y.B.Sc Sem-II	**BO-121**	**Plant life and Utilization-II**	CO1: Know the evolutionary trends and affinities of living gymnosperms with respect to external and internal features
			CO2:Know the economic importance of the gymnosperm and angiosperms.
	BO – 122	**Principles of plant science**	CO1:Understand the process of translocation of solutes in plants.
			CO2: Understand the factors affecting growth of plants.
			CO3: Know the cell cycle process in plants.
			CO4: Learn the Structure and types of DNA and RNA.
	BO – 123	**Practical Botany -II**	CO1:Demonstrate structure of Dicotyledonous and Monocotyledonous plants
			CO2: Observe characteristic features of prokaryotic and eukaryotic plant cell.
			CO3: Preparation of slides using onion root tips.
			CO4: Study about chlorophyll-a and chlorophyll-b.
S.Y.B.Sc	**BO 231**	**Taxonomy of**	CO1: Trace the history of development of systems of

Class	Subject code	Title	Cos:After successful completion of This course, student will be able to
Sem-III		**Angiosperms and Plant Ecology**	classification emphasizing angiosperm taxa.
			CO2: Understand various rules, principles and recommendations of plant nomenclature produces in plant identification.
			CO3: Learn and understand about interdisciplinary approach of ecology.
			CO4: Understand ecological grouping of the plants.
	BO 232	**Plant Physiology**	CO1:Understand the process of translocation of solutes in plants
			CO2:Know the nitrogen metabolism and its importance.
			CO3 :Know about phytohormones and vernalization in plants.
	BO 233	**Practical Based on BO231 & BO232**	CO1: Know the morphological and reproductive characters of plant family.
			CO2: Study about ecological adaptations in Hydrophytes and Xerophytes.
			CO3:Demonstration of various instruments.
S.Y.B.Sc Sem IV	**BO 241**	**Plant Anatomy and Embryology**	CO1: Know Epidermal tissue system and Mechanical tissue system.
			CO2: Understand the Microsporangium and male gametophyte.
			CO3:Understand the Megasporangium and female gametophyte.
	BO 242	**Plant Biotechnology**	CO1: Understand the principle and basic protocols for Plant Tissue Culture.
			CO2: Know about the Genetic Engineering.
			CO3: Know about the biofuel technology.
	BO 243	**Practical based on BO 241 & BO 242**	CO1: Understand various plant tissue.
			CO2: Study the preparation of permanent slide.
			CO3: Understand the Preparation & sterilization of MS medium.
			CO4: Study about transgenic crops.
T.Y.B.Sc Sem-V	**BO 351**	**BO: 331 Cryptogamic Botany**	CO1: Understand the cryptogamic diversity.
			CO2: Know life cycle pattern of cryptogams.
			CO3:Know economic importance of cryptogams.
			CO4: .Know thallus structure and reproduction of algae, fungi, bryophytes and Pteridophytes.
	BO 352	**BO.332: Cell and Molecular Biology**	CO1: Gain knowledge about cell and its function.
			CO2: Learn the scope and importance of molecular biology.
			CO3: Understand ultra-structure of cell wall, plasma

Class	Subject code	Title	Cos:After successful completion of This course, student will be able to
			membrane and cell organelles.
			CO4: Understand the biochemistry of cell.
			CO5:Understand the biochemical nature of nucleic acid and their role in living systems.
	BO 353	**BO: 333: Genetics and Evolution**	CO1: Understand the Mendelian and neo-Mendelian genetics.
			CO2: Know about interaction of genes, multiple alleles and linkage and crossing over.
			CO3: Know about sex linked inheritance, chromosomal aberrations.
			CO4: Know the evolutionary sequence of various groups of plants.
	BO 354	**BO.334: Spermatophyta and Palaeobotany**	CO1: Understand the Systematic study of gymnosperms and angiosperms.
			CO2: Understand the morphological and reproductive character of spermatophytic plant
			CO3: To bring investigation of palaeobotanical study in India.
			CO4: Know types of fossils, geological time scale.
	BO 355	**Horticulture and Floriculture**	CO1: Understand economic importance of plant and plant product.
			CO2: Know the methods of plant propagation.
			CO3: Understand the fruit & vegetables production technology.
			CO4: Understand the scope & importance of floriculture.
			CO5: Understand the methods of cultivation of different flowering plants.
	BO 356	**Computational Botany**	CO1: Understand the scope & importance of biostatistics.
			CO2: Understand the scope and some basic commonly used terms like sampling, data, dispersion, population, central tendency etc.
			CO3: Knowledge to apply statistical analysis to biological data for testing different hypothesis
	BO 3510	**Medicinal Botany**	CO1: Understand economic importance of plant and plant product.
			CO2: Know the methods of plant propagation.
			CO3: Understand the fruit & vegetables production technology.
			CO4: Understand the scope & importance of floriculture.
			CO5: Understand the methods of cultivation of different flowering plants.

Class	Subject code	Title	Cos:After successful completion of This course, student will be able to
	BO – 3511	**Plant Diversity and Human Health**	CO1: Understand difference between Higher cryptogams and Lower cryptogams.
			CO2: Know the systematic, morphology and structure, of Algae. Understand the life cycle pattern of Algae.
			CO3: Know the various types of lichen.
			CO4: Understand general characters, reproduction of Fungi.
			CO5: Understand the morphological diversity of Bryophytes.
T.Y.B.Sc Sem V	**BO 357**	**Botany Practical Paper I**	The range of thallus structure in algae, fungi, bryophytes and pteridophytes.
			Study of Chromosomes Morphology.
			Estimation of Plant DNA by DPA Method
			Extraction and estimation of RNA by Orcinol Method
	BO 358	**Botany Practical Paper II**	Solving of problems on gene mapping using three-point test cross data
			Study of the families with respect to morphological characters using botanical terms, floral formula, floral diagram and classification giving.
			Study of Pinus & Gnetum.
			Study of different types of fossils.
	BO 359	**Botany Practical Paper III**	Solving of problem on mean, mode, median, variance and standard deviation.
			Study of Koch's Postulates.
			Study the different Culture technique.
			Study of Bacterial Disease w.r.t. Causal organism, Symptoms and control measures.
T.Y.B.Sc Sem VI	**BO 361**	**BO. 341: Plant Physiology and Biochemistry**	Know scope and importance of plant physiology.
			Understand plant & water relation.
			Understand process of photosynthesis, C3, C4, CAM pathways.
			Understand the process of respiration, growth and developmental process in plant.
			Understand the biochemistry of cell.
	BO 362	**BO.342: Plant Ecology and Biodiversity**	Know the biotic and abiotic components of ecosystem.
			Food chain & food web in ecosystem.
			Understand plant community & ecological adaptation in plants.
			Scope, importance and management of biodiversity.
	BO 363	**BO.343: Plant Pathology**	Understand scope and importance of plant pathology.
			Know disease cycle and disease development.

Class	Subject code	Title	Cos:After successful completion of This course, student will be able to
			Know the effect of plant diseases on economy of crops.
			They can identify the plant diseases like bacterial, nematodal, and fungal.
			Know the disease forecasting.
			Know the prevention and control measures of plant diseases.
	BO 364	**BO.344: Medicinal and Economic Botany**	Understand scope and importance of pharmacognosy.
			Know the cultivation, collection, processing & importance of various herbal drugs.
			Understand the scope of economic botany and ayurvedic pharmacy.
			Know the botanical resources like non wood forest products.
			Understand scope and importance of pharmacognosy.
			Know the cultivation, collection, processing & importance of various herbal drugs.
	BO 365	**BO. 345: Plant Biotechnology**	Understand the fundamental of recombinant DNA technology.
			Understand tissue culture techniques.
			Role of microbes in agriculture, medicine & industry.
			Understand the concept of bioinformatics, genomics & proteomics.
			Understand technical germplasm & cryopreservation.
	BO 366	**BO346: Plant Breeding and Seed Technology**	Understand the scope & importance of plant breeding.
			Know the technique of production of new superior crop varieties.
			Know the about heterosis, hybrid vigour etc.
			Know the process of hybrid variety, development & their release.
			Know about seed germination, processing, production, storing etc.
	BO 3610	**Nursery and Gardening Management**	To understand scope , importance & disciplines of horticulture.
			To understand different horticultural practices & methods
			To understand production technology, harvesting technics.
			To understand methods of preservati
	BO 3611	**Biofertilizers**	CO1: Estimation of Phosphatic fertilizers from agricultural soil using colorimeter

Class	Subject code	Title	Cos:After successful completion of This course, student will be able to
			/Spectrophotometer
			CO2: The course is designed to provide comprehensive knowledge to the students regarding the general information, application and production technology of Biofertilizers
T.Y.B.Sc Sem IV	**BO 367**	**Botany Practical Paper I**	CO1: The range of thallus structure in algae, fungi, bryophytes and pteridophytes.
			CO2: Study of Chromosomes Morphology.
			CO3: Estimation of Plant DNA by DPA Method
			CO4: Extraction and estimation of RNA by Orcinol Method
	BO 368	**Botany Practical Paper II**	CO1: Solving of problems on gene mapping using three-point test cross data
			CO2: Study of the families with respect to morphological characters using botanical terms, floral formula, floral diagram and classification giving.
			CO3: Study of Pinus & Gnetum.
			CO4: Study of different types of fossils.
			CO5: Demonstration of Hybridization Techniques.
			CO6: Study of polluted water body with ref. to BOD.
			CO7: Study the Polyploidy induction in Allium cepa by colchicine.
	BO 369	**Botany Practical Paper III**	CO1: Study of Garden tools and Equipment's.
			CO2: Study techniques in Horticulture and floriculture like cutting, Layering, Budding, Grafting.
			CO3: Solving of problem on mean, mode, median, variance and standard deviation.
			CO4: Study of Koch's Postulates.
			CO5: Study the different Culture technique.
			CO6:Study of Bacterial Disease w.r.t. Causal organism, Symptoms and control measures.
			CO7: Study of viral diseases w.r.t. Causal organism and Symptoms.
			CO8: Study of Plant extraction methods.

HoD, Botany

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