



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)

Re-Accredited "B+" Grade (CGPA 2.69) by NAAC, ISO 21001:2018 (Certified)

Affiliated to University of Mumbai

M.Sc. Botany

Programme Specific Outcome

After successful completion of two year PG program in(M.Sc. Mycology and Plant Pathology) a student should be able to;

PSO1	Identify the different groups of Fungi, classification , nomenclature; Understand the basic concepts of fungal physiology , ecology and genetics and discuss their significance on the planet
PSO2	Demonstrate mycological techniques and analytical skills, analyze and interpret the experimental data using Bioinformatics tools and statistical methods
PSO3	Develop scientific communication skills, prepare reports based on literature and field surveys and presentation skills
PSO4	Develop research aptitude and Apply the knowledge of fungal physiology and Plant pathology in industrial, agricultural, healthcare and biotechnological fields and clinical environments
PSO5	Lead a research team for field surveys, fungal diversity assessment , ecology, or genetics and collaborating with industry or policy makers or agencies for fungal conservation and sustainable utilization of fungal resources
PSO6	Plan innovative strategies to manage fungal diseases and sustainable plant disease management, recommend bio -safety measures and practice bioethics



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Department	Semester	Course
Botany	I	M.Sc. Botany-I Practical Plant Diversity: Cryptogams I (Algae and Fungi) And Plant Diversity – Spermatophyta I (Gymnosperms and Angiosperms)

CO. No.	Course outcomes	Blooms Level	PO/PSO
CO1	Classify algae into various groups, understand the importance in various fields and will be able to collect and identify them	L1, L2	PO1, PO2, PSO1, PSO4
CO2	Classify algae into various groups, understand the importance in various fields and will be able to collect and identify them	L2	PO1, PO3, PSO1, PSO3, PSO4
CO3	A study of the angiosperm families mentioned in theory with reference to their morphological peculiarities and economic importance of its members.	L2	PO1, PO2, PO3, PSO1, PSO3, PSO4
CO4	Identification of genus and species with the help of flora (In addition to the above-mentioned families, all families studied in undergraduate classes are included)	L1	PO1, PO2, PSO1, PSO2, PSO4



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Department	Semester	Course
Botany	I	M.Sc. Botany-I Practical: Plant Physiology and (PSBOP104), Cytogenetics, Molecular Biology and Biotechnology

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Determination of K_m and V_{max} of the enzyme amylase purified amylase, extraction of cellulase from a suitable fungal culture and study of enzyme activity by DNSA method. Trained in the basic techniques of plant physiology, various stress experiments affecting the plant physiology, enzyme kinetics, estimation techniques of GOT & GPT	L1, L2, L3, L5	PO1, PO2, PO3, PSO1, PSO2
CO2	Quantitative study of diurnal fluctuation in titratable acid number (TAN) in a CAM plant. Estimation of the total nitrogen content of a plant using Kjeldahl's method	L2, L5	PO1, PO3, PSO1, PSO3
CO3	Preparation of cytological stains, fixatives and pretreatment agents, Squash preparation from pre-treated root tips (Colchicine/ Paradichlorobenzene/ Aesculin. Squash, Smear, preparation from mutagen treated root tips for study of aberrations	L2, L3, L5	PO1, PO2, PO3, PSO1, PSO2,
CO4	Problems based on: Restriction map analysis and construction of restriction maps, Tetrad analysis in Neurospora – two genes and centromere. Deletion mapping in Bacteriophage	L1, L2, L5	PO1, PO2, PO3, PSO1, PSO2, PSO3



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Department	Semester	Course
Botany	I	M.Sc. Botany-I : Plant Diversity-Cryptogams I (Algae and Fungi)

CO. No.	Course outcomes :	Blooms Level	PO/PSO
CO1	Identify and Classify algae into various groups, understand the importance in various fields and will be able to collect and identify them	L1, L2	PO1, PO2, PO3, PSO1, PSO2, PSO3
CO2	Classification of algae into various groups, understand the importance in various fields and will be able to collect and identify them	L2, L3, L5	PO1, PO2, PO4, PSO1, PSO2, PSO4
CO3	Identification techniques the Fungi with reference to their morphological peculiarities and economic importance of its members.	L2, L1	PO1, PO2, PO3, PSO1, PSO2, PSO4
CO4	Identification of diseases with reference to symptoms, causal organism and disease cycle : a. Late blight of potato b. Covered smut of jowar	L1, L5	PO1, PO2, PO3, PO4, PSO1, PSO2



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Department	Semester	Course
Botany	I	M.Sc. Botany-I : Plant Diversity – Spermatophyta I (Gymnosperms and Angiosperms)

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Classify gymnosperms upto orders according to the system proposed by C. J. Chamberlain, identification of general characters; affinities and interrelationships of Cycadofilicales, Bennettitales and Cordaitales into various groups, understand the importance in various fields and will be able to collect and identify them	L1, L2, L3	PO1, PO2, PO4, PSO1, PSO2, PSO4
CO2	Understand the origin and evolution of angiosperms; the primitive Angiospermic flower; primitive and advanced character in angiosperms.	L2, L5	PO2, PO3, PSO1, PSO2, PSO4
CO3	A study of the International Code of Botanical Nomenclature (I.C.B.N.) History and basic Principles.	L2, L3	PO1, PO2, PO3, PSO1
CO4	Understand the origin, evolution, variation and speciation, Biosystematics categories, Biotypes and Ecotypes. 2. Concept of characters:	L1, L2, L3	PO2, PSO1, PSO2, PSO4



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Department	Semester	Course
Botany	I	M.Sc. Botany-I : Theory: Plant Physiology

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Comprehend plant cell responses to various biotic and abiotic stresses, photosynthetic mechanism in plants, Role of light in the activation of dark phase enzymes, light effect, modulators and coordination of light , dark phase. Photosynthesis: inter and intra-cellular transport of metabolites, carbonic anhydrase.	L1, L2,L3,L5	PO1, PO2, PO3, PSO1, PSO2, PSO3
CO2	Understand the plant pigment systems in bacteria and Cyanobacteria, light harvesting mechanisms, reductive TCA cycle.	L1, L2	PO1, PO2,PO3, PSO1, PSO2, PSO3
CO3	Understand and study various protein structures, as primary, secondary, tertiary and quaternary structural features and their analysis – Theoretical and experimental; protein folding – biophysical and cellular aspects	L1, L2, L5	PO1, PO2, PSO1, PSO2, PSO3, PSO4
CO4	Comprehend plant cell responses to various Plant hormones: Biosynthesis, storage, breakdown and transport.	L1, L3, L5	PO1, PO2, PO3, PSO3, PSO1, PSO3



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Department	Semester	Course
Botany	I	M.Sc. Botany-I : Theory: (PSBOP104): Theory: Cytogenetics, Molecular Biology and Biotechnology

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Develop understanding in the area of Molecular Biology. Genetics, Cell division and cell cycle.	L1, L2,L5	PO1,PO2, PSO1,PSO2
CO2	Understanding in the area of Microbial Genetics: Molecular basis of transformation, transduction, Conjugation; fine structure of the gene, T4 Phage, complementation analysis, deletion mapping, cis-trans tests	L1,L5	PO1, PO2, PO3, PSO1,PSO2, PSO4
CO3	Gain Knowledge in Recombinant DNA technology, for production of herbicide resistant plants, insect resistant plants, improving seed storage proteins and golden rice.	L2,L5	PO1, PO2, PO3, PSO1,PSO2, PSO3
CO4	Understanding the molecular biology techniques	L1,L2,L5	PO1, PO2, PO4, PSO1,PSO2, PSO4



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Department	Semester	Course
Botany	II	Cryptogams II (Bryophyta and Pteridophyta)

CO. No.	Course outcomes	Blooms Level	PO/PSO
CO1	Identify, describe the characteristics of Bryophytes, illustrate the life cycles of Bryophytes, Interpret the significance of alternation of generations in bryophyte Classify Bryophytes into various groups, study their importance	L1, L2, L3	PO1, PO3, PSO1, PSO3,
CO2	assess the origin and evolution of bryophytes, discuss the diversity and their applications in food , medicine and environment	L1, L2, L3	PO1, PO3, PO4, PSO1, PSO3, PSO4,
CO3	identify and describe the life cycles of three genera of Pteridophytes, Classify Pteridophytes into various groups, study their importance and multiplication of important ferns	L1, L2, L3,	PO1, PO3, PSO1, PSO3,
CO4	Describe the geological time scale and its major divisions, Implement cultivation practices to successfully grow and maintain ornamental ferns , Apply knowledge of ethnomedicinal uses to evaluate the potential benefits and risks of pteridophytes in modern medicinal contexts.	L1, L2, L3	PO1, PO3, PO4, PO6, PO5, PSO3, PSO1, PSO4, PSO5, PSO6



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Department	Semester	Course
BOTANY	II	Spermatophyta II

After completion of this course the student should be able to:

CO. No.	Course outcomes	Blooms Level	PO/PSO
CO1	Describe the roles and functions of various types of meristems in plant growth and development. Explain the processes of leaf development, phyllotaxy, and floral transition in plants.	L1/L2,	PO1, PO3, PO4, PSO1, PSO3, PSO4,
CO2	understand various tissue systems in plants, focusing on sensory and secretory tissues, and the anatomy of wood. Apply knowledge of wood anatomy to identify and classify wood samples based on their anatomical features.	L1, L2, L3, L4	PO1, PO3, PO4, PSO1, PSO3, PSO4
CO3	Describe the process of pollen development and gene expression in male gametophytes, Analyze the factors that contribute to barriers to fertilization and how they affect successful pollination.	L2, L3, L3, L4	PO1, PO3, PO4, PSO1, PSO3, PSO4,
CO4	Identify and describe the major chemical constituents of pollen and its functions, Apply palynotaxonomic methods to classify and analyze pollen grains from different plant families. Utilize knowledge of pollen's properties to evaluate its potential uses in health and medicine.	L1, L2, L3, L4	PO1, PO2, PO4, PO5, PO6, PSO1, PSO2, PSO4, PSO5, PSO6



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Department	Semester	Course
Botany	II	Plant Physiology and Environmental Botany

After completion of this course the student should be able to:

CO. No.	Course outcomes	Blooms Level	PO/PSO
CO1	Distinguish key physiological processes underlying the seed germination Analyze the biochemical changes in seeds during germination, Integrate and apply their knowledge of crop physiology for analytical thinking and solving practical problems experienced in agricultural systems	L1, L2,L3, L4,	PO1, PO2,PO3, PO4,PO6, PSO1, PSO2, PSO3, PSO4, PSO6
CO2	Comprehend the mechanisms through which plants respond to biotic and abiotic stress, including the recognition of pathogens and insects. Assess the effectiveness of various adaptation strategies employed by plants to cope with different abiotic stressors.	L1, L2, L3,L4	PO1, PO2,PO4,PO6 PSO1, PSO2, PSO4,PSO6
CO3	Explain the nature of biotic and abiotic interactions and their impact on ecosystem functioning. analyze species distribution patterns in various biomes and regions, including India. Analyze population growth patterns and regulation mechanisms to understand population dynamics and predict future changes.	L2, L3,	PO1, PO2,PO3, PO4, PO5, PSO1, PSO2, PSO3,PSO4, PSO5
CO4	Apply knowledge of climate change to evaluate its impacts on various environmental and socio-economic systems and recommend strategies for sustainable development plan mitigation strategies	L1, L2, L3,14, 15	PO1,PO2, PO3, PO4, PO5,PO6, PSO1, PSO2, PSO3, PSO4, PSO5, PSO6



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Department	Semester	COURSE
Botany	II	PSBO204-Medicinal Botany and Dietitics

After completion of this course the student should be able to:

CO. No.	Course outcomes	Blooms Level	PO/PSO
CO1	Identify the biological sources of the drugs and categorize drugs based on their origin, the therapeutic uses and applications of the drugs in health and medicine industry	L1, L2, L3, L4	PO1,PO2, PO3, PO4, PSO1, PSO2, PSO3, PSO4,
CO2	Describe the role of Pharmacopoeias in standardizing drug quality, Analyze anatomical features to detect adulterants or inconsistencies. Apply phytochemical testing methods to determine the chemical profile of crude drugs in research and pharmacological industries, practice bioethics	L1, L2, L3,4,L5	PO1,PO2, PO3, PO4,PO6, PSO1, PSO2, PSO3, PSO4, PSO6
CO3	Define the basic concept of nutraceuticals, classify and categorize the different nutraceuticals, Apply knowledge of plant nutraceuticals to evaluate their potential uses in dietary planning and health promotion.	L1, L2, L3,4,L5	PO1,PO4, PO5, PO6, PSO1, PSO4, PSO5, PSO6
CO4	Identify and Describe the therapeutic roles of specific plant foods in managing these diseases, including their active compounds and mechanisms of action. recommend dietary modifications for individuals suffering from the specified diseases.	L1, L2, L3,4,L5	PO1,PO4, PO5, PO6, PSO1, PSO4, PSO5, PSO6



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Department	Semester	COURSE
Botany	II	Practicals of PSBOP201 and PSBOP202

After completion of this course the student should be able to:

CO. No.	Course outcomes	Blooms Level	PO/PSO
CO1	Identify, classify and Describe the morphological features of vegetative and reproductive structures of Bryophytes and differentiate them	L1, L2	PO1, PO3, PO4, PSO1, PSO3, PSO4
CO2	Identify, classify and Describe the morphological features of vegetative and reproductive structures of Pteridophytes and differentiate them. Distinguish the different pteridophyte fossils	L1, L2, L4	PO1, PO3, PO4, PSO1, PSO3, PSO4
CO3	perform the maceration technique for identification of wood elements, examine the leaf surface characters to evaluate the adaptability in plants, identify different types of embryos,	L1, L2, L3	PO1, PO2, PO3, PO4, PO5, PSO1, PSO2, PSO3, PSO4, PSO5,
CO4	draw the camera lucida sketches, Apply basic microtomy techniques to prepare and cut tissue sections for microscopic examination.	L2, L3	PO1, PO2, PO3, PO4, PO5, PSO1, PSO2, PSO3, PSO4, PSO5



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Department	Semester	COURSE
Botany	II	Practicals of PSBOP203 and USBOP204

After completion of this course the student should be able to:

CO. No.	Course outcomes	Blooms Level	PO/PSO
CO1	Analyze the TTC staining patterns to determine the viability status of seeds, Calculate the Nygard Index to analyze algal samples and assess the ecological condition of aquatic environments. Evaluate the effect of water and salt stress on plant physiology	L2, L3,L4	PO1, PO2,PO3, PO4, PSO1, PSO2, PSO3, PSO4,
CO2	Analyze the data on dust load to assess the impact of dust deposition on leaf health and overall plant performance. Describe how to measure and calculate the stomatal index, Apply LAI measurement techniques to evaluate canopy coverage and productivity in different plant communities or ecosystems.	L2, L3,L4	PO1, PO2,PO3, PO4, PO5,PSO1, PSO2, PSO3,PSO4, PSO5
CO3	identify the biological sources of the drugs and categorize and classify drugs based on their origin Evaluate the chemical constituents using appropriate tests for quality control, Apply standardization techniques to measure and record parameters	L1, L2, L4	PO1,PO2, PO3, PO4,PO6, PSO1, PSO2, PSO3, PSO4, PSO6
CO4	Identify and Describe the therapeutic roles of specific nutraceuticals in managing these diseases, perform and demonstrate chromatography technique for analysis of lycpenes and amino acid profile	L3, L4	PO1,PO4, PO6, PSO1, PSO4, PSO6



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Department	Semester	Course
Botany	III	Theory: Techniques and Instrumentation

CO. No.	Course outcomes: Theory	Blooms Level	PO/PSO
CO1	Understand and apply fundamental concepts of probability and statistical theory	L1, L2, L3	PO2, PO3 PSO1, PSO3
CO2	Understand the bioinformatics tools and database to analyze biological data, such as sequence alignment, genome assembly, and protein structure.	L2, L3	PO2, PO4, PSO1
CO3	Understand the principles and applications of pH and Buffers and Electrophoresis	L2, L1, L3	PO1, PO2, PO3, PSO1, PSO2
CO4	Prepare samples correctly for spectrophotometric analysis.	L1, L5	PO3, PO4, PSO1, PSO3



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Department	Semester	Course
Botany	III	Specialization :Applied Mycology and Plant Pathology

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Understand and learn: Pathogenesis and Crop Pathogeny	L1, L2, L3, L5	PO2, PO3,PO4, PSO3
CO2	Identify and understand Seed Mycoflora & Seed Pathology	L2, L3,L5	PO2,PO3, PO4, PSO1,PSO2
CO3	Understand and learn: Cultural Studies and Food borne Fungi	L3,L5	PO1, PO2, PSO1,PSO2,PSO4
CO4	Understand and learn: Industrial Mycology	L1, L2, L3	PO1, PO2, PO4, PSO1, PSO2,PSO4



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Department	Semester	Course
Botany	III	Molecular Biology

CO. No.	Course outcomes: Theory	Blooms Level	PO/PSO
CO1	Comprehend the basic principles of DNA structure and function.	L1, L2,	PO2, PO3 PSO1, PSO3
CO2	Identify and explain the roles of key enzymes and proteins involved in transcription.	L2, L3, L5	PO2, PO4, PSO1, PSO2
CO3	Comprehend the central dogma of molecular biology, and understand specific enzymes involved in RNA processing.	L2	PO1, PO2, PSO1, PSO2
CO4	Identify and explain the roles of key components in translation.	L1, L5	PO2, PO3, PO4, PSO1, PSO2, PSO3



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Department	Semester	Course
Botany	III	Specialization :Mycology and Plant Pathology (MPP)

CO. No.	Course outcomes: Theory: (PSBOP303): Theory: Specialization: Mycology and Plant Pathology (MPP)	Blooms Level	PO/PSO
CO1	Understand and learn history of Mycology and Plant Pathology in India & Soil Mycology	L1, L2, L5	PO2, PO3 PSO1,PSO3
CO2	Identify and understand Fungal Taxonomy & Life history and Systematic position of fungi	L2, L3,L5	PO2, PO4, PSO1,PSO2,PSO4
CO3	Understand and learn Fungal Physiology, Fungal Metabolites: Acetate and Nitrogenous metabolites	L3	PO1, PO2, PO3, PSO1,PSO2,PSO4
CO4	Identify and understand: Fungal Cytology, Genetics and Ecology	L1, L5,L3	PO2, PO4, PSO1, PSO2,PSO3,PSO4



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Department	Semester	Course
Botany	III	Molecular Biology

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	To understand the principles and applications of advanced instrumentation used in scientific research.	L1, L2, L3, L5	PO2, PO3, PO4, PSO3, PSO1, PSO2
CO2	To comprehend the basic principles of DNA structure and function.	L2, L3, L5	PO2, PO4, PSO1, PSO4
CO3	To use bioinformatics tools and database to analyze biological data, such as sequence alignment, genome assembly, and protein structure. To understand and apply fundamental concepts of probability and statistical theory.	L1, L2, L5	PO1, PO2, PO3, PSO1, PSO3, PSO4
CO4	To prepare samples correctly for spectrophotometric analysis. To comprehend the central dogma of molecular biology, and understand specific enzymes involved in RNA processing.	L2, L3	PO1, PO2, PO4, PSO1, PSO2, PSO4



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Department	Semester	Course
Botany	III	Specialization: General Mycology and (PSBOP304): Applied Mycology and Plant Pathology

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Identify and Isolation of soil fungi by Warcup method. Understand and Study of the following fungal types with reference to their systematic position, thallus and reproductive structures	L1, L2, L3	PO1,PO3,PO4,PSO1,PSO3,PSO4
CO2	Understand and Learn Isolation of fungal pathogens from infected leaves. Study and understand of the following diseases: i) Wart of potato ii) Downy mildew of grapes iii) Bunt of rice iv) Citrus canker	L1, L2, L3, L5	PO1, PO4, PSO1,PSO1,PSO2
CO3	Understand and Study of effect of incubation temperatures on fungal growth. Identify and Isolation of hematophagous fungi from garden soil/agriculture soil	L3,L2,L5	PO1, PO2, PSO1,PSO2
CO4	Isolation and identification of seed borne fungi by 2-4 D method, minimum inhibition concentration of salt on fungal growth. Learn the techniques of Quantitative estimation of cellulose by DNSA method	L1, L2,L3	PO1, PO2, PSO1, PSO2,PSO4



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Department	Semester	COURSE
Botany-	IV	Techniques and Instrumentation

After completion of this course the student should be able to:

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Identify and list the different types of rotors used in centrifugation, Summarize the differences between differential and density gradient centrifugation, including their applications and purposes.	L1, L2, L3	PO1, PO3, PSO1, PSO3,
CO2	Define and explain the fundamental concept of chromatography, describe and compare Techniques Ion exchange, Affinity Chromatography & HPLC, nterpret the chromatogram, and Assess the efficiency of HPTLC & HPLC in validation of herbal drugs	L1, L2, L3	PO1, PO2, PO3, PO4, PSO1, PSO2, PSO3, PSO4,
CO3	Define the concept of tracer techniques and its application in research, describe the Principle, instrumentation & technique: Geiger-Muller counter, Liquid scintillation counters & Autoradiography, PCR and its applications	L1, L2,	PO1, PO3, PO4, PSO1, PSO3, PSO4,
CO4	Explain the Synthesis of nanoparticles using biological samples. Identify the key techniques for the Characterization of nanoparticles and use of FTIR, SEM, TEM, STEM, Scanning Tunneling Microscope, Atomic Force Microscope, UV-Vis,). Define the Objectives of IPR, understand the IPR process & Analyze the scope and implications of IPR in various fields, including biotechnology, pharmaceuticals, and nanotechnology.	L1, L2, L3	PO1, PO2, PO3, PO4, PO6, PSO1, PSO2, PSO3, PSO4, PSO6



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Department	Semester	COURSE
Botany-	IV	Molecular Biology

After completion of this course the student should be able to:

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Define the structure and function of the trp operon, ara operon, and histidine operon in bacterial gene regulation. Apply the concepts of operon regulation to predict the effects of environmental changes on the expression of genes controlled by the trp, ara, and histidine operons.	L1, L2	PO1, PO3, PO4, PSO1, PSO3, PSO4
CO2	Identify the key mechanisms involved in the control of gene expression in eukaryotic cells. Evaluate the effectiveness of different gene expression control mechanisms in various biological contexts. Evaluate the implications of RNA processing defects or variations on cellular function and gene expression.	L1, L2, L3	PO1, PO3, PO4, PSO1, PSO3, PSO4
CO3	Apply genetic and molecular techniques to study the role of specific genes in Drosophila development. Explain the significance of each developmental stage in Drosophila. Apply genetic and molecular approaches to study the function of homeotic genes and their interactions in Drosophila.	L2, L3	PO1, PO2, PO4, PO6, PSO1, PSO2, PSO4, PSO6
CO4	Describe the mechanisms by which hormones interact with their receptors to elicit cellular responses. Evaluate the role of cell surface receptors and second messengers in various diseases and potential therapeutic interventions. Examine the effects of intracellular receptor activation on gene expression and cellular functions.	L2, L3	PO1, PO3, PO4, PSO1, PSO3, PSO4,



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Department	Semester	COURSE
Botany-	IV	Techniques and Instrumentation and Molecular Biology

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Describe and demonstrate the ion exchange chromatography, illustrate and Apply analytical techniques to quantify amino acids from chromatographic data and assess their presence in the sample.	L1, L2	PO1, PO2, PO3,PO4, PSO1, PSO2,PSO3, PSO4
CO2	Measure and determine the viscosity of proteins, demonstrate synthesis of nanoparticles and understand the characterization, Draft a complete patent application including claims, descriptions, and drawings based on a given invention.develop the skills necessary to successfully navigate patent applications and protection.	L2, L4, L5	PO1,PO2, PO3,PO4, PO6, PSO1,PSO2, PSO3, PSO4, PSO6
CO3	Illustrate the isolation of plasmid DNA using established protocols and laboratory techniques, Analyze quantification results to determine the concentration of plasmid DNA ,	L1, L2, L3	PO1,PO2, PO3, PO4, PO5, PO6, PSO1 , PSO2, PSO3, PSO4, PSO5,PSO6
CO4	carry out agarose gel electrophoresis to separate plasmid DNA and interpret the resulting gel images. Describe the steps involved in Southern blotting, Explain how β -galactosidase expression is used to monitor gene expression .	L2, L3	PO1,PO2, PO3, PO4, PO5, PO6,PSO1 , PSO2, PSO3, PSO4, PSO5,PSO6



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Department	Semester	COURSE
Botany-	IV	General Mycology

After completion of this course the student should be able to:

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Recall the History of Mycology and Plant Pathology in India and contribution of few eminent Mycologists and Plant Pathologists, discuss the diversity and distribution of soil mycoflora	L1, L2	PO1, PO3, PO4, PSO1, PSO3, PSO4
CO2	identify the key features and criteria used in the classification systems for fungi, Evaluate each classification system . Explain phylogenetic classification, role of the ICBN in standardizing fungal names , develop the skills necessary for effective fungal classification and communication in the scientific community.	L2, L3, L4	PO1, PO2, PO3, PO4, PSO1, PSO2, PSO3, PSO4
CO3	identify the different fungal metabolites, Describe the biosynthetic pathways and biological functions of acetate and nitrogenous metabolites, pigments, aromatic terpenes, organic acids produced by fungi . Analyze the advantages and limitations of using fungi in nanotechnology	L1, L2, L3, L4	PO1, PO2, PO5, PSO1, PSO2, PSO5,
CO4	Explain the processes involved in the parasexual cycle and its role in fungal genetics and reproduction. Assess the importance of fungal diversity in ecological balance, human health, and industrial applications.	L2, L3, L4	PO1, PO3, PO6, PSO1, PSO3, PSO6



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Department	Semester	COURSE
Botany-	IV	Applied Mycology and Plant Pathology

After completion of this course the student should be able to:

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Apply knowledge of plant defense mechanisms to evaluate how plants respond to fungal pathogens in different environments, Assess the potential of biological control methods as sustainable alternatives to chemical treatments. Investigate specific crop diseases to develop effective management strategies.	L1, L2, L3, L4	PO1,PO2, PO4,PO5, PO6, PSO1, PSO2, PSO3, PSO4, PSO5,PSO6
CO2	Identify and apply various tests for detection of seed borne fungal pathogens, list the various measures for management of seed borne fungal diseases, Implement biological control methods to manage seed-borne diseases	L1, L2, L3, L4	PO1, PO2, PO4, PSO1, PSO2, PSO4
CO3	Describe the principles behind each preservation method, Assess the suitability of various preservation techniques for different types of fungal cultures and the impact of mycotoxin concentrations on health and safety standards.	L1, L3, L4	PO1,PO3, PO4, PO5,PO6, PSO1, PSO2, PSO3, PSO4, PSO5, PSO6
CO4	Describe the processes involved in the fungal bio-conversion of lignocellulose, Implement fungal bioremediation techniques to treat contaminated soils or waters, outline the importance of fungi in food industry	L2, L3	PO1,PO4,PO6, PSO1, PSO4, PSO6



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Department	Semester	COURSE
Botany-	IV	Practicals based on PSBOPMPP403 and PSBOPMPP404

After completion of this course the student should be able to:

CO. No.	Course outcomes:	Blooms Level	PO/PSO
CO1	Describe the various stages in the life cycle of few fungal genera, solve the problems in nomenclature,	L1, L2, L3	PO1, PO2,PO3, PSO1,PSO2
CO2	Demonstrate the effect of various factors such as light, humidity and nitrogen sources on growth of fungi, prepare and set up baiting experiments for isolation of fungi,	L2, L3,L4	PO1, PO2,PO3,PO4, PO5, PSO1, PSO2, PSO3,PSO4, PSO5
CO3	Implement paper chromatography techniques to detect and quantify mycotoxins from infected samples, demonstrate the percent infection and spore count of AM fungi and Utilize micrometry techniques to measure dimensions of fungal structures	L1, L2, L4	PO1, PO2,PO3, PO4, PSO1, PSO2, PSO3, PSO4,
CO4	Develop research skills, Design a research proposal with clear objectives, a detailed plan,Execute appropriate methodologies for data collection and analysis.Prepare and deliver a clear and engaging presentation of the research project, highlighting key findings and implications.	L3, L4, L5	PO1,PO2, PO3,PO4, PO5,PO6, PSO1, PSO2, PSO3,PSO4, PSO5, PSO6