

Paper 4a COMBINED PRACTICAL
MYCOLOGY AND PLANT PATHOLOGY,
BRYOLOGY, PTERIDOLOGY AND GYMNOSPERMOLOGY &
RESEARCH METHODOLOGY, INSTRUMENTATION AND BIOSTATISTICS
M.Sc. va (Candidates admitted from the academic year 2021-2022)

Course Code 212BO1M04

Total Hours 165

Credits 5

COMBINED PRACTICAL

Learning Objective	To enable the students to learn and culture the various lower plant groups; to describe and compare the morphological and anatomical characters of gymnosperms, to have basic hands-on training towards the advanced microscopes, instruments and associated research techniques.
--------------------	---

CO No.	Course Outcome	PSO Addressed	CL
	Upon the completion of this course, students will be able to		
CO - 1	Examine different types of vegetative structures in fungi and reproductive structures associated with fungi & Lichen. Acquainting with the techniques in isolation and culturing different members of fungi and study the succession of fungi and infection of plant through experimental setups.	PSO-1	U
CO - 2	Demonstrate different diseases in plants with its symptoms and causal organisms disease through section affected plant parts.	PSO-1	U
CO - 3	Enumerate the morphological and physiological characters of various divisions of bryophytes; Understand the evolution and phylogeny of Bryophytes; Learn the various fossil and extent forms of primitive vascular land plants and their evolutionary importance; Enumerate the morphological and physiological characters of living and fossil gymnosperms.	PSO-1	An
CO - 4	Learn the inevitable use of Microscopy; Photomicrography, Macrophotography and tissue printing in biological science	PSO-1, 4	Ap
CO - 5	Understand the principle and working mechanism of various instruments used in extraction, separation and analysis of biocomponents; Learn various statistical methods and tools used in Scientific Research.	PSO-1, 5	U

MYCOLOGY**HOURS 28**

Structure of various Thallus and Reproductive stages of Fungi belonging to various classes.

Laboratory techniques in Mycology: Preparation of culture media. Preparation of culture slants and plates. Plate assay techniques.

Isolation of soil fungi, aquatic Fungi and Coprophilous fungi. Growth of fungi using Baits-Moisture chamber.

Sporangial and spore discharge mechanism of fungi with particular reference to *Pilobolus*.

Sectioning and observation of Zygomycotina (*Mucor & Rhizopus*), Ascomycotina (*Galiella, Xylaria*), Basidiomycotina (*Ganoderma, Lentinus*), Deuteromycotina (*Alternaria*).

Sectioning of Lichen Thallus & Reproductive structure: *Parmelia & Usnea*.

PLANT PATHOLOGY	HOURS 27
<p>Study of structures associated with the following diseases: Fungal Disease (Sectioning and Observation): Damping off of mustard (<i>Pythium</i>), White rust of Cruciferae (<i>Albugo</i>), Club root of Cruciferae (<i>Plasmodiophora</i>), Brown rust of wheat (<i>Puccinia</i>), Red rot of sugarcane (<i>Colletotrichum</i>), Leaf spot of brinjal (<i>Alternaria</i>), Tikka disease of groundnut (<i>Cercospora</i>). Bacterial Disease (Observation): Blight of rice (<i>Xanthomonas oryzae</i>), Citrus canker (<i>Xanthomonas citrii</i>). Viral Disease (Observation): Vein clearing of <i>Acalypha</i>, Mosaic of <i>Phaseolus</i>. Mycoplasma Disease (Observation): Little leaf of brinjal, Leaf curl disease.</p>	
BRYOLOGY	HOURS 18
<p>Study of habit, habitat distribution, external and internal structure of gametophytes of selected species; Sporophytes and reproductive structures of the following: <i>Riccia</i>, <i>Reboulia</i>, <i>Marchantia</i>, <i>Porella</i>, <i>Anthoceros</i>, <i>Sphagnum</i>, <i>Polytrichum</i> and <i>Bryum</i>. Knowledge of some common Bryophytes of Tambaram and neighbourhood.</p>	
PTERIDOLOGY	HOURS 19
<p>Study of vegetative and reproductive structures of the following living members: <i>Psilotum</i>, <i>Lycopodium</i>, <i>Selaginella</i>, <i>Isoetes</i>, <i>Equisetum</i>, <i>Ophioglossum</i>, <i>Gleichenia</i> and <i>Marsilea</i>. Slides or photographs of fossil Pteridophytes - <i>Rhynia</i>, <i>Zosterophyllum</i>, <i>Lepidodendron</i> and <i>Calamites</i>.</p>	
GYMNOSPERMOLOGY	HOURS 18
<p>Study of vegetative and reproductive structures of the following living gymnosperms: <i>Cycas</i>, <i>Ginkgo</i>, <i>Pinus</i>, <i>Araucaria</i> and <i>Gnetum</i>. Study and identification of fossil slides or photographs of <i>Lyginopteris</i>, <i>Medullosa</i>, <i>Williamsonia</i> and <i>Pentaxylon</i>.</p>	
RESEARCH METHODOLOGY, INSTRUMENTATION AND BIOSTATISTICS	HOURS 55
<p>Selected techniques in Light Microscopy: Permanent slide preparation –Microtomy, Pollen acetolysis method and Micrometry. Photomicrography and Photomacrography. Photomicrographs of LM and EM. Demonstration of Tissue printing technique. Demonstration of the following Instruments: pH meter, Spectrophotometer, Centrifuge, Chromatography and Electrophoresis. Observation of Analytical instruments from various Laboratories of Institutions in and around Chennai. Demonstration of SDS-PAGE, Column Chromatography. Solving Statistical problems - Standard Error, Standard Deviation, Graphical Representation of data and statistical software Open access Publishing, Publication Misconduct, Plagiarism tools, Indexing & citation databases (Web of Sciences, Scopus) and Research Metrics (h-index, G-index and i10 index).</p>	