

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Botany

(Choice Based Credit System)

(With effect from the academic year 2017-2018 onwards)

Sem	Pt	Sub No	Subject Status	Subject Title	Con Tact Hrs/wk	L Hrs/wk	P Hrs/wk	Credits
I	I	1	Language	Tamil/Other Languages	6	6	0	4
	II	2	Language	English	6	6	0	4
	III	3	Core – Paper I	Plant Anatomy & Microtechniques	4	4	0	4
	III	4	Core – Paper II	Algae & Bryophytes	4	4	0	4
	III	5	Major Practical I	Plant Anatomy, Microtechniques, Algae & Bryophytes	2	0	2	2
	III	6	Allied I Paper – 1	Plant Diversity and Medicinal Botany	4	4	0	3
	III	7	Allied Practical-1		2	0	2	2
	IV	8	Common	Environmental Studies	2	2	0	2
				Subtotal	30	26	4	25
II	I	9	Language	Tamil/Other Languages	6	6	0	4
	II	10	Language	English	6	6	0	4
	III	11	Core – Paper III	Fungi, Plant Pathology and Lichenology	4	4	0	4
	III	12	Core – Paper IV	Cell Biology & Embryology of Angiosperms	4	4	0	4
	III	13	Major Practical 2	Fungi, Plant Pathology, Lichenology, Cell Biology & Embryology of Angiosperms	2	0	2	2
	III	14	Allied I Paper – II	Embryology, Plant anatomy, Physiology and Biotechnology	4	4	0	3
	III	15	Allied Practical-2		2	0	2	2
	IV	16	Common	Social Value Education	2	2	0	2
				Subtotal	30	26	4	25
III	I	17	Language	Tamil/Other Languages	6	6	0	4
	II	18	Language	English	6	6	0	4
	III	19	Core – Paper V	Pteridophytes, Gymnosperms & Paleobotany	4	4	0	4
	III	20	Major Practical 3	Pteridophytes, Gymnosperms & Paleobotany	2	0	2	2
	III	21	Allied - II		4	4	0	3
	III	22	Allied Practical II		2	0	2	2

	III	23	Skilled Based Core	Mushroom Cultivation/Preservation of Fruits and Vegetables	4	4	0	4
	IV	24	Non-Major Elective	Gardening and Garden Management/ Herbal Medicine	2	2	0	2
				Subtotal	30	26	4	25
IV	I	25	Language	Tamil/Other Languages	6	6	0	4
	II	26	Language	English	6	6	0	4
	III	27	Core – Paper VI	Microbiology & Techniques in Biology	4	4	0	4
	III	28	Major Practical 4	Microbiology & Techniques in Biology	2	0	2	2
	III	29	Allied - II		4	4	0	3
	III	30	Allied Practical II		2	0	2	2
	IV	31	Skilled Based II	Personality Development and Yoga	4	4	0	4
	IV	32	Non-Major Elective	Food and Nutrition/Botany for Competitive Examination	2	2	0	2
	V	33	Extension Activity	NCC/NSS/YRC/YWF	-	-	-	1
				Subtotal	30	26	4	26
V	III	34	Core – Paper VII	Morphology and Taxonomy of Angiosperms & Economic Botany	6	6	0	4
	III	35	Core – Paper VIII	Biochemistry & Bioinformatics	6	6	0	4
	III	36	Major Elective-1	Plant Biotechnology & Genetic Engineering/Environmental Biotechnology	5	5	0	4
	III	37	Major Elective - 2	Horticulture and Plant Breeding/Forestry	5	5	0	4
	III	38	Major Practical V, VI	Morphology and Taxonomy of Angiosperms, Economic Botany Biochemistry, Bioinformatics and Electives I & II	6	0	6	4
	IV	39	Skill Based III Common	Computer	2	2	0	2
				Subtotal	30	22	8	22
VI	III	40	Core Paper IX	Plant Physiology	6	6	0	4
	III	41	Core Paper X	Genetics, Evolution and Biostatistics	6	6	0	4
	III	42	Core Paper XI	Plant Ecology & Phytogeography	5	5	0	4
	III	43	Major Practical VII, VIII and IX	Plant Physiology, Genetics, Evolution, Biostatistics, Plant Ecology & Phytogeography	8	0	8	6
	III		Group Project		5			4
				Subtotal	30	17	13	22
Grand Total					180	143	37	145

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Botany) / Semester – I / Core – I

PLANT ANATOMY AND MICRO TECHNIQUES

(4 hrs/week)

UNIT –I

12Hrs

Meristems – Characteristics of meristematic tissues – Types, functions and Theories of meristems. Structure and functions of simple and permanent tissues – parenchyma, collenchyma, sclerenchyma, xylem and phloem.

UNIT – II

12Hrs

Structure of dicot stem and root, structure of monocot stem and root, structure of dicot and monocot leaves.

UNIT – III

12Hrs

Normal secondary thickening in dicot stem and root, anomalous secondary growth in the stem of *Boerhaavia* and *Dracaena*.

UNIT – IV

12Hrs

Nodal anatomy: Types of nodes – unilocular, trilocular and multilocular; leaf traces and leaf gaps; epidermal tissue system: stomatal types, hair, trichomes and glands.

UNIT – V

12Hrs

Microscopy: Principle and working of simple and compound light microscopes and electron microscope (TEM only). Micro techniques – simple staining, double staining and preparation of permanent slides – Maceration

PRACTICALS:

1. To observe and identify the following slides showing
 - a. Meristems – shoot apex and root apex
 - b. Simple tissues
 - c. Xylem elements
2. Primary structure of stem, root and leaves of dicot and monocot plant.
3. Normal secondary thickening in dicot stem and root.
4. Anomalous secondary growth in *Boerhaavia* and *Dracaena*.
5. Maceration technique (Xylem elements only)
6. Demonstration: Preparation of double stained permanent slides.

ALGAE AND BRYOPHYTES
(4 hrs/week)

UNIT –I **12Hrs**
General characters and classification of Algae based on Fritsch (1945), life cycle patterns of Algae, systematic position, distribution, structure, reproduction and life history of *Volvox* and *Caulerpa* .

UNIT – II **12Hrs**
Systematic position, distribution, structure, reproduction and life history of *Chara*, *Sargassum* and *Gracilaria*.

UNIT – III **12Hrs**
Seaweed cultivation – *Gracilaria*; Methods of extraction and uses of agar-agar and carrageenin; Economic importance of Algae.

UNIT – IV **12Hrs**
Morphology, mass culture and nutritive importance of *Spirulina*; Morphology, mass culture and economic importance of *Nostoc*.

UNIT – V **12Hrs**
General characters and classification of Bryophytes by Rothmaler (1951); systematic position, distribution, structure, reproduction and life history of *Marchantia*.

PRACTICALS

1. Study of morphology of the Algae and Bryophytes prescribed in the syllabus.
2. Make suitable micro preparations of the following:
 - a. *Caulerpa*– Rhizomeb. *Sargassum* - Stipe, leaf
 - c. *Gracilaria*–Thallus with cystocarpd. *Marchantia* – Thallus.
3. Observe and identify the microslides
 - a. *Volvox* - Vegetative colony, colony with daughter colonies and sexorgans.
 - b. *Chara* - Sex organs
 - c. *Sargassum* - Male and female conceptacles
 - d. *Gracilaria* - Thallus with cystocarp.
 - e. *Marchantia* – V.S of Gemma cup, V.S of Antheridiophore, V.S of Archegoniophore, V.S of Sporophyte
 - f. Algal Slides/ Tablet - *Spirulina*, *Nostoc*; BGA – fertilizer (packet);.
4. Field trip of minimum one day.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Botany) / Semester – I / Allied – I

Semester I / III
PLANT DIVERSITY AND MEDICINAL BOTANY
4hrs/week

UNIT – I

General characters and economic importance of Algae – Distribution, Structure and Life History of Volvox; General characters and economic importance of Fungi – Distribution, Structure and Life History of Polyporus

UNIT – II

General characters and classification of Lichens; Structure and Reproduction of Usnea. General characters of Bryophytes; Structure, Reproduction and Life History of Funaria.

UNIT – III

General characters of Pteridophytes; Structure, Reproduction and Life History of Lycopodium. General characteristics of Gymnosperms ; Structure, Reproduction and Life History of Pinus.

UNIT – IV

Bentham and Hooker's system of classification; Critical study of the following families: Rutaceae, Asclepiadaceae, Euphorbiaceae and Poaceae.

UNIT – V

Study of the following plants with reference to the morphology of the useful parts and their medicinal importance: *Aloe vera*, *Piper nigrum*, *Phyllanthusamarus*, *Coleus amboinicus* and *Catharanthusroseus*,.

Practical's

1. Assign the given plant to its family, giving reasons.
2. Dissect out and draw the floral parts of the plants belong to the families prescribed in the syllabus.
3. Make suitable micropreparations of Lycopodium stem, Pinus needle.
4. Identify and record the medicinal values and morphology of the useful parts of the plants prescribed in the syllabus.
5. Observe and identify the following specimens: Polyporus, Funaria, Lycopodium and Pinus –male and female cone.
6. Identify the slides showing mature anther, ovule, dicot embryo, Volvox, Nostoc, Yeast, Lycopodium - cone L.S and Funaria -capsule L.S.

FUNGI, PLANT PATHOLOGY AND LICHENOLOGY
(4 hrs/week)

UNIT I

12Hrs

General characters and classification of fungi based on Alexopoulos (1962). occurrence, systematic position, structure, reproduction and life cycle of *Albugo* and *Mucor*.

UNIT II

12Hrs

Occurrence, systematic position, structure, reproduction and life cycle of *Peziza* and *Puccinia*. Economic importance of fungi: Role of fungi in medicine, industry, agriculture, food and food products.

UNIT III

12Hrs

Study of the following plant diseases with special reference to the symptoms, etiology, dissemination and control measures: Tikka disease of groundnut, Red rot of sugarcane; Paddy blast.

UNIT IV

12Hrs

Study of the following plant diseases with special reference to the symptoms, etiology, dissemination and control measures: Citrus canker, Bunchy top disease of Banana and Tobacco Mosaic viral disease.

UNIT V

12Hrs

Lichens: General account, types and economic importance of Lichens. Structure and reproduction with special reference to *Usnea*.

PRACTICALS

1. Micro preparation and identification of *Peziza*, *Puccinia* and Lichen thallus.
2. Spotters:
 - i. Slides - *Albugo*, *Mucor*, *Usnea*- VS of apothecium, *Puccinia* – Uredosorus and Teleutosorus
 - ii. Disease infected leaves showing *Albugo* and *Puccinia*; *Usnea* habit
 - iii. Observe and identify the following Plant diseases.
 - a. Tikka disease of Groundnut
 - b. Red Rot of Sugarcane
 - c. Paddy Blast
 - d. Citrus Canker
 - e. Bunchy Top of Banana
 - f. Tobacco Mosaic Viral disease
5. Maintain a record note book.

**CELL BIOLOGY & EMBRYOLOGY OF ANGIOSPERMS
(4 hrs/week)**

UNIT I

Cell Biology: Structure of a Plant cell – prokaryotic and eukaryotic cell, structure and functions of cell wall, plasma membrane, endoplasmic reticulum and ribosome.

UNIT II

Structure and functions of Mitochondria, Chloroplast, Nucleus, Chromosome.

UNIT III

Non-living inclusions - cystolith, raphides, starch grains.

Cell Division: Mitosis and Meiosis.

UNIT IV

Embryology : Structure of Microsporangium, microsporogenesis, development of male gametophyte. Types and structure of megasporangium, Megasporogenesis, development of female gametophyte, Types of embryo sac: Monosporic – Polygonum type; Bisporic – Allium type; Tetra sporic - Peperomia type

UNIT V

Double fertilization, types of endosperm – nuclear, cellular and helobial; Ruminant endosperm. Structure and Development of dicot embryo (Capsella) and Polyembryony.

PRACTICALS

Cell Biology

1. Mitosis using Onion roots.
2. Electron micrographs of cell organelles – Chloroplast, Mitochondria and Nucleus.
3. Non-living inclusions – Starch grains, Cystolith and Raphides.

Embryology of Angiosperms

1. Dissect out any one stage of embryo.
2. Identification of slides/specimen/photographs showing the C.S of mature anther, Ovules-orthotropous and anatropous; dicot embryo and Polyembryony
3. Specimen – Ruminant endosperm

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Botany) / Semester-II / Allied –II

Semester II/IV

EMBRYOLOGY, PLANT ANATOMY, PHYSIOLOGY AND BIOTECHNOLOGY

4hrs/week

UNIT – I

Structure and development of microsporangium; Structure, types and development of megasporangium; Development of male and female gametophyte; Double fertilization, Endosperm – types, Structure of dicot embryo.

UNIT – II

Meristem - Structure and classification. Simple tissues, complex tissues; Primary structure of **Dicot** and Monocot stem and root; Structure of leaf; Normal secondary thickening in dicot stem.

UNIT – III

Absorption of water – diffusion, osmosis, imbibition, mechanism of absorption of water; Ascent of sap – (cohesion theory only); Transpiration – Types, Mechanism of stomatal transpiration (Starch – sugar hypothesis); Photosynthesis importance of photosynthesis, Mechanism of Photosynthesis – Light and dark reaction (Calvin cycle).

UNIT – IV

Nostoc - Morphology, Use as Biofertilizer and Mass cultivation; Structure, multiplication (budding and fission) and Mass culture of Yeast.

UNIT – V

Tissue Culture – Scope and importance - totipotency, Nutrient media(M.S medium) Callus and Meristem Culture; Applications of plant tissue culture.

**MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Botany) / Semester – II /
Allied Practical –II**

PRACTICAL – 2

EMBRYOLOGY, PLANT ANATOMY, PHYSIOLOGY AND BIOTECHNOLOGY

- 1) Dissect out young embryo from *Tridax* flower bud.
 - 2) Make suitable micro-preparations of dicot and monocot stem, root and leaf.
 - 3) Demonstrate the physiology experimental set up –Potato osmoscope, Ganong's light screen, Bell jar experiment
 - 4) Identify the Photograph/ Slide/ Specimen/setup - (i) *Nostoc* (ii) Yeast (iii) Callus culture, (iv) Meristem culture.
 - 6) Maintain a record note book for external and internal evaluation.
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