DEBRA THANA SAHID KSHUDIRAM SMRITI MAHAVIDYALAYA
Autonomous College (w.e.f 2024-25)
Re-accredited by NAAC with grade "A" (2nd Cycle)
Gangaramchak, P.O.: Chakshyampur, District: Paschim Medinipur, PIN: 721124.
(Affiliated to the Vidyasagar University)

PROPOSED CURRICULUM & SYLLABUS (DRAFT) OF

BACHELOR OF SCIENCE WITH BOTANY (MULTIDISCIPLINARY STUDIES)

3-YEAR UNDERGRADUATE PROGRAMME

(w.e.f. Academic Year 2024-2025)

Based on

Curriculum & Credit Framework for Undergraduate Programmes (CCFUP), 2023 & NEP, 2020

DTSKSM

BACHELOR OF SCIENCE IN LIFE SCIENCES with BOTANY

(*Under CCFUP, 2023*)

Level	YR.	SEM	Course Type	Course Code	Course Title	Credit	L-T-P	Marks		
								CA	ESE	TOTAL
B.Sc. in Life Sc. with Botany	2nd	III	**SEMESTER-III**							
			Major-A2	BOTPMJ02	**T: Morpho-Anatomy and Taxonomy of Plants; P: Practical** *(To be studied by students taken* **Chemistry** *as Discipline- A)*	4	3-0-1	15	60	75
			Major-A3	BOTPMJ03	**T: Cell Biology; P: Practical** *(To be studied by students taken* **Chemistry** *as Discipline- A)*	4	3-0-1	15	60	75
			SEC	SEC03	*To be taken from SEC-03 of Discipline C.*	3	0-0-3	10	40	50
			AEC	AEC03	Communicative English-2 (***common for all programmes***)	2	2-0-0	10	40	50
			MDC	MDC03	Multidisciplinary Course-3 (***to be chosen from the list***)	3	3-0-0	10	40	50
			Minor-3 (Disc.-C3)	BOTMIN03	**T: Plant Science-III; P: Practical** *(To be studied by students taken Chemistry as Discipline- C)*	4	3-0-1	15	60	75
					Semester-III Total	20				375

MJP = Major Programme (Multidisciplinary), MI = Minor, A/B = Choice of Major Discipline; C= Choice of Minor Discipline; SEC = Skill Enhancement Course, AEC = Ability Enhancement Course, MDC = Multidisciplinary Course, CA= Continuous Assessment, ESE= End Semester Examination, T = Theory, P= Practical, L-T-P = Lecture-Tutorial-Practical, MIL = Modern Indian Language

MAJOR (MJ)

MJ A2/B2: Plant Morphology and Taxonomy. **Credits 04 (Full Marks: 75)**

MJ A2/B2T: Plant Morphology and Taxonomy **Credits 03** **[45L]**

Course contents:

UNIT	Topic	No. of Lectures
1	**Plant morphology**- Types and modification of Roots, Stem and Leaves .	3
2	**Flower**- Inflorescences; types , Floral parts , Aestivation, Placentation , Floral formula, Floral diagram.	4
3	Fruits and Seeds ; types and dispersal	2
4	**Plants systematics** *; Hierarchy, concept of taxa , species concept , principle and rules of ICN, Nomenclature, Author ciatation, valid and effective publication ,Herbariun and Botanical Garden- concept and importance* **;** Brief concept about flora ,monographs ;Keys single and multi access.	5
5	Systems of classification, Overview of artificial, natural and phylogenetic classification; Classification system of Bentham and Hooker (up to series). Brief account of Angiosperm Phylogeny Group classification(APG); concept of basal angiosperm and eudicots; monophyly, polyphyly , phylogenetic tree, cladogram, dendrogram .	4
6	General descriptions of the given families:- Malvaceae, Fabaceae , Acanthaceae, Solanaceae , Asteraceae, Poaceae, Orchidaceae .	4

MJ-2P: Plant Morphology and Taxonomy II (Practical) **Credits 01**

Course Outline:

1. Study of leaf types.
2. Study of inflorescence types.

3. Study of fruit types:
   Berry: *Cucumis sativus*, *Capsicum annuum*, *Solanum melongena*
   Drupe: *Mangifera indica*, *Borasus flaballifer*
   Hesperidium: *Citrus*
   Nut: *Arachis hypogea*
4. Study of vegetative and floral characters of the following families
   Malvaceae – *Sida* sp. */ Abutilon* sp */ And locally available species* .
   Acanthaceae – *Ruellia* sp./*Barleria*
   Fabaceae – *Tephrosia* sp./*Crotalaria* sp.
   Solanaceae – *Solanum / Datura / and locally available sp.*

5.Herbarium preparation.

6.Field visit

MJ A3/B3: Cell Biology **Credits 04 (FM: 75)**

MJ A3/B3T: Cell Biology **Credits 03 [45L]**

Course contents:

Unit	Topic	lectures /Hours
1	**Cell as a unit of Life-** The Cell Theory – modern concept; endosymbiotic theory; Characteristics of Prokaryotic and eukaryotic cells; Cell size and shape; Eukaryotic Cell components.	08
2	**Cell Organelles-** Structure and function of cell organelles: Chloroplast, Mitochondria, Ribosomes, GERL system. **Cytoskeleton:** Component, structure, and functions. **Nucleus:** Component, structure and functions. **Cell Membrane:** Structure, Fluid mosaic Models, functions of membranes; The fluidity of membranes; Membrane proteins and their functions; Carbohydrates in the membrane; Selective permeability of the membranes; **Cell wall**: Gross and ultra structure, origin, chemical compositions and functions.	25
3	**Cell division-** Mitosis and meiosis- stages and significance, synaptonemal complex. **Cell Cycle-** Stages, check points and regulations.	12

MJ A3/B3P: Practical **Credits 01**

Course Outline:

1. Study of electron micrographs of prokaryotic cells and eukaryotic cells
2. Study of the photomicrographs of cell organelles.
3. To study the structure of plant cell through temporary mounts.
4. Measure the cell size by micrometry
5. Study of mitosis by squash method from onion root tips.
6. Study of meiosis (permanent slides).
6. Study the effect of temperature on semi permeable membrane.
7. Study of plasmolysis and deplasmolysis on Rhoeo leaf.

MINOR (MI)

MI-3/C3: Same as Minor-1 (BOTMIN03) of Botany (Hons) programme **Credits 04**
Full Marks: 75

SKILL ENHANCEMENT COURSE (SEC)

(To be studied by students taken Botany as Discipline- C)

SEC-03 P: Same as SEC-03 (BOTSEC03) of Botany (Hons) programme **Credits 03**
Full Marks: 50

MI-4: Plant Science IV **Credits 04 (Full Marks: 75)**

MI-4T: Plant Science IV **Credits 03** **[45L]**

Economic Botany, Anatomy and Pharmacognosy

Course contents:

UNIT	Topic	No. of Lectures
1	**Origin of Cultivated Plants-** Concept of centres of origin, their importance with reference to Vavilov's work.	5
2	**Cereals-**Wheat -Origin, morphology, uses. **Legumes-** General account with special reference to Gram and soybean. **Spices-** General account with special reference to clove and black pepper (Botanical name, family, part used, morphology and uses). **Beverages-**Tea and coffee (morphology, processing, uses). **Oils and Fats-** General description with special reference to groundnut. **Fibre Yielding Plants-** General description with special reference to Cotton and Jute (Botanical name, family, part used, morphology and uses)	15
3	**Pharmacognosy:** Definition, Importance, Classification of drug - Chemical and Phannacological, Drug evaluation. Organoleptic and microscopic studies with reference to nature of active principles and common adulterants of *Alstonia* (bark), *Adhatoda*(leaf), *Strychnos*(seed), *Rauvolfia* (root), and *Zinziber* (rhizome). Secondary Metabolites: Definition of primary and secondary metabolites and their differences, major types - terpenes, phenolics and alkaloids. A brief idea about extraction of alkaloids.	15
4	**Structure and Development of Plant Body:** Tissue systems, primary structure of root, stem, and leaf; types of stomata, Types of vascular bundles; Secondary growth in root and stem, Sapwood and heartwood; Ring and diffuse porous wood; Early and late wood; Annual ring; periderm and lenticels.	10

MI-4P: Plant Science IV (Practical) **Credits 01**

Course Outline:

1. Study of economically important plant: Wheat, Gram, Soybean, Black pepper, Clove Tea, Cotton, Groundnut through specimens, sections and microchemical tests.
2. Organoleptic and powder microscopy of *Alstonia*bark, *Adhatoda* leaf, *Strychnos* seed and *Zinziber* rhizome.
3. Chemical tests for Tannin (*Terminalia chebula*) and Alkaloid (*Catharanthus roseus*).
4. Anatomical study of root and stem (monocot and dicot).
5. Anatomical study of leaf and stomata (monocot and dicot).

SKILL ENHANCEMENT COURSE (SEC)

SEC 3: Mushroom Cultivation Technology **Credits 03**

SEC3P: Mushroom Cultivation Technology **Full Marks:**

50 Course Outline:

Unit 1: Introduction, history. Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms. Types of edible mushrooms available in India - *Volvariella volvacea, Pleurotus citrinopileatus, Agaricus bisporus*.

Unit 2: Cultivation Technology: Infrastructure: substrates (locally available) Polythene bag, vessels, Inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Pure culture: Medium, sterilization, preparation of spawn, multiplication. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves. Factors affecting the mushroom bed preparation - Low cost technology, Composting technology in mushroom production.

Unit 3: Storage and nutrition: Short-term storage (Refrigeration - upto 24 hours) Long term Storage (canning, pickels, papads), drying, storage in saltsolutions. Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content - Vitamins.

Unit 4: Food Preparation: Types of foods prepared from mushroom.Research Centres - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value.

Suggested Readings:

1. Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R (1991) Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
2. Swaminathan, M. (1990) Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.
3. Tewari, Pankaj Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi.
4. Nita Bahl (1984-1988) Hand book of Mushrooms, II Edition, Vol. I & Vol. II.