

**Teaching Plan Academic Session: 2025-26**  
**Department of Botany**  
**Jagannath Barooah College (Autonomous), Jorhat**

**Name of the Teacher: Mrittika Das**

**Semester: ODD & EVEN (UG and PG)**

<b>Class/Semester</b>	<b>Title &amp; Code of The Paper Allotted (Credit)</b>	<b>Method of Teaching</b>	<b>Teaching Material</b>	<b>Unit</b>	<b>Topic</b>	<b>Period/Hours Required</b>	<b>Details of the Contents</b>	<b>Remarks / Books</b>
UG, Semester I (Odd)	Phycology and Microbiology  BOTMJ-011, Credits: 4	Discussion, Chalk and Board, PPT	Text-book, Reference books, diagrams	Unit 1	Introduction to the microbial world	3	Microbial nutrition, growth, and metabolism	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA
UG, Semester I (Odd)	Phycology and Microbiology  BOTMJ-011, Credits: 4	Discussion, Chalk and Board, PPT	Text-book, Reference books, diagrams	Unit 5	Cyanophyta and Xanthophyta	6	Ecology and occurrence; Range of thallus organization; Cell structure; Reproduction, Morphology and life-cycle of Nostoc and Vaucheria. .	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA
UG, Semester I (Odd)	BOTMI-011, Credits: 4	Discussion, Chalk and Board, PPT	Text-book, Reference books, diagrams	Unit 1	Introduction to the microbial world	3	Microbial nutrition, growth, and metabolism	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA

UG, Semester I (Odd)	BOTMI-011, Credits: 4	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 5	Cyano-phyta and Xantho-phyta	6	Ecology and occurrence; Range of thallus organization; Cell structure; Reproduction, Morphology and life-cycle of Nostoc and Vaucheria. .	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA
UG, Semester I (Odd)	Basic of Botany, BOTMD-011, Credits:03	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 3	Structural Organisation in Plants:	8	Tissues in plants, Morphology, anatomy, and functions of different parts of flowering plants: Roots, stem, leaf, inflorescence, flower, fruits, and seed.	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA
UG, Semester I (Odd)	Basic of Botany, BOTMD-011, Credits:03	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 4	Plant Propagation	7	Sexual, Asexual or Vegetative Propagation, Artificial methods of propagation (fundamental ideas only)	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA

UG, Semester I (Odd)	Biofertilizers, BOTSEC01, Credits:03	Discussion, Chalk and Board, PPT	Text-book, Reference books, diagrams	Unit 1	-----	10	Factors affecting plant growth; essential nutrients; General account about the microbes used as bio-fertilizers – (nitrogen fixers, phosphate solubilizers, PGPR) bio-control agents.	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA, Biofertilizer and organic farming by npcs
UG, Semester III (Odd)	Mycology and Phytopathology, BOTMJ-031, Credits :04	Discussion, Chalk and Board, PPT	Text-book, Reference books, diagrams	Unit 1	Introduction to true fungi	8	General characteristics; Affinities with plants and animals; Thallus organization; Cell wall composition; Nutrition; Classification.	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA
UG, Semester III (Odd)	Mycology and Phytopathology, BOTMJ-031, Credits :04	Discussion, Chalk and Board, PPT	Text-book, Reference books, diagrams	Unit 2	Chytridiomycota and Zygomycota	6	Characteristic features; Ecology and significance; Thallus organisation; Reproduction; Life cycle with reference to Synchytrium, Rhizopus	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA

UG, Semester III (Odd)	Biomolecules and cell biology, BOTMJ-032, Credits: 04	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 1	Biomolecules	10	Types and significance of chemical bonds; Structure and properties of water; pH and buffers. Carbohydrates: Nomenclature and classification Lipids: Definition and major classes of storage and structural lipids; Fatty acids structure and functions; Essential fatty acids; Triacyl glycerols structure, functions and properties; Phosphoglycerides. Proteins: Structure of amino acids; Levels of protein structure, secondary, tertiary and quaternary; Protein denaturation and biological roles of proteins	Biochemistry by U Satyanarayan, Lehninger's Biochemistry, Cooper Cell biology
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UG, Semester III (Odd)	Morphology and anatomy of angiosperms, BOTMJ-033, Credits: 04	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 3	Tissues	10	cytodifferentiation of tracheary elements and sieve elements; Pits and plasmodesmata; Wall ingrowths and transfer cells, Ergastic substances. Hydathodes, cavities, lithocysts and laticifers.	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA
UG, Semester III (Odd)	Morphology and anatomy of angiosperms, BOTMJ-033, Credits: 04	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 4	Structure and Development of Plant Body	8	Internal organization of plant body: The three tissue systems, Development of plant body: Polarity, Cytodifferentiation, and organogenesis during embryonic development.	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA
UG, Semester III (Odd)	Mycology and Phytopathology, BOTMI-031, Credits :04	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 1	Introduction to true fungi	8	General characteristics; Affinities with plants and animals; Thallus organization; Cell wall	Studies in Botany, College Botany by S. Chand, A textbook of botany by NCBA

							composi- tion; Nutri- tion; Classi- fication.	
UG, Se- mester III (Odd)	Mycology and Phyto- pathology, BOTMI- 031, Cred- its :04	Discus- sion, Chalk and Board, PPT	Text- book, Refer- ence books, dia- grams	Unit 2	Chytridi omycota and Zy- gomy- cota	6	Characteris- tic features; Ecology and significance; Thallus or- ganisation; Reproduc- tion; Life cycle with reference to Synchytriu m, Rhizopus	Studies in Botany, College Botany by S. Chand publica- tion, A textbook of botany by NCBA publication
UG, Se- mester V (Odd)	Reproduc- tive biology of angio- sperms, BOT MJ- 052, Cred- its: 04	Discus- sion, Chalk and Board, PPT	Text- book, Refer- ence books, dia- grams	Unit 3	Anther and pol- len biol- ogy	12	Anther wall: Structure and func- tions, micro- sporogene- sis, callose deposition and its sig- nificance. Microgam- etogenesis; Pollen wall structure, MGU (male germ unit) structure, NPC sys- tem; Paly- nology and scope (a brief ac- count); Pol- len wall pro- teins; Pollen viability, storage and germination; Abnormal features:	The em- bryology of angio- sperms by Bhojwani <i>et al</i>

							Pseudo-monads, polyads, massulae, pollinia.	
UG, Semester V (Odd)	Plant physiology, BOT MJ-053, Credits: 04	Discussion, Chalk and Board, PPT	Text-book, Reference books, diagrams	Unit 2	Mineral nutrition	8	Essential and beneficial elements, macro and micronutrients, methods of study and use of nutrient solutions, criteria for essentiality, mineral deficiency symptoms, roles of essential elements, chelating agents.	Studies in Botany, College Botany by S. Chand publication, A textbook of botany by NCBA publication
UG, Semester V (Odd)	Biostatistics, BOTMJ-054 Credits: 04	Discussion, Chalk and Board, PPT	Text-book, Reference books, diagrams	Unit 2	Collection of data primary and secondary	10	Types and methods of data collection procedures - merits and demerits. Classification - tabulation and presentation of data – Sampling methods	Elementary biostatistics by S. P. Biswas
UG, Semester V (Odd)	Biostatistics, BOTMJ-054 Credits: 04	Discussion, Chalk and	Text-book, Reference books,	Unit 5	Statistical inference	5	Hypothesis - simple hypothesis - student 't'	Elementary biostatistics by S. P. Biswas

		Board, PPT	dia-grams				test - chi-square test.	
UG, Semester V (Odd)	Plant ecology and Taxonomy, BOTMI-051; Credits: 04	Discussion, Chalk and Board, PPT	Text-book, Reference books, dia-grams	Unit 5	Identification	5	Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access	Plant taxonomy by O P Sharma
UG, Semester II (Even)	Archae-goniates, BOTMJ-021, Credits: 04	Discussion, Chalk and Board, PPT	Text-book, Reference books, dia-grams	Unit 1	Introduction	5	Unifying features of archae-goniates, transition to land habit, alternation of generations	Studies in Botany, College Botany by S. Chand publication, A textbook of botany by NCBA publication
UG, Semester IV (Even)	Economic botany, BOTMJ-041, Credits: 04	Discussion, Chalk and Board, PPT	Text-book, Reference books, dia-grams	Unit 4	Sources of sugars and starches :	3	Morphology and processing of sugarcane, products and by products of the sugarcane industry. Potato – morphology, propagation & uses	Studies in Botany, College Botany by S. Chand publication, A textbook of botany by NCBA publication
UG Semester IV (Even)	Basic of genetics, BOTMJ-	Discussion, Chalk and	Text-book, Reference books,	Unit 3	Link-age, crossing over and	10	Linkage and crossing over-Cytological basis of crossing	Cell biology, genetics, molecular biology by S.



	042 Credits: 04	Board, PPT	diagrams		chromosome mapping		over; Recombination frequency, two factor and three-factor crosses; Interference and coincidence; Numerical based on gene mapping; Sex Linkage.	Chand publication,
UG Semester IV (Even)	Basic of genetics, BOTMJ-042 Credits: 04	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 5	Gene mutations	8	Types of mutations; Molecular basis of Mutations; Mutagens – physical and chemical (Base analogs, deaminating, alkylating, and intercalating agents); Detection of mutations: ClB method. Role of Transposons in Mutation. DNA repair mechanisms	Cell biology, genetics, molecular biology by S. Chand publication,
UG, Semester IV (Even)	Molecular Biology, BOTMJ-043, Credits: 04	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 7	Translation	8	Ribosome structure and assembly, mRNA; Charging of tRNA, aminoacyl tRNA	Cell biology, genetics, molecular biology by S. Chand publication,

							<p>synthetases; Various steps in protein synthesis, proteins involved in initiation, elongation, and termination of polypeptides; Fidelity of translation; Inhibitors of protein synthesis; post-translational modifications of proteins.</p>	<p>Lehninger's biochemistry, Cooper's cell biology, Biochemistry by U Satyanarayan</p>
UG Semester IV (Even)	Plant Breeding, BOTMJ-044, Credits: 04	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 2	Methods of crop improvement	10	<p>plant genetic resources; Acclimatization; Selection methods: For self-pollinated, cross pollinated and vegetatively propagated plants; Hybridization: For self, cross and vegetatively propagated plants – Procedure, advantages, and limitations.</p>	Plant breeding by B D Singh

UG Semester IV (Even)	Genetics and Plant Breeding, BOTMI - 044, Credits: 04	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 3	Plant Breeding	10	Plant genetic resources; Acclimatization; Selection methods : for self-pollination, cross pollination and vegetative propagation in plants; Hybridization : For self, cross and vegetative propagation in plants – procedure, advantages and limitations; Quantitative inheritance concept, mechanism, examples of inheritance of Kernel colour in wheat, Monogenic vs polygenic inheritance; inbreeding depression and heterosis, history, genetic basis of inbreeding depression and heterosis; Applications, crop	Plant breeding by B D Singh
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							improvement and breeding role of mutations; polyploidy; Distant hybridization and role of biotechnology in crop improvement.	
PG, Semester I	Morphology, Anatomy, and Embryology of Angiosperms, BOTC-103, Credits: 04	Discussion, Chalk and Board, PPT	Textbook, Reference books, diagrams	Unit 2	Plant tissue system	20	Meristems, their classification, functions, organization of root and shoot apices. Structure of xylem and phloem. Procambium vs. vascular cambium; factors influencing the activity of vascular cambium; Transition from root to stem. Primary and secondary growth, anomalous structure, and abnormal secondary growth in stems. Application of anatomy in	Studies in Botany, College Botany by S. Chand publication, A textbook of botany by NCBA publication

							systematics, archaeology, and climate change studies, current trends and prospects in plant anatomy	
PG, Semester II	Cytogenetics , Plant Breeding & Evolution, PBOTC203 , Credits: 04	Discussion, Chalk and Board, PPT	Text-book, Reference books, diagrams	Unit 3	-----	18	Transcriptional regulation in prokaryotes, operon system for lactose, tryptophan, and arabinose metabolism; Mutation at molecular level, spontaneous, reverse, and suppressor mutations, transposable genetic elements, DNA damage and repair; in-born errors of metabolism, metabolic pathways, overview of the metabolic basis of inherited diseases	Cell biology, genetics, molecular biology by S. Chand publication, Lehninger's biochemistry, Cooper's cell biology, Biochemistry by U Satyanarayan