

Mizoram University

UG/Bachelor's Degree Programme with Multiple Entry and Exit Options

Under the New Education Policy 2020

in

Botany

First Semester

Semester	Course Code	Course Name	Components with Credits		Total credits
			Theory	Practical	
I	BOT/MJ/100	Phycology and Microbiology	3	1	4
	BOT/MJ/101	Biomolecules and Cell Biology	4	-	4
	BOT/MN/102	[To be chosen from an MJ course offered by other disciplines]	4	-	4
		Introductory Course (Interdisciplinary)	3	-	3
	AEC/103	MIL/English I	3	-	3
	VAC/104	Understanding India	2	-	2
					20

Phycology and Microbiology

BOT/MJ/100

Credits: 3 (Theory) + 1 (Practical)

Theory

- Unit 1 Introduction to microbial world: Microbial nutrition, nutritional types and growth. Economic importance of viruses with reference to vaccine production, medicine, as causal organisms of plant diseases. Economic importance of bacteria with reference to their role in agriculture and industry (fermentation and medicine).
- Unit 2 Viruses and Bacteria: General characteristics; classification (Baltimore), structure and replication of DNA virus, lytic and lysogenic cycle; RNA virus (TMV). General characteristics; Archaeobacteria, Eubacteria, wall-less forms (mycoplasmas); Reproduction and recombination (conjugation, transformation and transduction).
- Unit 3 Algae, Cyanophyta and Xanthophyta: Life histories of algae; Classification (by Fritsch); Algal cell structure; Algal evolution; Ecology and occurrence, Range of thallus organization, Cell structure, Reproduction and Life Cycles of *Nostoc*, *Spirulina* and *Vaucheria*.
- Unit 4 Chlorophyta, Phaeophyta and Rhodophyta: General characteristics of Chlorophyta, Phaeophyta and Rhodophyta; Ecology and occurrence, Range of thallus organization, Cell structure, Reproduction and Life Cycles of *Volvox*, *Chara*, *Ectocarpus* and *Polysiphonia*. Economic importance of algae.

Practical

1. Electron micrographs/Models of viruses – T4 and TMV, Line drawings/ Photographs of Lytic and Lysogenic Cycle.
2. Types of Bacteria from temporary/permanent slides/photographs. Electron micrographs or charts of bacteria, binary fission, endospore, conjugation.
3. Gram-staining of root nodule and curd.
4. Micrometry and counting of cells by Haemocytometer
5. Microscopic observation of vegetative and reproductive structures of *Nostoc*, *Volvox*, *Chara*, *Vaucheria*, *Ectocarpus* and *Polysiphonia*,

Mark distribution of practical for end semester examination

1. Experiment 1	5
2. Experiment 2	5
3. Minor experiment	3
4. Laboratory record	3
5. Viva voce	4
TOTAL	20

Suggested Readings

1. Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4th edition.
2. Wiley, J.M, Sherwood, L.M. and Woolverton, C.J. (2013). Prescott's Microbiology. 9th Edition. McGraw Hill International.
3. Campbell, N.A., Reece, J.B., Urry, L.A., Cain, M.L., Wasserman, S.A., Minorsky P.V. and Jackson, R.B. (2008). Biology, 8th edition. Pearson Benjamin Cummings, USA.
4. Pelczar, M.J. (2001). Microbiology, 5th edition, Tata McGraw-Hill Co, New Delhi.
5. Mukherji, H. (2005). Plant groups. New Central Book Agency, Calcutta.
6. Hait G, Bhattacharya K, Ghosh AK (2020). Textbook of Botany Vol I. New Central Book Agency, Kolkata.

Biomolecules and Cell Biology

BOT/MJ/101

Credits: 4

Unit 1 Carbohydrates, Lipids and Proteins: Structure and classification of carbohydrates (monosaccharides, disaccharides, oligosaccharides and polysaccharides), lipids and proteins.

Unit 2 Enzymes, Nucleic acids and ATP: Classification, nomenclature and mechanism of action of enzymes; Structure and function of different types of nucleic acids; Structure of ATP.

Unit 3 Cell Biology – I: Cell as a unit of structure and function; Characteristics of prokaryotic and eukaryotic cells; Overview of membrane function; fluid mosaic model; Chemical composition of membranes; endocytosis and exocytosis. Nucleus: Structure-nuclear envelope, nuclear pore complex, nuclear lamina, molecular organization of chromatin; nucleolus.

Unit 4 Cell Biology – II: Cytoskeleton: Role and structure of microtubules, microfilaments and intermediary filament; Structural organization and Function of chloroplast, mitochondria and peroxisomes; Endoplasmic Reticulum – Types and Structure.

Suggested Readings

1. G.M. Cooper. (2015). The cell: A Molecular Approach. 7th Edition. Sinauer Associates.
2. Alberts, B., Johnson, A.D., Lewis, J., Morgan, D., Raff, M., Roberts, K., Walter, P. (2014). Molecular Biology of Cell. 6th Edition. WW. Norton & Co.
3. Campbell, M.K. (2012) Biochemistry, 7th ed., Published by Cengage Learning.
4. Nelson, D.L. and Cox, M.M. (2008). Lehninger Principles of Biochemistry, 5th Edition., W.H. Freeman and Company.
5. Karp, G. (2010). Cell Biology, John Wiley & Sons, U.S.A. 6th edition. 9. Hardin, J., Becker, G., Skliensmith, L.J. (2012). Becker's World of the Cell. 8th edition. Pearson Education Inc. U.S.A.