

SEMESTER -I**MDC-1 (T): Phycology and Microbiology****Course Objective**

This Course aims to enhance the knowledge of Algae and Microbes. Algae have significant importance in industry and also used as food and fodder. As microbes are everywhere and affect almost all aspects of our lives, the study of microbes is necessary.

Course Outcomes

After the completion of the course, the students will be able to:

- CO1:** Classify the plant kingdom
CO2: Describe the diversity, structure and importance of viruses and bacteria
CO3: Describe the general account of mycoplasma
CO4: Explain the thallus organization, economic importance and the life cycle of various algae

MDC-1 (T) Phycology and Microbiology (Theory: 2 credits)		
Unit	Topics to be covered	No. of Lectures
1	Algae: Characteristics, Morphology and life cycle of <i>Nostoc</i> , <i>Oedogonium</i> and <i>Chara</i>	07
2	Virus- Discovery and General Structure, DNA Virus (Bacteriophage)-Structure and its replication (Lytic and Lysogenic Cycle), RNA Virus (TMV), Economic importance of Viruses.	06
3	Bacteria – Discovery, Characteristics and cell structure, Reproduction- Vegetative, asexual and genetic recombination (Conjugation, Transformation and Transduction), Economic importance of Bacteria.	07
TOTAL		20

Suggested Readings:

1. Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4th edition.
2. Prescott, L.M., Harley J.P., Klein D.A. (2005). Microbiology, McGraw Hill, India. 6th edition
3. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West Press, Delhi.
4. Campbell, N.A., Reece J.B., Urry L.A., Cain M.L., Wasserman S.A., Minorsky P.V., Jackson R.B. (2008). Biology, Pearson Benjamin Cummings, USA. 8th edition.
5. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata McGraw-Hill Co, New Delhi.
6. Vashishtha, B.R., Sinha, A.K. Singh, V.P. (2010). Botany for degree students: Algae, S. Chand & Company Ltd. 2nd edition
7. Srivastava, H.N. (2005). Algae, Pradeep Publication. 12th edition.
8. Dubey R.C., Maheshwari D.K. (2005). A Text Book of Microbiology, S. Chand & Company Ltd. 2nd edition.

MDC-1(P) Phycology and Microbiology (Practical: 1 credit)	No. of Classes
(c) Algae- Study of Vegetative and reproductive structures of the forms prescribed in the syllabus through temporary slides preparation. (d) Models and microphotographs of viruses and bacteria.	20






SEMESTER -II

MDC-2 (T): Bio molecules and Cell Biology

Course Objective

Students should be able to understand the Micromolecules. The accurate measurement and monitoring of the concentration of specific Bio molecules in a living system are crucial to ensure the well-being of the cells and living organism.

Course Outcomes

After the completion of the course, the student will be able to:

- CO1:** Describe the structure and properties of bio molecules
- CO2:** Explain the classification, properties and functions of enzymes
- CO3:** Describe cell wall, cell membrane and the structure, chemistry and functions of cellular organelles
- CO4:** Explain the eukaryotic cell cycle, mitotic and meiotic cell divisions; and regulation of cell cycle

MDC 2 (T) Bio molecules and Cell Biology (Theory: 2 credits)		
Unit	Topics to be covered	No. of Lectures
1	Bio molecules- Structure, classification and function of Carbohydrates, Amino acids, Protein	06
2	Enzymes- Nomenclature, Classification, mode of action	04
3	Cell Biology- a. Structure of the cell as seen under Electron Microscope b. Characteristics of Prokaryotic & Eukaryotic Cells c. Structure of Chromosome d. Mitosis and meiosis	10
TOTAL		20

Suggested Readings:

1. Campbell, MK (2012) Biochemistry, 7th ed., Published by Cengage Learning.
2. Campbell, PN and Smith AD (2011) Bio chemistry Illustrated, 4th ed., Published by Churchill Living stone.
3. Tymoczko JL, Berg JM and Stryer L (2012) Biochemistry: A short course, 2nd ed., W.H.Freeman
4. Berg JM, Tymoczko JL and Stryer L (2011) Bio chemistry, W.H. Freeman and Company.
5. Nelson DL and Cox MM (2008) Lehninger Principles of Biochemistry, 5th Edition., W.H. Freeman and Company.
6. Karp, G. (2010). Cell Biology, John Wiley & Sons, U.S.A .6th edition.
7. Hardin, J., Becker, G.,S Kliensmith, L.J.(2012). Becker's World of the Cell, Pearson Education Inc. U.S.A. 8th edition.
8. Cooper, G.M .and Hausman, R.E.(2009)The Cell: A Molecular Approach, 5thedition. ASM.
9. Becker, W.M.,Kleinsmith,L.J.,Hardin.J.andBertoni,G.P.(2009)TheWorld of the Cell 7th edition. Pearson Benjamin Cummings Publishing, San Francisco.

MDC-2 (P) Bio molecules and Cell Biology (Practical: 1 credit)	No. of Classes
1. Estimation of Carbohydrates, Amino acid and Protein 2. Study of different stages of mitosis and meiosis	20

Suggested Readings :

1. Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, John Wiley & Sons (Asia) Singapore. 4th edition.
2. Webster, J. and Weber, R. (2007). Introduction to Fungi, Cambridge University Press, Cambridge. 3rd edition.
3. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi and Their Allies, Macmillan Publishers India Ltd.
4. Sharma, P.D. (2011). Plant Pathology, Rastogi Publication, Meerut, India.
5. Vashishtha, B.R. Sinha, A.K. (2005). Botany for degree Students Part II, S. Chand & Company Ltd. 2nd edition.
6. Bilgrami, K.S. Dubey, H.C. (2005). A text book of Modern Plant Pathology, Vikas Publishing Home Pvt. Ltd. 2nd edition.

MIC-3 (P)	Mycology and Phytopathology (Practical: 1 credit)	No. of Classes
Practical :		20
1. Photographs of above mentioned diseases.		
2. Temporary slide preparation of diseases studied in theory		

MDC-3: Horticultural Practices**Course Objective**

The course will let the students understand the basic scope and importance of horticulture and gain in-depth knowledge of various fruits, vegetables and ornamental plants.

Course Outcomes

After the completion of the course, the student will be able to:

- CO1: Understand the scope and importance of horticulture
 CO2: Obtain knowledge of different fruits, vegetables and ornamental plants.
 CO3: Know the basics of horticulture practices for fruits, vegetables and ornamental plants
 CO4: Understand the importance of Post-harvest technology.

MIC-10 Horticultural Practices (Theory: 3 credits)		
Unit	Topics to be covered	No. of Lectures
1	Introduction: Scope and importance, Branches of horticulture; Role in rural economy and employment generation; Urban horticulture and ecotourism.	06
2	Ornamental plants: Types, classification (annuals, perennials, climbers and trees); Identification and salient features of some ornamental plants [rose, marigold, carnations, cacti and succulents] Fruit and vegetable crops: Production, origin and distribution; Description of plants and their economic products; Management and marketing of vegetable and fruit crops; Identification of some fruits and vegetable varieties banana, mango, chillies and cucurbits).	12
3	Horticultural techniques: Application of manure, fertilizers, nutrients and PGRs; Weed control; Biofertilizers, biopesticides; Irrigation methods (drip irrigation, surface irrigation, furrow and border irrigation); Propagation Methods: asexual (grafting, cutting, layering, budding)	12
	TOTAL	30

Suggested Readings :

1. Singh, D. & Manivannan, S. (2009). Genetic Resources of Horticultural Crops. Ridhi International, Delhi, India.
2. Swaminathan, M.S. and Kochhar, S.L. (2007). Groves of Beauty and Plenty: An Atlas of Major Flowering Trees in India. Macmillan Publishers, India.
3. NIIR Board (2005). Cultivation of Fruits, Vegetables and Floriculture. National Institute of Industrial Research Board, Delhi.
4. Kader, A.A. (2002). Post-Harvest Technology of Horticultural Crops. UCANR Publications, USA

SEMESTER – IV**MJC-5 (T): Morphology and Anatomy****Course Objective**

This course will introduce the concept of tissue system, its relevance and presence in the plant body. Students will also acquire knowledge about normal and anomalous secondary growth in plant system. Tissue organization in relation to environment will be studied. Students will acquire the knowledge about the morphological features of plant.

Course Outcomes

After the completion of the course, the student will be able to:

- CO1: Know the morphological characters of plants.
 CO2: Understand the tissue system and the normal as well as anomalous secondary growth in plants.
 CO3: Learn about the structural adaptations in plants growing in different environmental conditions
 CO4: Describe the structure and function of periderm

MJC-5 (T) Morphology and Anatomy (Theory: 3 credits)		
Unit	Topics to be covered	No. of Lectures
1	Brief account of inflorescence, flowers, fruits and seeds	08
2	Meristem and permanent tissue; Root and shoot meristem, simple and complex tissue Mechanical Tissues – Structure, distribution and function	10
3	Normal secondary growth; Anomalous secondary growth in <i>Tinospora</i> , <i>Bignonia</i> , <i>Boerhaavia</i> , and <i>Dracaena</i>	10
4	Organization of tissue in relation to environment: Hydrophytes, Xerophytes, Halophytes and Epiphytes Periderm – Origin, structure and function	12
TOTAL		40

Suggested Readings:

1. Dickison, W.C. (2000). Integrative Plant Anatomy, Harcourt Academic Press, USA.
2. Fahn, A. (1974). Plant Anatomy, Pergmon Press, USA.
3. Mauseth, J.D. (1988). Plant Anatomy, The Benjamin/Cummings Publisher, USA.
4. Esau, K. (1977). Anatomy of Seed Plants, John Wiley & Sons, Inc., Delhi.
5. Vasishtha, P.C. (2004). Plant Anatomy, Pradeep Publication. 17th edition.
6. Grewal, R.C. (2011). Plant Anatomy, Campus Book International. 1st edition.
7. Singh S.K. Srivastava. S. (2014). Anatomy of angiosperms, Campus Books International. 1st edition.