

**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

<b>MDC-1 (T) Phycology and Microbiology (Theory: 2 credits)</b>		
<b>Unit</b>	<b>Topics to be covered</b>	<b>No. of Lectures</b>
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
<b>TOTAL</b>		<b>20</b>

**Suggested Readings:**

1. Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4<sup>th</sup> edition.
2. Prescott, L.M., Harley J.P., Klein D.A. (2005). Microbiology, McGraw Hill, India. 6<sup>th</sup> 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. 8<sup>th</sup> edition.
5. Pelczar, M.J. (2001) Microbiology, 5<sup>th</sup> 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. 2<sup>nd</sup> edition
7. Srivastava, H.N. (2005). Algae, Pradeep Publication. 12<sup>th</sup> edition.
8. Dubey R.C., Maheshwari D.K. (2005). A Text Book of Microbiology, S. Chand & Company Ltd. 2<sup>nd</sup> edition.

<b>MDC-1(P) Phycology and Microbiology (Practical: 1 credit)</b>	<b>No. of Classes</b>
(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.	<b>20</b>






## 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

<b>MDC 2 (T) Bio molecules and Cell Biology (Theory: 2 credits)</b>		
<b>Unit</b>	<b>Topics to be covered</b>	<b>No. of Lectures</b>
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
<b>TOTAL</b>		<b>20</b>

#### **Suggested Readings:**

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

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



**Suggested Readings :**

1. Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, John Wiley & Sons (Asia) Singapore. 4<sup>th</sup> edition.
2. Webster, J. and Weber, R. (2007). Introduction to Fungi, Cambridge University Press, Cambridge. 3<sup>rd</sup> 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. 2<sup>nd</sup> edition.
6. Bilgrami, K.S. Dubey, H.C. (2005). A text book of Modern Plant Pathology, Vikas Publishing Home Pvt. Ltd. 2<sup>nd</sup> edition.

MIC-3 (P)	Mycology and Phytopathology (Practical: 1 credit)	No. of Classes
<b>Practical :</b>		<b>20</b>
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	<b>Introduction:</b> Scope and importance, Branches of horticulture; Role in rural economy and employment generation; Urban horticulture and ecotourism.	06
2	<b>Ornamental plants:</b> Types, classification (annuals, perennials, climbers and trees); Identification and salient features of some ornamental plants [rose, marigold, carnations, cacti and succulents] <b>Fruit and vegetable crops:</b> 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	<b>Horticultural techniques:</b> 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
<b>TOTAL</b>		<b>30</b>

**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
<b>TOTAL</b>		<b>40</b>

**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. 17<sup>th</sup> edition.
6. Grewal, R.C. (2011). Plant Anatomy, Campus Book International. 1<sup>st</sup> edition.
7. Singh S.K. Srivastava. S. (2014). Anatomy of angiosperms, Campus Books International. 1<sup>st</sup> edition.