

**SEMESTER -I****MIC-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>MIC-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, McGrawHill, 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>MIC-1 (P) Phycology and Microbiology (Practical: 1 credit)</b>	<b>No. of Classes</b>
(a) Algae- Study of Vegetative and reproductive structures of the forms prescribed in the syllabus through temporary slides preparation. (b) Models and microphotographs of viruses and bacteria.	<b>20</b>

## SEMESTER -II

### **MIC-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>MIC 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 a. Characteristics of Prokaryotic & Eukaryotic Cells b. Structure of Chromosome c. 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. and Bertoni, G.P.(2009) The World of the Cell 7<sup>th</sup> edition. Pearson Benjamin Cummings Publishing, San Francisco.

<b>MIC-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. Vander-Poorteri 2009 Introduction to Bryophytes, COP.
2. Vashistha, P.C., Sinha, A.K., Kumar, A. (2010). Pteridophyta, S. Chand. Delhi, India.
3. Bhatnagar, S.P. & Moitra, A. (1996). Gymnosperms,, New Age International (P) Ltd Publishers, New Delhi, India.
4. Vashistha, P.C., Sinha, A.K. Kumar, A. (2006). Botany for degree students: Gymnosperm, S. Chand & Company Pvt. Ltd.
5. Srivastava, H.N. (2002). Gymnosperm, Pradeep Publications. 10<sup>th</sup> edition.
6. Rashid A. (1999). An introduction to Pteridophyta Vikas Publishing Home Pvt. Ltd. 2<sup>nd</sup> edition.
7. Puri P. (1996). Bryophyta: Morphology, Growth and Differentiation, Atma Ram and Sons, 2<sup>nd</sup> edition.

MJC-4 (P)	Archegoniate (Practical: 1 credit)	No. of Classes
<b>Practical:</b> <ol style="list-style-type: none"> <li>1. Bryophytes: Study of vegetative and reproductive structures of <i>Marchantia</i>, <i>Anthoceros</i>, <i>Sphagnum</i> through temporary preparations and permanent slides</li> <li>2. Pteridophytes: Study of vegetative and reproductive structures of <i>Psilotum</i>, <i>Selaginella</i>, <i>Equisetum</i> and <i>Marsilea</i> through temporary preparations and permanent slides</li> <li>3. Gymnosperms: Study of vegetative and reproductive structures of <i>Cycas</i>, <i>Pinus</i> and <i>Gnetum</i> through temporary preparations and permanent slides</li> </ol>		20

**MIC-3 (T): Mycology and Phytopathology****Course Objective**

Students will acquire sound theoretical knowledge and understanding of the fundamentals of fungal groups and lichens, their ecology, classification, characteristics, reproduction and economic importance. Moreover, few fungi are fatal for plants, as they cause serious diseases. Study of their control measures are important for their further spread.

**Course Outcomes**

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

- CO1: Describe the thallus organization, nutrition, economic importance and life cycle of various fungi  
 CO2: Explain the diversity, structure and importance of lichen and mycorrhiza  
 CO3: Describe the terms, scope and importance of plant pathology  
 CO4: Describe the etiology, symptoms and control measures of plant diseases

MIC-3 Mycology and Phytopathology (Theory: 2 credits)		
Unit	Topics to be covered	No. of Lectures
1	<b>Fungi:</b> General characteristics; Thallus organization General account of Lichens, types & economic importance; Mycorrhiza- Ectomycorrhiza, Endomycorrhiza and their significance	06
2	Structure and life history of the following genera: <i>Synchytrium</i> and <i>Puccinia</i>	06
3	Etiology, symptoms and control of the following diseases: Citrus canker, Little leaf of brinjal, Late blight of potato, White rust of crucifers	08
	<b>TOTAL</b>	20

**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>

## SEMESTER – IV

### **MIC-4 (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:** Explain the tissue system in plants and their functions
- CO2:** Understand the normal and anomalous secondary growth in plants and their causes
- CO3:** Learn about the structural adaptations in plants growing in different environmental conditions
- CO4:** Describe the structure and function of periderm

<b>MIC-4 Morphology and Anatomy (Theory: 2 credits)</b>		
<b>Unit</b>	<b>Topics to be covered</b>	<b>No. of Lectures</b>
1	Brief account of inflorescence, flowers, fruits and seeds	05
2	Meristem and permanent tissue.	05
3	Normal secondary growth; Anomalous secondary growth in <i>Tinospora</i> , <i>Boerhaavia</i> , and <i>Dracaena</i>	05
4	Organization of tissue in relation to environment: Hydrophytes, Xerophytes, Halophytes and Epiphytes	05
<b>TOTAL</b>		<b>20</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. Singh S.K. Srivastava. S. (2014). Anatomy of angiosperms, Campus Books International. 1<sup>st</sup> edition.

<b>MIC-4 Morphology and Anatomy (Practical: 1 credit)</b>		<b>No. of Classes</b>
<b>Practical</b>		<b>20</b>
1.	Study of anatomical details through slides/ Photographs	
2.	Study of morphological and anatomical adaptations in hydrophytes and xerophytes through specimens and slide	

MJC-9 (P)	Plant Ecology and Phytogeography (Practical: 2 credits)	No. of Classes
1. Determination of pH of various soil and water samples 2. Analysis for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency from two soil samples by rapid soil tests 3. Study of morphological and anatomical adaptations of hydrophytes and xerophytes 4. Study of biotic interactions of the following: Stem parasite ( <i>Cuscuta</i> ), Root parasite ( <i>Orobancha</i> ) Epiphytes, Predation (Insectivorous plants) through specimens/photographs 5. Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer's frequency distribution law 6. Quantitative analysis of herbaceous vegetation for density and abundance in the college campus field visit		40

### SEMESTER – V

### **MIC-5: Economic Botany**

#### Course Objective

Students will acquire sound theoretical knowledge and understanding of the botanical characteristics, economic importance and distribution pattern of crops, fruits, vegetables, timber and fiber-yielding plants etc. Students will also study uses of medicinal, sugar and starch yielding plants.

#### Course Outcomes

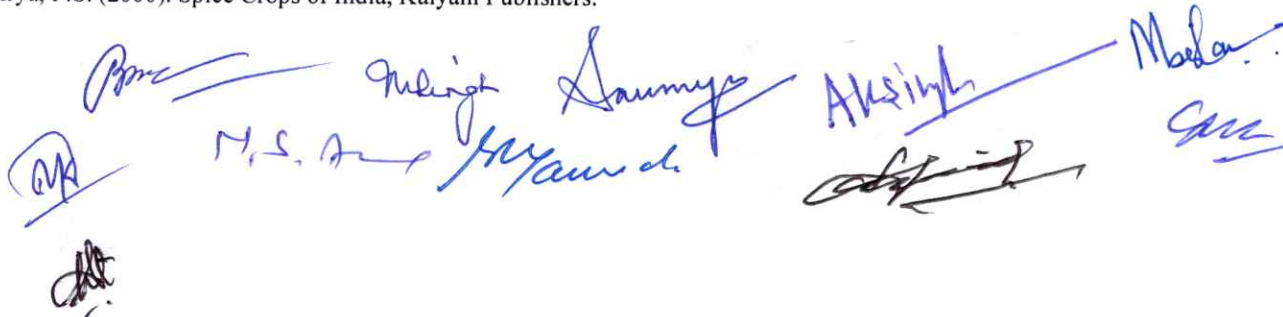
After the completion of the course, the student will be able to:

- CO1: Create awareness about plants of economic importance  
CO2: Know about their distribution patterns  
CO3: Identify them on the basis of their botanical features  
CO4: Learn about their cultivation and economic importance

Unit	MIC-5 Economic Botany (Theory: 3 credits)	
	Topics to be covered	No. of Lectures
1	Botanical characteristics, cultivation and uses of Cereals (Wheat), Legumes (Garden pea), Oil and Fats (Mustard) yielding plants	10
2	Botanical characteristics, cultivation and uses of Spices (Chilli), Fruits and Vegetables (Mango, Brinjal)	10
3	Botanical characteristics, cultivation, processing and uses of Beverages (Tea), Timber and Fiber yielding plant (Sal, Cotton) Botanical characteristics, cultivation and uses of five Medicinal plants	10
	<b>TOTAL</b>	30

#### **Suggested Readings :**

1. Kochhar, S.L. (2012). Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
2. Wickens, G.E. (2001). Economic Botany: Principles & Practices, Kluwer Academic Publishers, The Netherlands.
3. Chrispeels, M.J. and Sadava, D.E. (2003). Plants, Genes and Agriculture, Jones & Bartlett Publishers.
4. Pandey, B.P. (2005). Economic Botany, S. Chand & Company Pvt. Ltd. 6<sup>th</sup> edition.
5. Kochner, S.N. (2016). Economic Botany: A Comprehensive Study, Cambridge University Press. 5<sup>th</sup> edition.
6. Sharma, V. K., Shenai, S. K. (2013). Economically Important Medicinal Plants, Campus Book International. 1<sup>st</sup> edition.
- Arya, P.S. (2000). Spice Crops of India, Kalyani Publishers.



### SEMESTER – V

## MIC-6: Genetics

### Course Objective

This course is designed to facilitate students to understand the basic concepts of genetics, especially Mendelian laws of inheritance and its variations. Chromosomal disorders leading to various genetic disorders, mutations etc. will be introduced.

### Course Outcomes

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

- CO1: Understand Mendelian laws of inheritance and its variations  
CO2: Comprehend the effect of chromosomal abnormalities leading to genetic disorders  
CO3: Know the details of mutations and their uses  
CO4: Know about the sex determination and sex linked inheritance

MIC-6		
Genetics (Theory: 3 credits)		
Unit	Topics to be covered	No. of Lectures
1	<b>Mendelian inheritance:</b> Mendel's experiments and principles of inheritance: back cross and test cross; gene interactions and modified dihybrid ratio-complementary, supplementary	10
2	<b>Linkage and crossing over:</b> Cytological basis of crossing over; Sex determination and sex linked inheritance; Cytoplasmic inheritance	05
3	<b>Mutations:</b> Types and induction (physical and chemical mutagens); Molecular basis of mutations and their role	05
4	<b>Chromosomes:</b> Physical and chemical characteristics, Lampbrush chromosomes and polytene chromosomes Chromosomal aberrations: Deletion, Duplication, Inversion, Translocation, Polyploidy (types and role in evolution)	10
	<b>TOTAL</b>	30

**Suggested Readings :**

1. Gardner, E.J., Simmons, M.J., Snustad, D.P. (1991). Principles of Genetics, John Wiley & sons, India. 8<sup>th</sup> edition.
2. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics, John Wiley & Sons Inc., India. 5<sup>th</sup> edition.
3. Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics, Benjamin Cummings, U.S.A. 10<sup>th</sup> edition.
4. Verma, P.S. Agarwal, V.K. (2010). Genetics, S. Chand & Company Pvt. Ltd. 2<sup>nd</sup> edition.
5. Singh, B.D. (2014). Genetics, Kalyani Publishers. 2<sup>nd</sup> edition.
6. Gupta P.K. (2001). Genetics, Rastogi Publication. 3<sup>rd</sup> edition.

Page 23 of 35

## SEMESTER – VI

### **MIC-7 (T): Plant Ecology and Phytogeography**

#### Course Objective

This course is designed to develop in depth knowledge of the core concepts and principles of ecology and phytogeography. Students will acquire information about soil properties, types of pollution and biogeochemical cycles. Students will also get to understand the importance of conservation of biodiversity, and important climatic events like global warming and ozone hole.

#### Course Outcomes

**After the completion of the course, the student will have to:**

- CO1:** Knowledge of plant communities and ecological adaptations in plants
- CO2:** Knowledge about the succession and soils on the basis of physical, chemical and biological components
- CO3:** Know about the types of pollution and their control measures
- CO4:** Knowledge about the types and control of pollution, phyto-geographical regions of India

MIC-7                      Plant Ecology and Phytogeography (Theory: 3 credits)		
Unit	Topics to be covered	No. of Lectures
1	Environment, Ecology, Biosphere, Biome, habitat, niche; Adaptation of hydrophytes and xerophytes Biotic interactions: Beneficial and harmful interactions (symbiosis, commensalism, amensalism, herbivory, predation, parasitism)	6
2	Community ecology: Concept of ecological amplitude; Characters: analytical and synthetic; Dynamics: succession (Hydrosere and Xerosere) Ecosystem: Structure and function of ecosystem, food chains and webs, Principles and models of energy flow, ecological pyramids	10
3	Soil: Origin, Formation, Composition (Physical, Chemical and Biological) Soil profile and importance	4
4	Biogeochemical cycles: Gaseous cycles Environmental pollution: Air pollution, water pollution, noise pollution, radioactive pollution and their control measures, global Warming and Ozone hole Phytogeography: Major vegetational belts of India	10
<b>TOTAL</b>		<b>30</b>

#### **Suggested Readings:**

1. Odum, E.P. (2005). Fundamentals of ecology, Cengage Learning India Pvt. Ltd., New Delhi. 5<sup>th</sup> edition.
2. Singh, J.S., Singh, S.P., Gupta, S. (2006). Ecology Environment and Resource Conservation, Anamaya Publications, New Delhi, India.
3. Sharma, P.D. (2010). Ecology and Environment, Rastogi Publications, Meerut, India. 8<sup>th</sup> edition.
4. Wilkinson, D.M. (2007). Fundamental Processes in Ecology: An Earth Systems Approach, Oxford University Press. U.S.A.
5. Dash, M.C., Dash, S.P. (2009). Fundamentals of Ecology, Tata McGraw Hill. 3<sup>rd</sup> edition.
6. Shukla, R.S., Chandel, P.S. (2010). A text book of Plant Ecology, S. Chand & Company Pvt. Ltd. 2<sup>nd</sup> edition.

## SEMESTER – VI

### **MIC-8 (T): Plant Systematics**

#### Course Objective

The aim of this course is to acquaint the students with the systematic arrangement of plants based on their characteristics and different systems of plant classification. Students will acquire knowledge of botanical nomenclature as per ICBN. Tools and techniques of herbarium preparation will be taught.

#### Course Outcomes

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

- CO1: Identify and classify the local flora
- CO2: Know about the rules of ICBN
- CO3: Awareness of Plant Classification
- CO4: Preparation of herbarium and its importance

MIC-8 Plant Systematics (Theory: 2 credits)		
Unit	Topics to be covered	No. of Lectures
1	Systematics, Concept of taxa (family, genus, species); Categories and taxonomic hierarchy; Species concept (taxonomic, biological, evolutionary) Botanical nomenclature: Idea about important rules of plant nomenclature as per ICBN	08
2	Classification of plants as proposed by Bentham & Hooker	03
3	Floral characteristics and economic importance of following families: Ranunculaceae, Apocynaceae, Euphorbiaceae and Cyperaceae	10
	<b>TOTAL</b>	<b>48</b>

#### **Suggested Readings :**

1. Singh, G. (2012). Plant Systematics: Theory and Practice, Oxford & IBH Pvt. Ltd., New Delhi. 3<sup>rd</sup> edition.
2. Judd, W.S., Campbell, C.S., Kellogg, E.A., Stevens, P.F. (2002). Plant Systematics-A Phylogenetic Approach, Sinauer Associates Inc., U.S.A. 2<sup>nd</sup> edition.
3. Radford, A.E. (1986). Fundamentals of Plant Systematics, Harper and Row, New York.
4. Sharma, O.P. (2016). Plant Taxonomy, McGraw Hill Education Pvt. Ltd. 2<sup>nd</sup> edition.
5. Sambamurthy, A.V.S.S. (2005). Taxonomy of angiosperms, I.K. International Pvt. Ltd. 1<sup>st</sup> edition.

MIC-8 Plant Systematics (Practical: 1 credit)		No. of classes
<b>Practical :</b> 1. Study of vegetative and floral characters of the above families.  2. Preparation of Herbarium sheets (to be submitted in the record book)		<b>20</b>

**Suggested Readings :**

1. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice, Elsevier Science Amsterdam. The Netherlands.
2. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications of recombinant DNA, ASM Press, Washington.
3. Singh, B.D. (2012). Biotechnology : Expanding Horizons, Kalyani Publishers, 4<sup>th</sup> edition.
4. Dubey R.C. (2006). A text book of Biotechnology, S. Chand & Company Pvt. Ltd. 4<sup>th</sup> edition.

MJC-14 (P) <b>Recombinant DNA technology and Plant Biotechnology</b> (Practical: 2 credits)		No. of Classes
1. (a) Preparation of MS medium (b) Demonstration of <i>in vitro</i> sterilization and inoculation methods using leaf and nodal explants of tobacco, <i>Datura</i> , <i>Brassica</i> etc. 2. Study of anther, embryo and endosperm culture, micropropagation, somatic embryogenesis & artificial seeds through photographs 3. Study of steps of genetic engineering for production of Bt cotton, Golden rice, Flavr Savr tomato through photographs 4. Isolation of genomic DNA from cauliflower 4. Models on the above mentioned topics to be submitted by the students		40

**SEMESTER – VII****MIC-9 (T): Plant Physiology****Course Objective**

The course aims at making students realize how plants function, namely the importance of water, minerals, hormones, and light in plant growth and development; understand transport mechanisms and translocation in the phloem.

**Course Outcomes**

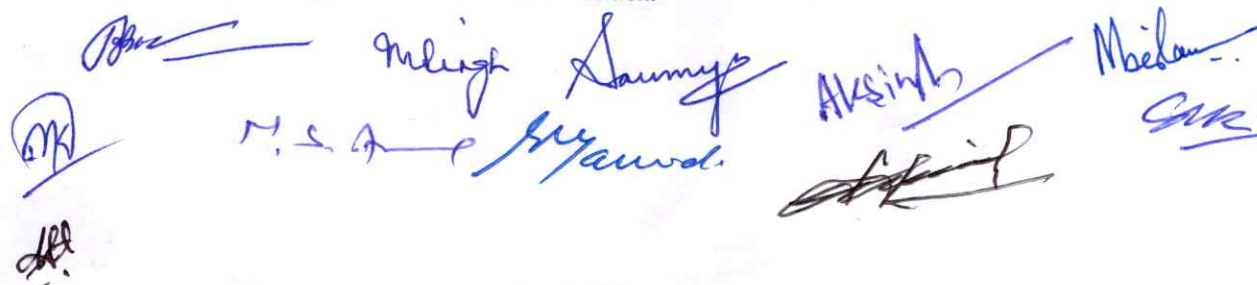
After the completion of the course, the student will be able to:

- CO1: Understand Water relation of plants with respect to various physiological processes  
 CO2: Know about the mineral nutrition  
 CO3: Learn about types and roles of phytohormones

MIC-9 <b>Plant Physiology</b> (Theory: 4 credits)		
Unit	Topics to be covered	No. of Lectures
1	<b>Plant water relationship:</b> Imbibition, diffusion and osmosis; Water Potential and its components; Active and passive absorption and transport of water and solutes; Ascent of sap; Transpiration and factors affecting transpiration, Transport of organic substances	20
2	<b>Mineral nutrition:</b> Macro and micronutrients and their role in plant nutrition	06
3	<b>Phytohormones:</b> Discovery, chemical nature (basic structure), bioassay and physiological roles of Auxin, Gibberellins and Cytokinin	14
	<b>TOTAL</b>	<b>40</b>

**Suggested Readings :**

1. Taiz, L., Zeiger, E., Møller, I.M. and Murphy, A (2015). Plant Physiology and Development, Sinauer Associates Inc. USA. 6<sup>th</sup> edition.
2. Bajracharya D. (1999). Experiments in Plant Physiology-A Laboratory Manual, Narosa Publishing House, New Delhi.
3. Jain V. K. (2014). Fundamentals of Plant Physiology, S. Chand & Company Ltd. 16<sup>th</sup> Revised edition
4. Verma V. (2016). Plant Physiology, Athena Academic. 2<sup>nd</sup> edition.



## SEMESTER – VIII

### **MIC-10: 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: 4 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.	08
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).	16
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)	16
	<b>TOTAL</b>	<b>40</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

*[Handwritten signatures: Anil Singh, Saunay, Akshay, Madan]*

*[Handwritten signature]*

*[Handwritten signature: M. S. A. P. Myanude]*

*[Handwritten signature]*

*[Handwritten signature]*

*[Handwritten signature]*