

III SEMESTER			
AI - 1	PLANT DIVERSITY & PLANT PATHOLOGY		18UABT31
Hrs/Week: 4	Hrs/Sem: 4 x 15 = 60	Hrs/UNIT:12	Credits: 3

**Objectives:** To enable the students

- > To have a general understanding about the diverse group of plants and observe the variations among the plants.
- > To identify the different plants by morphological and anatomical studies.
- > To have a comprehensive knowledge of Algae, Fungi, Bryophyte, Pteridophytes, Gymnosperms and Angiosperms.

#### UNIT I - Algae & Fungi

Algae - General characters of algae: structure, reproduction & life cycle of *Sargassum*. Economic importance of algae. Fungi - General characters of fungi: structure, reproduction & life cycle of *Albugo*. Economic importance of fungi.

#### UNIT II - Lichens and Bryophytes

General characters of lichen - Types - Crustose, Foliose, Frustricose. Bryophytes- General characters of Bryophyte. Distribution, structure reproduction & life history of *Marchantia*. Economic importance of bryophytes.

#### UNIT III - Pteridophytes & Gymnosperms

Pteridophytes- General characters, structure, reproduction & life cycle of *Lycopodium*. Gymnosperms - General characters, Structure, reproduction & life cycle of *Pinus*. Economic importance of gymnosperms.

#### UNIT IV - Taxonomy

Brief account on Classification: Natural - Bentham & Hooker. Morphology and reproductive characters of flowering plants (Phyllotaxy and inflorescence). Study of the following families - *Rutaceae*, *Asclepiadaceae*, *Euphorbiaceae*, *Poaceae*.

#### UNIT V - Plant pathology

Introduction to plant pathology - Tikka disease of groundnut, Citrus canker, Bunchy top of banana, Red rot of sugarcane, and Late blight of Potato - causal organism, symptoms, disease cycle and control measures.

#### TEXT BOOKS:

1. Pandey B.P. 2001. College Botany Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
2. Vashishta, B.R. 2008. Botany for Degree Students - Vol I Algae.
3. Sethi, I.K. and Walia, S.K. 2011. Text Book of Fungi and Their Allies, Macmillan Publishers Pvt.Ltd. Delhi.

#### REFERENCE BOOKS:

1. Pandey B.P. 2001. College Botany Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
2. Parihar. N. S.2001. Bryophyta - Central Book Depot Publications in Botany, Allahabad
3. Vashista . B R .1997, The Algae, S .Chand & Co. Ltd... New Delhi
4. Pandey.B.P.1997 - Taxonomy of Angiosperms - S.Chand & Co., New Delhi.
5. Power,D. General Microbiology, 1986, Himalaya Publishing House, Bombay.
6. Gangulee, Das & Datta, Collge Botany Vol I,1986, New central book agency, Calcutta.
7. Vashishta, P.C., Sinha., A.K.Kumar. A., 2010. Pteridophyta, S. Chand. Delhi. India.

III SEMESTER		
DSCP-III	CELL & MOLECULAR BIOLOGY PRACTICALS	18UCZO3P1
Hrs/Week: 2	Hrs/Sem: 2 x 15 = 30	Credits: 1

- Onion root tip squash: Observation of different stages of mitosis.
- Chironomous larva: Mounting of Polytene chromosomes.
- Male Grasshopper: Observation of different stages of meiosis.
- Preparation of the following:
  - Human Squamous epithelium
  - Human blood smear
- Models & charts:
  - DNA
  - tRNA
  - Ribosome
  - Protein synthesis
  - Mitochondria
  - Golgi apparatus
  - Nucleus
  - Endoplasmic reticulum
  - Lysosomes
  - Microtome.
  - Frog Blood Smear

III SEMESTER		
AII-P1	PLANT DIVERSITY AND PLANT PATHOLOGY PRACTICAL	18UABT3P1
Hrs/Week: 2	Hrs/Sem: 2 x 15 = 30	Credits: 1

- Objectives:** To enable the students
- To take better sections of plant materials of anatomical & morphological interest for identification.
  - To identify various groups of non flowering plants.
  - To develop skill in identify the flowering plants upto species level.

#### DIVERSITY OF PLANT LIFE PRACTICAL

- Micropreparation & Identification of the following
  - Sargassum - Stipe and leaf
  - Marchantia - Thallus
- Observation and Identification of Permanent slide -
  - Sargassum - Male and female conceptacles.
  - Marchantia sporophyte
  - Disease infected leaves showing Albugo.
- Micropreparation & Identification of Lycopodium Stem & Pinus needle.
- Identification, botanical name, family, floral formula, floral diagram and description of the plants from the families prescribed in the theory syllabus.
- Identification of plant diseases prescribed in the syllabus.
- Field trip for specimen collection.

#### REFERENCES:

- Gunasekaran, P., 1996. Lab Manual in Microbiology. New Age International (P), Ltd., Publishers, New Delhi.
- Parihar, N.S. 1985, The Biology and Morphology of Pteridophytes, Central Book Department, Allahabad.
- Sporne, K.R. 1971, The Morphology of Gymnosperms, Hutchinson University library London.
- Pandey, B.P. 2010. Modern Practical Volume - 1. S.Chand & company Ltd. New Delhi.
- Santra. S.C, Chatterjee, T.P and Das, A.P. 2001. College botany practical - Vol. II. New Central Book Agency (p) Ltd. India.

All the units completely changed

### III SEMESTER

TIME-I	PLANT RESOURCES AND THEIR UTILIZATION	18UNBT31
Hrs/Week: 2	Hrs/Sem: 2 x 15 = 30	Hrs/UNIT:6
		Credits: 2

**Objectives:** To enable the students

- > To know about the common names and useful parts of plant species around us
- > To know about the commercial usage of medicinal plants.
- > To exploit the uses of plants in small scale like industries like canning, beverage, Pharmaceuticals, Nursery gardens, Floriculture, horticulture etc.

**A Study on the following with references to their botanical name, morphology of useful part, family and economic importance.**

#### UNIT I

Plant resources as food: Cereals - Rice, Wheat; Millets - Ragi; Pulses - Pea, Black gram; Vegetables - Cabbage; Fruits - Mango, Banana.

#### UNIT II

Plant resources as fibers - Classification - Surface fibers - Cotton, Coir; Soft fibers - Jute, Aloe, banana.

#### UNIT III

Plant resources as timbers - Wood Classification, properties (Mechanical, Physical) - Teak, Deodar; Gums - Gum Arabic; Resin - Oleoresin.

#### UNIT IV

Plant resources as beverages - Coffee, Tea - Botanical traits, Processing methods.

#### UNIT V

Plant resources as Spices and Condiments - Botanical name, Morphology of useful part & uses - Seed - Cardamom; Bark - Cinnamon; Fruit - Coriander, Leaves - Mint, Flower - Clove, Rhizome - Zinger, Root - Withania.

#### TEXT BOOKS:

1. Pandey, B.P. 1997. Economic Botany - S. Chand & company Ltd. New Delhi.
2. Verma, V. 198. Economic Botany - Emkay publication, New Delhi.
3. Albert E. Hill, 1988, Economic Botany. A textbook of useful plants and plants Products. TATA Mc Graw - Hill publishing company Ltd. New Delhi.

#### REFERENCE BOOKS:

1. Herbs, spices & Medicinal plants, Recent advanced botany by Craker, Lyle E. 1988. Oryx press, phoenix. Arizona.
2. Medicinal plants of India (Medicinal plants of the world vol.5. by Sudhanshu Kumar. Jain. 1985-1989.
3. Trease, G.E. & Eram, N.C. 1983, Pharmacognosy Baullinie, Trendall, Enaullourne
4. Pulok K. Mukherjee, 1988 Quality control herbal drugs. New Delhi.
5. Vinod L.D. and Rengaw. 1976. Pharmacogonosy & Phytochemical 1st edition Vol I & II. Delhi.
6. Chowdery. R. D., 1996. Herbal Drug Industry. Delhi.

All the units Completedly changed

#### IV SEMESTER

DSE - 2A	MUSHROOM CULTURE	18UEBT4A
Hrs/ Week: 4	Hrs / Sem : 4 x 15 = 60	Hrs/ Unit: 12
		Credits: 4

#### Objectives

To enable the students

- > To know the various types of edible mushrooms and their nutritional value.
- > To understand the method of cultivation of edible mushroom and spawn production.

#### UNIT - I

Introduction - History -- Scope & Importance of edible mushroom cultivation - Types of Edible & Poisonous mushrooms in India.

#### UNIT - II

Spawn preparation : Preparation of pure culture, media used in raising pure culture, Culture maintenance, Facilities required for spawn preparation, Preparation of spawn substrate, storage of spawn.

#### UNIT - III

Cultivation technology of Oysters, Button and Milky mushrooms (Mass cultivation), Storage of mushroom.

#### UNIT - IV

Nutrient Profile of Mushrooms. Problems encountered in mushroom cultivation techniques and its commercial exploitation.

#### UNIT - V

Mushroom Recipes : Preparation of various dishes like Mushroom sabji, Mushroom Achar, Mushroom khir, Mushroom soup, Mushroom pakoda, Mushroom papad. Cutlet, Omelette Samosa, Curry, Soup Powder and Idly chutney powder.

**Field visit to Mushroom farm and Oneday Training on Mushroom cultivation.**

#### TEXT BOOK:

Nita Bahl (1984-1988) Hand book of Mushrooms, II Edition, Vol. I & Vol. II.

#### REFERENCES:

1. Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R (1991) Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
2. Swaminathan, M. (1990) Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.
3. Paul Stamets, J.S. and Chilton, J.S. (2004). Mushroom Cultivator: A practical guide to growing mushrooms at home, Agarikon Press.
4. Shu-Ting Chang, Philip G. Miles, Chang, S.T. (2004). Mushrooms: Cultivation, nutritional value, medicinal effect and environmental impact, 2nd ed, CRC press.

## IV SEMESTER

1 - 2	PLANT ANATOMY, PLANT FUNCTIONS & PLANT BIOTECHNOLOGY	18UABT41
Hrs/ Week: 4	Hrs / Sem : 4 x 15 = 60	Hrs/ Unit: 12
Objectives		Credits: 3

To enable the students

- To understand the metabolic activities of plants.
- To know about the various concepts and mechanisms of functions of plant.
- To understand the basic principles of tissue culture and in various aspects of crop improvements.
- To make the students aware of the application of biotechnology to human welfare.

### UNIT I

Tissues - Meristematic tissues, simple and complex tissues. Primary structure of dicot and monocot stem, root, Annual ring. Secondary growth in dicot stem. Anomalous secondary growth- Boerhaavia.

### UNIT II

Water relations - Diffusion, Imbibition & Osmosis. Absorption of water - Mechanism of water absorption - active and passive. . Ascent of sap - Path and Mechanism, Cohesion theory. Transpiration - Types - Cellular, Stomatal, Lenticular. Mechanism of Stomatal Transpiration. (Theories not needed). Antitranspirant, significance of transpiration.

### UNIT III

Photosynthesis - Ultra Structure of Chloroplast. Pigment systems. 'Z' scheme of electron transport - Calvin cycle, factors affecting photosynthesis - significance of photosynthesis.

### UNIT IV

Respiration - Ultra Structure of Mitochondria. Types - Aerobic & Anaerobic, Glycolysis - Krebs's cycle. Growth Hormones - Physiological role of Auxins and Cytokinins.

### UNIT V

Plant tissue culture: Definition, Scope & importance. Totipotency, Callus & Meristem Culture, induction. Application of tissue culture. Biofertilizer - Definition, Scope & importance. Mass production of Rhizobium, BGA - Nostoc, VAM fungi and Azolla. Applications.

### TEXT BOOKS:

1. Jain V. K. 1996 - Fundamentals of Plant Physiology 5<sup>th</sup> edition - S Chand & Co., New Delhi.
2. Kumar H. D. 1998 - Modern Concept of Biotechnology, Vikas Publishing House Ltd., New Delhi.

### REFERENCE BOOKS:

1. Dubey R.C. 2001 A Text Book of Biotechnology, S. Chand & Co., New Delhi.
2. Taiz, L and Zeiger, E. 1991, Plant Physiology. The Bengamen Cummings Publishers, California.
3. Thakur. K. and Bassi. K, 2007. Diversity of microbes and cryptogams. S.Chand & company Ltd. New Delhi.

<b>IV SEMESTER</b>		
<b>DSCP-IV</b>	<b>BIOCHEMISTRY PRACTICAL</b>	<b>18UCZO4P1</b>
<b>Hrs/ Week: 2</b>	<b>Hrs / Sem : 2 x 15 = 30</b>	<b>Credits: 1</b>

**BIOCHEMISTRY**

1. Beer's and Lambert's law verification using Colorimeter
  - a) Protein
  - b) Carbohydrate.
2. Separation of Amino acid using paper Chromatography.
3. Separation of Amino acid using Thin layer Chromatography.
4. Qualitative tests for Carbohydrates, Proteins & Lipid.
5. pH measurement of any two samples with the help of pH meter.
6. **Charts/Models:**

a) Glucose	e) Colorimeter
b) Amino acid	f) pH meter
c) Steroid	g) Chromatogram.
d) Electrophoresis unit	

<b>IV SEMESTER</b>		
<b>AII-P2</b>	<b>PLANT ANATOMY, PLANT FUNCTIONS AND PLANT BIOTECHNOLOGY PRACTICAL</b>	<b>18UABT4P1</b>
<b>Hrs/ Week: 2</b>	<b>Hrs / Sem : 2 x 15 = 30</b>	<b>Credits: 1</b>

**Objectives:** To enable the students

- To take better sections of plant materials of anatomical & morphological interest for identification.
- To identify various groups of non flowering plants.
- To develop skill in identify the flowering plants upto species level.

**Plant Anatomy:**

1. Micropreparation and Identification of
 

a. Dicot Stem	c. Dicot Root
b. Monocot Stem	d. Monocot Root
2. To observe and identify the following slides showing
  - a. Meristems - Shoot apex and root apex
  - b. Simple tissues.

**Plant Functions:**

To demonstrate simple set up in Plant Physiology.

1. Osmosis - Potato Osmoscope.
2. Transpiration Ganong's potometer experiment.
3. To demonstrate plasmolysis by using Tradescantia leaf.
4. Ganong's light screen experiment.
5. Ganong's respiroscope - Respiration.

**Plant Biotechnology:**

Photograph / model in Biotechnology.

1. Biofertilizer - Rhizobium / B.G.A. / VAM Fungi.
2. Tissue culture - Photograph (Callus & Meristem culture).
3. Industrial visit.

**REFERENCES:**

1. Pandey, B.P. 2010. Modern Practical Volume -III. S.Chand & company Ltd. New Delhi.
2. Pandey, B.P. 2010. Botany for degree students. S.Chand & company Ltd. New Delhi.
3. Santra. S.C, Chatterjee, T.P and Das, A.P. 2005. College botany practical - Vol. I. New Central Book Agency (p) Ltd. India.

All the units completely changed<sup>47</sup>

IV SEMESTER			
DSE - 2B	ORGANIC FARMING		18UEBT4B
Hrs/ Week: 4	Hrs / Sem : 4 x 15 = 60	Hrs/ Unit: 12	Credits: 4

### Objectives

To enable the students

- > To learn the definition of organic farming.
- > To know the various types of organic farming and their importance.
- > To learn the production of various organic farming.

### UNIT I

Soil Science, Brief Account of Soil Profile; Fertility of Soil – Importance of Organic-Matter – Water Retentivity and Aeration of Soil.

### UNIT II

Organic Manure, Types, Animal Wastes – Cattle Dung, Urine, Poultry Wastes, Slaughter Wastes, Piggery and Fishery Wastes.

### UNIT III

Plant wastes – Fallen leaves and Twigs – Humus Formation, Green Manuring – Mulching – Leaves of Trees like Pongamia, Gliricidia, Azadirachta, Calotropis – Compost making.

### UNIT IV

Biofertilizers: Rhizobium-Importance, Mass Production and Application, VAM Fungi - Mass production and Applications.

### UNIT - V

Vermicomposting – Importance, Application and Production of Vermicompost; Preparation and importance of Panchagavya foliar spray.

### REFERENCES:

1. Dubey, R.C. 2006, A Text Book of Biotechnology, S. Chand and Company Ltd. New Delhi.
2. ICAR, 1980. Hand Book of Agriculture, Indian Council of Agricultural Research, New Delhi.
3. John Jothi Prakash, E. 2006. Outlines of Biotechnology. Emkay Publications, New Delhi.
4. Mark Coyne, 2004. Soil Microbiology- An Exploratory Approach. Delmar Publishers, Singapore.
5. Miller, C.E. and Turk, L.M. 2002. Fundamentals of Soil Science. Biotech Books, New Delhi.