

SEMESTER-I& III – PAPER-1

UBBTA20/UABTA20– OPTIONAL ALLIED BOTANY-I/ALLIED BOTANY-I

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
I Year I Sem	UBBTA20	Optional Allied Botany-I	Theory	Allied	4	4	40+60=100
II Year III Sem	UABTA20	Allied Botany-I	Theory	Allied	4	4	40+60=100

Course Outcomes (CO):

On completion of the course, the students will be able to,

1. Outline the general characters, life cycle and economic importance of Algae and Fungi.
2. Distinguish the general characters of Bacteria and Virus
3. Understand the general characters and life cycle of Bryophyta, Pteridophyta and Gymnosperms.
4. Upgrade the knowledge in Cell biology and Genetics
5. Identify the pathogens and the applications of Plants in agriculture.

Unit I: Algae and Fungi:**(12 hours)**

- 1.1 General characters of Algae. (K2)
- 1.2 Structure, reproduction and life cycle of *Nostoc* and *Sargassum*. (K1, K3)
- 1.3 Economic importance of Algae. (K4)
- 1.4 General characters of Fungi. (K2)
- 1.5 Structure, reproduction and life cycle of *Yeast* and *Agaricus*. (K1, K2)
- 1.6 Economic importance of Fungi. (K3)

Unit II: Bacteria and Virus:**(12 hours)**

- 2.1 General characters of Bacteria (K2)
- 2.2 Structure and reproduction of *E.coli*. (K3)
- 2.3 Economic importance of Bacteria. (K4)
- 2.4 General characters of Viruses. (K2)
- 2.5 Structure of TMV and Bacteriophage. (K2,K3)
- 2.6 Structure of COVID-19. (K3)

Unit III: Bryophyta, Pteridophyta and Gymnosperms:**(12 hours)**

- 3.1 General characters of Bryophyta. (K1, K2)
- 3.2 Structure and life cycle of *Funaria*. (K2, K3)
- 3.3 General characters of Pteridophyta. (K1, K2)
- 3.4 Structure and life cycle of *Lycopodium*. (K2, K3)
- 3.5 General characters of Gymnosperms. (K1, K2)
- 3.6 Structure and life cycle of *Cycas*. (K3, K4)

Unit IV: Cell Biology and Genetics:**(12 hours)**

- 4.1 Ultra structure of Prokaryotic and Plant Eukaryotic cell. (K2, K3)
- 4.2 Cell organelles- Ultra structure and functions of Chloroplast, Mitochondria and Nucleus. (K2,K3)
- 4.3 Cell division- Mitosis and Meiosis (K3)
- 4.4 Genetics-Mendelism-Monohybrid and Dihybrid cross. (K1,K4)
- 4.5 Back cross, Law of dominance, Law of segregation. (K1,K3)
- 4.6 Incomplete dominance, Law of independent assortment. (K1,K2)

Unit V:Ecology, Crop Management and Applied Botany: (12 hours)

- 5.1 Ecosystem - structure and functions, Food chain and Food web. (K2, K3)
- 5.2 Ecological Pyramid, Adaptation of Plants- Hydrophytes, Xerophytes. (K1,K2)
- 5.3 Symptoms, causative organism and control measures of Tobacco Mosaic disease. (K3)
- 5.4 Symptoms, causative organism and control measures of Citrus canker. (K2, K3)
- 5.5 Symptoms, causative organism and control measures of Tikka disease of groundnut. (K3)
- 5.6 Biopesticides – BT, Biofertilizers in Agriculture (Azolla and BGA), Mycorrhiza. (K3)

Text Books:

1. Kumaresan .V - Algae and Bryophytes, Saras Publications, Nagercoil, Kaniyakumari. 1997
2. Pandey B.P. - College Botany - Volume I, S.Chand and company pvt.Ltd.,Ramnagar, Newdelhi. 2015
3. Arumugam.N, Kumaresan . V. - Plant Ecology and Phytogeography, Saras Publication, 2005.

Reference Books:

1. Vashishta B.R, Sinha A.K, Singh V.P. - Fungi, S.Chand and company pvt.Ltd.,Ramnagar, Newdelhi.2005
2. Vashishta, B.R, Sinha, A. K and Adarsh Kuma - Botany for degree students -Bryophyta, S. Chand & Company LTD, Ram Nagar, New Delhi. 2005
3. Vashishta, P.C, Sinha,A.K and Anil Kumar, - Botany for degree students- Pteridophyta, S. Chand & Company LTD. Ram Nagar, New Delhi.(Revised edition, 2010).
4. Vashishta, P.C, Sinha,A.K and Anil Kumar - Botany for degree students Gymnosperms, S. Chand & Company LTD. Ram Nagar, New Delhi.(Revised edition, 2014),

Open Educational Resources (OER):

1. <https://youtu.be/c2adzEjYUmA>
2. https://youtu.be/VIS_4G3Ysyk
3. https://youtu.be/VVuYGkk_I8s
4. <https://youtu.be/FmBZGx8fkp0>
5. <https://youtu.be/URUJD5NEXC8>
6. https://youtu.be/2lqhJNgn_Wg

SEMESTER-II& IV – PAPER-2
UBBTB20 /UABTB20- OPTIONAL ALLIED BOTANY-II /ALLIED BOTANY-II

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
I Year II Sem	UBBTB20	Optional Allied Botany-II	Theory	Allied	4	4	40+60=100
II Year IV Sem	UABTB20	Allied Botany-II	Theory	Allied	4	4	40+60=100

Course Outcomes (CO):

On completion of the course, the students will be able to

1. Classify Angiosperms and identify the family with the characters .
2. Identify and analyse the histology of Plants.
3. Gain knowledge on Embryology of Plants.
4. Understand the key process of Plant Physiology.
5. Integrate the knowledge of Horticulture in growing Plants.

Unit I: Taxonomy:

(12 hours)

- 1.1 Bentham and Hooker's system of classification, Nomenclature. (K2, K3)
- 1.2 Study of characters and economic importance of the family Caesalpiniaceae. (K1, K2)
- 1.3 Study of characters and economic importance of the family Rubiaceae. (K2, K3)
- 1.4 Study of characters and economic importance of the family Asclepiadaceae. (K2, K4)
- 1.5 Study of characters and economic importance of the family Amaranthaceae. (K2, K4)
- 1.6 Study of characters and economic importance of the family Liliaceae. (K1, K3)

Unit II: Plant Anatomy:

(12 hours)

- 2.1 Tissues- Meristematic and Permanent tissue. (K1, K2)
- 2.2 Primary structure of Dicot stem. (K1, K3)
- 2.3 Primary structure of Monocot stem. (K2, K3)
- 2.4 Primary structure of Dicot root and Monocot root. (K1, K3)
- 2.5 Primary structure of Dicot leaf. (K1, K3)
- 2.6 Primary structure of Monocot leaf. (K3)

Unit III: Embryology:

(12 hours)

- 3.1 Structure of mature Anther. (K2, K3)
- 3.2 Structure of Ovule. (K2, K4)
- 3.3 Types of Ovules. (K3)
- 3.4 Structure of Embryo sac. (K3)
- 3.5 Structure of Pollen grain. (K3)
- 3.6 Structure of Dicot embryo, Parthenocarpy. (K1, K3)

Unit IV: Plant Physiology:

(12 hours)

- 4.1 Absorption of Water. (K1, K2)
- 4.2 Transpiration. (K3, K4)
- 4.3 Photosynthesis - Light reaction, Calvin cycle. (K1, K3)
- 4.4 Respiration - Glycolysis, Fermentation, Krebs's Cycle. (K2, K3)
- 4.5 Electron transport system. (K1, K3)
- 4.6 Growth hormones - Auxins, Gibberellins and application. (K1, K3)

Unit V: Plant propagation methods:

(12 hours)

5.1 Tissue Culture-*Invitro* Culture method. (K1,K2)

5.2 Plant tissue culture and its applications. (K1,K3)

5.3 Vegetative Propagation. (K2, K3)

5.4 Horticulture methods – Cutting – Stem Layering-ground layering and air layering. (K2,K3)

5.5 Grafting- Cleft, Bark grafting. (K2,K3)

5.6 Terrace garden, Kitchen garden. (K3)

Text Books:

1. Pandey, B.P -Taxonomy of Angiosperms for University students,(Revised) S. Chand & Company LTD. Ram Nagar, New Delhi, 2009.

2. Pandey B.P. - College Botany - Volume II, S.Chand and company pvt.Ltd.,Ramnagar, Newdelhi. 2015

Reference Books:

1.Pandey, B.P. - Embryology of Angiosperms. S. Chand & Company Ltd., New Delhi, 1995.

2. Pandey, S.N. and Sinha, B.K. - Plant Physiology. IV Edition, Vikas Publishing company, Noida, UP, 2009

3.Verma, P.S. and Agarwal, V.K. - Cell biology, Genetics, Molecular Biology, Evolution and Ecology. S.Chand& Company Ltd. New Delhi, 2004

4. Dubey R.C - A textbook of Biotechnology, S.Chand and company pvt. Ltd., Ramnagar, New Delhi, 2015

5.Manibushan Rao. K - Text book of Horticulture. McMillan publication. Co., New York.1991

Open Educational Resources (OER):

1.https://youtu.be/TTIGRcd_ju0

2. <https://youtu.be/f2dvh0YNDwM>

3. <https://youtu.be/C8VHyezOJD4>

4. <https://youtu.be/dV9QcGs58l0>

5. <https://youtu.be/NqqeeAlp9zA>

SEMESTER-I and II – SKILL BASED ELECTIVE**USBTA120/ USBTA220– HERBAL THERAPY AND COSMETOLOGY**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
I Year I / II Sem	USBTA120 USBTA220	Herbal therapy and Cosmetology	Theory	Skill based elective	2	2	40+60=100

Course Outcomes (CO):

On completion of the course, the students will be able to,

1. Acquire knowledge in the basics of medicinal plants.
2. Get an insight into the therapeutic values of Indian system of medicine.
3. Identify the herbs and formulate herbal medicines for skin care.
4. Identify the herbs and formulate herbal medicines for hair care.
5. Evaluate the importance of herbs used in herbal cosmetics.

Unit I: Herbs:**(6hours)**

- 1.1 Herbs – definition, division, distribution. (K2, K3)
- 1.2 Elementary knowledge of herbs. (K1)
- 1.3 Importance of Medicinal plants. (K3)
- 1.4 Role of medicinal plants in human health care. (K3)
- 1.5 Plants in folk religion – *Aegle marmelos*, *Ficus benghalensis*. (K2)
- 1.6 *Curcuma domestica* and *Sesamum indicum*. (K2,K3)

Unit II: Indian system of medicines:**(6hours)**

- 2.1 Indian system of medicines –AYUSH - Ayurveda, Unani (K2, K3)
- 2.2 Siddha and Homeopathy (K1,K3)
- 2.3 Therapeutic values of Naturopathy (K4)
- 2.4 Traditional knowledge and utility of some medicinal plants in Tamil Nadu -*Solanum trilobatum*, *Cardiospermumhalicacabum* (K3)
- 2.5 *Vitex negundo*, *Adathoda vasica* (K2,K3)
- 2.6 *Azadirachta indica* and *Eclipta alba* (K1,K3)

Unit III:Skin care:**(6 hours)**

- 3.1 Herbal care for facial skin (K1, K2)
- 3.2 Formulation of face pack for dry (K2)
- 3.3 Formulation of face pack for oily skin (K2)
- 3.4 Formulation of face pack for normal skin (K3)
- 3.5 Herbal remedy for skin disorders - pimple, acne (K3)
- 3.6 Herbal remedy for skin disorders - boiles, black heads and tans (K3, K4)

Unit IV:Hair care:**(6 hours)**

- 4.1 Herbal care for hair (K2, K3)
- 4.2 Formulation of hair oil (K3)
- 4.3 Formulation of hair tonics (K3)
- 4.4 Herbal remedy for dandruff (K1,K4)

4.5 Herbal remedy for Premature greying (K3)

4.6 Herbal remedy for hairloss (K1,K2)

Unit V:Herbal Cosmetics:

(6 hours)

5.1 Herbal cosmetics – Meaning, advantage and disadvantage (K1, K3)

5.2 Preparation of Herbal shampoo (K3)

5.3 Herbal tooth paste (K3)

5.4 Herbal soap (K2,K3)

5.5 Role of herbs in skin care - Tulasi and Aloe vera (K2, K3)

5.6 Role of herbs in hair care –Henna and Coconut (K2)

Text Books:

1. Kumar, N.C. - An Introduction to Medical Botany, Emkay Publications, NewDelhi. 1993
2. Kapoor L.D - Hand book of Ayurvedic medicinal plants, CRC press Anes books, New Delhi, 2005

Reference Books:

1. Sivarajan, V.V and Balasubramaniyan, I - Ayurvedic Drugs and their Plant Sources. Oxford and IBH, New Delhi, 1994.
2. Ambaster - Wealth of India. CSIR Publications, New Delhi, 1996.
3. Herbal Cosmetics - H.Pande, Asia Pacific Business press, New Delhi.

Open Educational Resources (OER):

1. <https://youtu.be/DeLjnFTDjFc>
2. <https://youtu.be/p5zb17r0f3U>
3. <https://youtu.be/arVcJITMAtQ>
4. <https://youtu.be/c2d0UFRjlpw>
5. <https://youtu.be/eJmAY2OWrs4>

SEMESTER-I and II-SKILL BASED ELECTIVE**USBTB121/ USBTB221– HORTICULTURE**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
I Year I / II Sem	USBTB121 USBTB221	Horticulture	Theory	Skill based elective	2	2	40+60=100

Course Outcomes(CO):

On completion of the course, the students will be able to,

1. Apply the principles of the cultivation of economically important horticultural crops.
2. Analyze the different methods of plant propagation in horticultural crops.
3. Evaluate the importance of floriculture in indoor gardening.
4. Plan and execute the different types of garden layouts and design.
5. Develop the skill for vegetable and fruit processing, its preservation and preparation of value added products.

Unit I: Introduction to Horticulture:**(6hours)**

- 1.1 Importance and scope of Horticulture (K2)
- 1.2 Divisions and requirements of horticulture(K1, K2)
- 1.3 Soil types (K2)
- 1.4 Irrigation and nutrition (K3, K4)
- 1.5 Cultivation of economically important plant - Rose (K3)
- 1.6 Cultivation of economically important plant – Mango (K3)

Unit II: Plant propagation:**(6hours)**

- 2.1 Methods of plant propagation (K2, K3)
- 2.2 Cutting- stem, root, leaf and leaf bud(K1,K3)
- 2.3 Layering - Simple, air, tip and mound (K1,K3)
- 2.4 Grafting - cleft and bark(K3)
- 2.5 Budding - chip and patch (K3)
- 2.6 Role of plant growth regulator in horticulture. (K2,K3)

Unit III:Indoor gardening:**(6 hours)**

- 3.1 Potted plants and hanging basket (K1, K2)
- 3.2 Hydroponics (K1, K2)
- 3.3 Bonsai -Training, watering and pruning (K2)
- 3.4 Flower arrangement (K2,K3)
- 3.5Cut flowers (K3)
- 3.6 Flower decoration -displays, bouquets and wreaths (K3, K4)

Unit IV:Outdoor gardening:**(6 hours)**

- 4.1 Landscaping (K2, K3)
- 4.2 Rockery and arches (K2,K3)
- 4.3 Terrace gardening (K3)
- 4.4 Kitchen gardening - plan and principles (K1,K4)
- 4.5 Classification of vegetables and fruits (K1,K3)

4.6 Layout for a model college garden. (K1, K2)

Unit V: Fruits and vegetable preservation:

(6 hours)

5.1 Preparation of Jam, jelly (K1, K3)

5.2 Preparation of squash, sauce (K2, K3)

5.3 Preparation of pickle, ketchup (K2)

5.4 Use of preservatives – chemicals, sugar (K1, K3)

5.5 Brim for fruits (K3)

5.6 Vegetable canning, bottling and levelling (K1, K2)

Text Books:

1. Manibushan Rao. K. - Text book of horticulture. McMillan publication. Co., New York, 1991
2. Sheela V.L - Horticulture. MJP Publishers, 1959

Reference Books:

1. Kumar. N - Introduction to Horticulture. Rajalakshmi publication Nagercoil, 1986
2. SubbhaRoa, N.S - Biofertilizers in Agriculture and Forestry. India Book House Limited. 1997
3. Trivedy . P.P - Home gardening. ECA Publication, New Delhi, 1987
4. Arora, J. S. - Introductory Ornamental Horticulture. Kalyani Publishers, New Delhi, 1992
5. Rao, K. M. - Text Book of Horticulture. Macmillan India Ltd., New Delhi, 2000

Open Educational Resources (OER):

1. <https://youtu.be/cVzO00HDLLA>
2. <https://youtu.be/5vem9fyWuss>
3. <https://youtu.be/NqgeeAlp9zA>
4. https://youtu.be/seA_h3FKKEE8
5. <https://youtu.be/dwpNe5xiN2I>

SEMESTER-V and VI – NON-MAJOR ELECTIVE**UGBTA520/ UGBTA620– EDIBLE MUSHROOM CULTIVATION**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
III Year V / VI Sem	UGBTA520 UGBTA620	Edible Mushroom Cultivation	Theory	Non- Major Elective	3	2	40+60=100

Course Outcomes (CO):

On completion of the course, the students will be able to,

1. Plan the cultivation of mushroom for self employment activity
2. Identify the medicinal and nutritional value of mushroom
3. Evaluate the cultivation of Oyster mushroom
4. Develop the technical skills for both cultivation and preservation of mushroom
5. Establish a commercial mushroom production Unit.

Unit I: Introduction to Mushroom:**(9hours)**

- 1.1 Biology of edible mushroom (K2, K3)
- 1.2 *Agaricus* sp.(K1, K3)
- 1.3 *Calocybe* sp. (K3)
- 1.4 *Volvariella* sp. (K3)
- 1.5 *Pleurotus* sp. (K1, K2)
- 1.6 Scope of edible mushroom cultivation in India. (K2,K3)

Unit II: Medicinal and nutritional value of Mushroom:**(9hours)**

- 2.1 Nutrient Profile of Mushroom- Protein, aminoacids, (K2, K3)
- 2.2 Calorific values, carbohydrates, fats, vitamins & minerals. (K1,K3)
- 2.3 Medicinal properties (K4)
- 2.4 Disease cured and prevented by the consumption of edible mushroom (K3)
- 2.5 Poisonous mushrooms(K2,K3)
- 2.6 Types of edible mushroom available in India (K3)

Unit III:Cultivation technology:**(9 hours)**

- 3.1 Infrastructure, substrates, polythene bag, vessels, inoculation loop, low cost stove, culture rack, mushroom Unit, water sprayer, tray (K1, K2)
- 3.2 Preparation of spawn (K1, K2)
- 3.3 Substrate preparation- Steam pasteurization, Hot water treatment (K2)
- 3.4 Mushroom bed preparation, Spawning of substrate (K2,K3)
- 3.5 Crop management- Incubation and fruit body induction, Harvesting (K3)
- 3.6 Factors influencing mushroom cultivation (K3)

Unit IV:Preservation and value added mushroom products:**(9 hours)**

- 4.1 Short term storage- Refrigeration (K2, K3)
- 4.2 Long term storage - Freezing, dry Freezing, drying, canning (K2,K3)
- 4.3 Food preparations - soup powder, pickles, chips (K3)
- 4.4 Mushroom recipies - cutlets , samosa, curry, manchurian(K1,K4)
- 4.5Beverages (K1,K3)

4.6 Dietary Supplements (K1,K2)

Unit V: Establishment of mushroom Unit:

(9 hours)

5.1 Plans and procedure (K1, K3)

5.2 Role of TIIC and DIC in promoting edible mushroom cultivation (K2, K3)

5.3 Research centers- National level and regional level (K2)

5.4 Cost benefit ratio- Marketing in India and abroad (K1,K3)

5.5 Export value (K2, K3)

5.6 Economics of a small scale model (K1,K2)

Text Books:

1. Marimuthu, T. - Oyster Mushroom. Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore, 1991.
2. Pathak, V.N. and Yadav, N. - Mushroom Production and Processing Technology. Agrobios, Jodhpur, 1998.

Reference Books:

1. Kaul, T.N. - Introduction to mushroom science, Oxford & IBH Co., Pvt. Ltd., New Delhi, 1999.
2. Bahl, N. - Handbook on mushrooms. Oxford & IBH Publishing Co., Pvt. Ltd., 2000.
3. Philip G. Miles, Shu-Ting Chang -Mushroom biology, World Scientific, 1997.

Open Educational Resources (OER):

1. <https://youtu.be/TYu3AnuMJlg>
2. <https://youtu.be/BNtANzcc9yg>
3. <https://youtu.be/8xIVVRHNeXA>
4. <https://youtu.be/0sc0Tnfaytg>