

Government Degree College Baramulla

SEMESTER-3rd

MAJOR COURSE

Subject: BOTANY

Title: Morphology and Anatomy of Angiosperms
(CREDITS (4+2): THEORY- 04, PRACTICALS-02)

Course code: BOT322M
Contact hours: 64(T) + 64(L)

Part 1: Theory= (4 CREDITS)

Course Outcomes:

To impart understanding to students about the fundamental concepts of plant morphology and anatomy, to make them understand the structure of different plant organs, secondary growth and structure of wood in plants.

Course learning Outcomes:

After thoroughly understanding the course the student should be able to:

- *Identify different parts of plants.*
- *Identify and classify different types of tissues in plants.*
- *Identify different modified plant structures.*
- *Identify different aspects of secondary growth in Dicots & Monocots.*
- *Correlate morphology with anatomy.*

Unit I : Vegetative Morphology

Root: Types of Root system, Root zonation, Primary functions of Root, Root modifications.

Stem: Forms of Stem, Primary functions of stems, Branching patterns, Stem modifications, Classification of Buds.

Leaf: Parts of leaf, Leaf venation, Types of Leaves, Phyllotaxy, Leaf Shapes.

Unit II Reproductive morphology

Inflorescence: Inflorescence and its types

Flower: Structure of a typical flower, Aestivation,

Androecium: Stamen, Attachment and its types, Fusion (Cohesion and Adhesion).

Gynoecium: Carpel, Attachment and position, Fusion (Cohesion and adhesion), Placentation and its types

Fruits: Definitions of true, false and parthenocarpic fruits, Major types of fruits

Seed: General Account of Monocot seed and Dicot Seed.

UNIT III: Plant Tissues

Introduction to Plant Tissue; Meristematic tissues, classification of Meristems;

Permanent Tissues, Simple permanent tissues (Parenchyma, Collenchyma, Sclerenchyma),
Complex Tissues: Xylem and Phloem.

Secretory tissue: Structure and classification.

Tissue system: Epidermal/Ground/Vascular (Brief Idea)

UNIT IV: Anatomy of Organs

Anatomy of Monocot and Dicot Root/Stem/Leaf.

Organization of Root and shoot apex (Histogen theory, Tunica Corpus theory, Korper-Kappe theory), quiescent center.

Cambium and its types, Secondary growth in typical Dicot Stem & Root, Anomalous Secondary Growth in Monocots.

PRACTICALS (02 CREDITS)

1. To study floral diagrams and floral formulas through Bio-visual Charts (Liliaceae, Solanaceae).
2. To study different types of placentations through permanent slides, bio-visual charts/models.
3. To study different types of tissues using permanent slides.
4. Study of anatomical details of monocot root/stem/leaf through permanent slides/temporary mounts.
5. Study of anatomical details of dicot root/stem/leaf through permanent slides/temporary mounts.
6. To study secondary growth of dicot stem/root.
7. To Study Fruit dispersal mechanism through bio-visual charts.
8. To ensure conduct of two Botanical trips to Study Natural Flora

Suggested Readings

1. Plant Systematics (third Edition, 2019) by Michael G. Simpson Elsevier
2. Plant Systematics (fourth Edition, 2021) by Gurcharan Singh, CBS Publishers and Distributors, New Delhi
3. Plant Morphology by Jennifer Soukhome; Jennifer Soukhome
4. Plant Anatomy, Morphology and Physiology by Clive Koelling; Syrawood Publishing House.
5. Integrative Plant Anatomy by Dickison, W.C. Harcourt Academic Press, USA.
6. Plant Anatomy by Fahn, A. Pergmon Press, USA.
7. Plant Anatomy by Mauseth, J.D. The Benjammin/Cummings Publisher, USA.

8. Campbell Biology; Concepts and Connection by Taylor, M., Simon, E., Dickey, J., Hogan, K., and Reece J.; Pearson
9. Anatomy of Seed Plants by Esau, K. John Wiley & Sons, Inc., Delhi.

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SEMESTER – 3rd

Skill Enhancement Course

Subject: botany

Title: Commercial Mushroom Cultivation – III: Post Harvesting Management and Marketing Strategies

Course code: BOT322S

Credits (2+2): Theory: 2, Practical: 2

Part 1: Theory = (2 Credits)

Course outcomes:

To develop understanding about the establishment of mushroom farms, scope of growing economically and industrially important mushrooms for marketing and processing. Students have to develop value addition of mushroom products and their marketing strategies – local to cross country.

Course Learning outcomes:

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

- *Gain the knowledge of cultivation of different types of edible mushrooms and spawn production*
- *Gain the knowledge of post harvest procedures*
- *Develop competency in self-employment and income generation.*
- *Markets available for commercial production.*
- *Develop research aptitude*

Unit I: Post Harvest Management

Present scenario and prospects of Mushroom cultivation; Economically and industrially important mushrooms.

National and Global Scenario of Mushroom Market, harvesting, grading, processing, packaging, storing and value addition of mushrooms, preparation of different mushroom products (Pickle, Sweets, Snacks, fast food, namkeen), Branding and marketing of mushroom and its products

Unit II: Business establishment and Marketing

Design, construction and establishment of mushroom farm- an overview, components of a mushroom unit, low tech and high tech mushroom farming, Setting a low cost mushroom unit.

Economics of cultivation, compost production and mushroom recipes

Part 2 Practicals = (2 Credits)

1. Preparation of different recipes and mushroom products (Pickle, sweets, snacks and fast foods).

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2. Design and layout of mushroom farm.
3. Equipment and tools of mushroom unit.
4. Use of Spent mushroom in vermi-composting and organic farming.
5. To ensure two industrial visits to mushroom farms.

Suggested Readings

1. Modern Mushroom Cultivation by Reeti Singh and U.C Singh Agrobios India Jodhpur
2. Mushroom Cultivation by Tewari S.C and Pankaj Kapoor; Mittal Publications New Delhi
3. Mushroom Growing for Everyone by Roy Genders; 3 Queen Square London.
4. Mushrooms in the World by Ian Tribe; Orbis Publishing London
5. Mushroom, A manual of Cultivation by Biswas, S. Dutta; Ashok K Ghosh, PHI Learning, PVT
New Delhi.
6. Mushroom: Cultivation, Nutritional Values, Medical Effects and Environmental Impact by Chang,
S.T and Miles, P.G; CRC Press.

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SEMESTER – 1st

Open Elective Course/ Multidisciplinary

Subject: BOTANY

Title: Plants for Human Welfare

Course code: BOT022I

Credits: Theory –03

Contact hours: 48 (T)

Course Objectives:

To impart the basic understanding of plants to students about economic importance, medicinal values, conservation and diversity of different classes of plants and to acquaint them about the classification, structure, morphology and reproduction.

Learning Outcomes:

After thoroughly understanding the course the student should be able to:

- *Understand the morphological features of different classes of plants as well as their differentiation.*
- *Understand the medicinal value and food value of different classes of plants.*
- *Understand the importance of plants in our daily life and need of conservation strategies.*

Unit 1. Morphology of Flowering plants

(16 Contact hours)

- Morphology of Root, Stem, Leaf, Flower.
- Modifications of Root, Stem, Leaf

Unit II. Major Food Crops

(16 Contact hours)

Plants as food

Origin, Morphology, cultivation and food values of

- Wheat
- Rice
- Maize

Plants as Spices

Spices and condiments (Saffron, Garlic, Ginger, Saunf, Turmeric, Chilies, Cumin)

Timber yielding plants of Kashmir- Popular, Pinus, Juglans, Salix.

Fruits of Kashmir: Apple, Plum, Peaches, Almond, Walnut etc.

Oil yielding plants of Kashmir: Sunflower, Linseed and Mustard

Unit III. Medicinal Plants

(16 Contact hours)

Introduction and Scope

Some common Herbal practices used to cure

- Fever
- Cough and Cold
- Worms
- Arthritis

Traditional uses of medicinal plants

- Podophyllum
- Datura
- Rheum
- Bergenia
- Atropa
- Aconitum
- Artemisia

Books recommended:

1. Balick, Michael J. "Economic botany of the Guahibo. I. Palmae." *Economic Botany* 33.4 (1979): 361-376.
2. Biswas, Bidhan Ch, Amit Roy, and B. K. Sen. "Economic Botany: a bibliometric study." *Malaysian Journal of Library & Information Science* 12.1 (2007): 23-33.
3. Dar, Rafiq Ahmad, Akhila Nand Rai, and Imtiyaz Ahmad Shiekh. "*Stigmina carpophila* detected on *Prunus armeniaca* and *Prunus persica* in India." *Australasian Plant Disease Notes* 12.1 (2017): 1-4.
4. Dar, Rafiq Ahmad. *Fungal Taxonomy: A Molecular Approach*. Educreation Publishing.
5. Hill, Albert Frederick. "Economic botany. A textbook of useful plants and plant products." *Economic botany. A textbook of useful plants and plant products*. 2nd edn (1952).
6. Kochhar, Suraj Lal. *Economic botany*. Cambridge University Press, 2016.
7. Lewis, Walter H., and Memory PF Elvin-Lewis. *Medical botany: plants affecting human health*. John Wiley & Sons, 2003.
8. Pandey, B. P. *Economic botany*. S. Chand Publishing, 1999.
9. Verma, V. *Textbook of economic botany*. Ane Books Pvt Ltd, 2009.
10. Wickens, Gerald E. "What is economic botany?." *Economic botany* 44.1 (1990): 12-28.