Course Code: ALS BOT DSC 02
Course Title: Economic Botany
Discipline Specific Core Course (DSC)
Total Credits: 04 (Theory 02, Practical 02)
Total Lectures: Theory 30, Practical 60

Learning Objectives:

The Learning Objectives of this course are as follows:

- To understand the economic importance of diverse plant species, identifying plants of economic importance through field visit, live plant specimens, herbarium specimens and digital resources.
- To understand the importance of various plant parts and their products used as food, fibres, medicines, oils and economically important products.
- To learn the processing of various economically important plant resources, identification and analysis of nutrients using simple microchemical tests.

Learning Outcomes:

By studying this course, students will be able to:

- acquire knowledge about the economic importance of plants, their products and their role in our daily lives.
- perform micro-chemical tests to study the presence of various biochemical constituents.
- explore the regional diversity of economically important plants.

Theory:

Unit 1. Introduction and Origin of Cultivated Plants: **Lectures: 02**

Importance of Plant Resources; Vavilov's concept for the Origin of cultivated plants; Centers of Origin (Primary and Secondary); Centers of diversity, Harlan's concept of gene pools.

Unit 2. Cereals: **Lectures: 04**

Wheat (Origin, Evolution of Wheat; (tetra- & hexaploid), Morphology, Production, Cultivation and Economic importance of hexaploid wheat); Rice (Origin-Monophyletic and Polyphyletic, Production, Morphology, Cultivation, Comparison between *indica* and *japonica* Rice, Parboiling, Economic Importance); Millets, man-made cereal (*Triticale*) and Pseudocereals, Green revolution (briefly).

Unit 3. Legumes: **Lectures: 03**

General account (Nutritive Value of Pulses, Protein Malnutrition, Lathyrism, Favism, Ecological Importance); Chick pea, and Groundnut (Production, Morphology and Economic Importance). Fodder legumes and green manure crops.

Unit 4. Sugars and Starches: **Lectures: 03**

Sugar-Different sources of sugar, Sugarcane (Morphology, Ratooning, Nobilization, Uses of products and by- products); Starch- sources, types of starch grain, Potato (Morphology, Tuber Anatomy, Seed Tubers vs True Potato Seeds and Economic uses).

Unit 5. Spices, Condiments & Flavorings: **Lectures: 03**

General Account (Spices, Condiments, Culinary Herbs and Essences, with examples), Importance of Spices, Clove (Morphology, Anatomy of part used and Economic importance) and Black Pepper (Morphology, Anatomy of part used and Economic importance).

Unit 6. Beverages: **Lectures: 02**

Types of Beverages (Alcoholic and Non-Alcoholic) with examples, Tea and Coffee (Morphology, Varieties, Chemistry and Economic Importance)

Unit 7. Fibres and Fibre-yielding plants: **Lectures: 03**

Classification of Fibres based upon their Origin (surface fibres, bast fibres, and leaf fibres, with examples); Jute (morphology, extraction and economic importance), Cotton (*Gossypium* species, morphology and economic importance)

Unit 8. Oil-Yielding Plants: **Lectures: 03**

Fatty Oils and Essential Oils, Comparison between Fatty Oils and Essential Oils; Fatty Oils (Classification with examples, keeping quality), Coconut and Mustard (Morphology and Economic Importance); Essential Oils (General characteristics, and Economic Importance, with examples).

Unit 9. Medicinal and Drug-Yielding Plants: **Lectures: 02**

Brief Account of Therapeutic Drugs with Examples; Morphology, Chemical Constituents, Economic Importance of *Cinchona, Rauwolfia, Digitalis.*

Unit 10. Fumigator & Masticatory: **Lectures: 02**

Tobacco **(**Morphology, species - *Nicotiana tabacum* & *N. rustica*), Products, Economic Importance and Health Hazards).

Unit 11. Rubber: **Lectures: 01**

Para Rubber - *Hevea brasiliensis* (Morphology, Tapping of latex, Products and Economic Importance).

Unit 12. Vegetables and Fruits: **Lectures: 02**

General account with common examples.

Practical:

1. **Cereals**:

   Wheat (Habit Sketch, L.S/T.S. grain, W.M. starch grains, Micro-chemical tests), Rice (Habit Sketch, Study of paddy and grain, W.M. starch grains, Micro- chemical tests). Millets (anyone) and Pseudocereals (any one) (specimens/digital resources and grains).

2. **Legumes**:

   Chickpea, Groundnut (Habit, Fruit, Seed structure, Micro-chemical tests).

3. **Sugars and Starches**:

   Sugarcane (Habit Sketch, Products and By-products, Cane Juice-Micro - chemical tests); Potato (Habit Sketch, Tuber morphology, T.S. tuber to show localization of starch grains, W.M. starch grains, Micro-chemical tests).

4. **Spices**:

   Clove and Black pepper (Habit and sections L.S./T.S.).

5. **Beverages**:

   Tea (Plant specimen, Tea leaves), Coffee (Plant specimen, Beans).

6. **Fibres**:

   Jute (Specimens/digital resources of Jute, T.S. stem, Test for cellulose and lignin on section of stem and fibre). Cotton (Specimen, W.M. seed to show lint and fuzz; W.M. fibre, Test for cellulose).

7. **Vegetable Oil-Yielding Plants**:

   Fatty Oils: Coconut; Habit (photograph), Fruit, T.S. nut, Mustard; (Habit- specimen, seeds).

8. **Essential Oils:**

   Extraction methods (Specimen/ digital resources), Habit Sketch of Rose, Jasmine, *Vetiver* sp., (specimens/photographs).

9. **Drug-Yielding plants:**

   Habit - Fever Bark Tree, Poppy, Foxglove (Specimens/ Photographs).

10. **Fumigatory Material:**

    Nicotiana sp. (specimens/photographs), Tobacco Products.

11. **Rubber:**

Para Rubber - Habit, Tapping of latex (Specimen/photograph), Rubber Products.

Suggested Readings:

1. Kochhar, S.L. (2012). *Economic Botany in Tropics.* MacMillan & Co.
2. Kochhar, S.L. (2016). *Economic Botany – A Comprehensive Study* (5th Ed.). Cambridge University Press.
3. Wickens, G.E. (2001). *Economic Botany: Principles & Practices*. The Netherlands: Kluwer Academic Publishers.
4. Chrispeels, & M.J., Sadava, D.E. (1994). *Plants. Genes and Agriculture*. Jones & Bartlett-Publishers.
5. Berg L, (2008). *Introductory Botany: Plants, People, And the Environment*. Thomson Brooks/Cole.
6. Cook F.E.M. (1995). *Economic Botany: Data Collection*. Standard Royal Botanic Garden, Kew, Richmond.

Keywords:

Cultivated plants, Plant products of economic value, Cereals, Legumes, Starches & Sugars, Spices, Oils & Fats, Drug yielding plants, Natural rubber, Fibres.

Teaching Learning Process:

Learning material will be delivered through a series of lectures with conventional chalk and talk method, supported by power point presentations, charts, flow charts and video education resources. Emphasis would be on an interactive classroom environment so as to encourage students to ask questions and clarify their doubts. Students would also be encouraged to refer to the referenced books in the library to inculcate reading habits for better understanding of the subject.

Assessment Methods:

Performance of the students will be evaluated on the basis of regular class test, presentations and assignments as a part of internal assessment during the course, as per the curriculum. There would be a continuous evaluation of laboratory exercises and the record files. End semester university examination will be held for both theory and practical components. In practical, assessment will be done based on continuous evaluation and performance in the practical examination.