IV Semester

Course 11: Plant Resources and Utilization

Credits -3

I. Learning Objectives: By the end of this course the learner has:

1. To know different plants domesticated by humans and utility of their products.
2. To gain knowledge on commercial and timber products obtained from plants.
3. To know the facts on economic value of plants products in relation to human welfare.

II. Learning Outcomes: Students at the successful completion of the course will be able to:

1. Explain the significance of plants in human nutrition.
2. List out different plant products used by human beings.
3. Evaluate the commercial plant products and their utilization
4. Discuss the uses of medicinal and aromatic plants for human health care.
5. Appraise the importance of timber and non-timber products for value added products.

III. Syllabus of Theory:

UNIT-1: Food plants **10 Hrs.**

1. Centres of diversity of plants, origin of crop plants.
2. Domestication and introduction of crop plants; concepts of sustainable development.
3. Cultivation, production, and uses of cereals (rice and wheat), major (jowar and bajra) and minor millets (finger millet, fox tail millet), pulse crops (red gram and black gram) and sugarcane.

UNIT-2: Other economic plant products **8 Hrs.**

1. A general account of oil seed crops and vegetable oils.
2. A general account of fruit and vegetable yielding plants.
3. Plant sources and economic importance of rubber, latex, gums, resins, dyes, alkaloids and tannins.
4. A general account of major fibre crops in India; textile production from plant fibres.

UNIT-3: Commercial plant products **8 Hrs.**

1. A general account and economic potential of spices and condiments.
2. Plant sources and economic importance of flavouring products, beverages, fumitories and masticatories and narcotics.

3. Utilization of some important ornamentals, flowering plants and orchids.

UNIT-4: Medicinal and aromatic plant products 10 Hrs.

1. Traditional and modern uses of some medicinal plants of India.
2. Active compounds in medicinal plants and their pharmacological effects.
3. Essential oils and their uses; aromatic plants in perfumery and cosmetics.
4. Phytochemicals and their potential health benefits.

UNIT-5: Timber products and energy crops 9 Hrs.

1. Important timber yielding plants of India; wood as a construction and manufacturing material.
2. Other uses of wood products, such as paper and fuel.
3. Energy crops, biofuels and bioplastics.
4. Bamboos, *Eucalyptus, Casuarina* - generation of paper industry raw material.

IV. Textbooks:

1. S. K. Jain and R. A. Jain, (2015) Handbook of Plant Resources, Springer, New York.
2. H. Panda and A. K. Padhi, (2017) Medicinal Plants and Their Utilization, Springer, Singapore.
3. G.E. Wickens (1998) Economic Botany: Principles and Practices, Chapman & Hall, London.
4. S.L. Kochhar (1990) The Economic Botany of the Tropics, Macmillan, London.

V. Reference Books:

1. K. V. Peter, (2004) Handbook of Herbs and Spices, CRC Press, Boca Raton.
2. J. E. Simon, J. A. Duke, and E. A. L. Bobilya, (1990) Handbook of Edible Weeds, CRC Press, Boca Raton.
3. J. Smartt and N. Haq, (2016) Handbook of Industrial Crops, Springer, New York.
4. P. N. Ravindran, (2017) The Encyclopaedia of Herbs and Spices, CABI, Wallingford.
5. Beryl B. Simpson (2010) Economic Botany: Plants in Our World, Academic Press, London.
6. Michael J. Balick and Paul Alan Cox (1996) Plants, People, and Culture: The Science of Ethnobotany, Scientific American Library, New York.
7. Ben-Erik van Wyk (2016) Food Plants of the World: An Illustrated Guide, Timber Press, Portland.

8. Jo Homan (2012) Plants That Changed History, Chartwell Books, New York.
9. Gary J. Martin (2004) Ethnobotany: A Methods Manual, Earthscan Publications, London.

VI. Suggested activities and evaluation methods:

Unit-1: Activity: A critical assignment on origin of crop plants.

Evaluation method: Evaluate the extent and quality of data collected to support the assignment's arguments.

Unit-2: Activity: Group discussion on various plant products and their source plants.

Evaluation method: Assess the logical flow and coherence of the group's discussion based on a grading scale.

Unit-3: Activity: A survey report on commercial plant products available in local markets.

Evaluation method: Evaluate the clarity and comprehensibility of the survey questions.

Unit-4: Activity: A case study report on phytomedicines used in human health care.

Evaluation method: Examine the depth and coherence of the discussion and interpretation based on a rubric.

Unit-5: Activity: A field trip to timber depots and silviculture plantations in their locality.

Evaluation method: Evaluate the level of student engagement and active participation during the trip based on a grading scale.

IV Semester

Course 11: Plant Resources and Utilization

Credits -1 (Practical)

I. Course Outcomes: On successful completion of this practical course, student shall be able to:

1. Characterize various plant products based on morphological and microscopic observations.
2. Identify economically valuable plants and their products.
3. Categorize distinct plant products utilized by humans.

II. Laboratory/field exercises:

1. Study of morphology and micro-chemical test for stored material of any 3 food crops.
2. Study of morphology and microscopic study anatomy of some plant fibres (cotton, jute, hemp, ramie, sisal).
3. Study of morphology, medicinal and aromatic plants and their useful parts.
4. Study of some oil yielding crops and properties of their oils.
5. Study of some gum, resin, tannin, dye yielding plants. 6. Study of firewood, biofuel and timber yielding plants.