

Detailed Syllabi

Semester I

Deeksharambh (Induction-cum-Foundation Programme)

0+2 (NG)

The activities to be taken under *Deeksharambh*, in addition to giving a broad view and application areas of the subject of study, also will aim at creating a platform for

- Helping students from different backgrounds for cultural integration
- Knowing about the operational framework of academic process in university
- Instilling life and social skills, leadership qualities, team working spirit
- Developing social awareness, ethics and values, creativity
- Helping students to identify the traditional values and indigenous cultures along with diverse potentialities both in indigenous and developed scenario.

The details of activities/ schedules will be decided by the parent universities. The structure shall include, but not restricted to:

- I. discussions on operational framework of academic process in university, as well as interactions with academic and research managers of the University
- II. creating awareness on the subject of study, and the traditional values and indigenous cultures along with diverse potentialities both in indigenous and developed scenario
- III. interaction with alumni, business leaders, perspective employers, outstanding achievers in related fields, and people with inspiring life experiences;
- IV. group activities to identify the strength and weakness of students (with expert advice for their improvement) as well as to create a platform for students to learn from each other's life experiences;
- V. field visits to related fields/ establishments; and
- VI. sessions on personality development (instilling life and social skills, social awareness, ethics and values, team work, leadership, etc.) and communication skills.

Crop Production and Protection Technologies

4 (3+1)

Objective

To enable the students to have basic idea on crop production and protection practices to understand the domain of agricultural sciences and to have an idea of the different types of machineries/ equipment that can be adopted for these operations

Theory

Introduction and scope of agronomy; Classification of crops; Effect of different weather parameters on crop growth and development; Principles of tillage, tith and its characteristics; Crop seasons; Time and method of sowing of major field crops, seed rate for important crops; Methods and time of application of manures and fertilizers, fertigation; Basic principles of natural farming, organic farming and sustainable agriculture.

Soil-water-plant relationship, crop coefficients, water requirement of crops and critical stages for irrigation; Weeds and their management in crops; Crop rotation, cropping systems, cropping scheme, relay cropping, mixed cropping and intercropping.

Soil forming processes; Classification and composition of soil, soil taxonomy orders; Important soil physical properties and their importance; soil particle distribution; soil inorganic colloids– their composition, properties and origin of charge; ion exchange in soil and nutrient availability; soil organic matter– its composition and decomposition, effect on soil fertility; Soil reaction – acidic, saline and sodic soils; Quality of irrigation water.

Essential plants nutrients- their functions and deficiency symptoms in plants; Important inorganic fertilizers and their reactions in soils; Gypsum requirement for reclamation of sodic soils and neutralizing RSC; Liquid fertilizers and their solubility and compatibility.

Types of horticultural crops; Sowing and planting times and methods; Seed rate and seed treatment for vegetable crops; Macro and micro propagation methods; Types of plant growing structures; Pruning and training; Water requirements and critical stages; Management of orchard; Major pests and diseases of horticultural crops and their management.

Practical

Identification of crops and their varieties, seeds and weeds; Study of different fertilizer application methods and weed control methods; Judging the maturity time for harvesting of crop; Study of seed viability and germination test; Identification of rocks and minerals; Examination of soil profile in the field; Determination of bulk density; particle density and porosity of soil; Determination of organic carbon of soil; Identification of nutrient deficiency symptoms of crops in the field; Determination of gypsum requirement of sodic soils; Identification and description of important fruits, flowers and vegetables crops; Study of different garden tools; Preparation of nursery bed; Practices of pruning and training in some important fruit crops; Study of cultural operations for vegetable crops (sowing, fertilizer application, mulching, irrigation and weed control); Seed extraction techniques; Visit to commercial greenhouse/ polyhouse.

Suggested Readings

1. Ahamad S, Anwar Ali and Sharma P K (Eds). 2018. *Plant Disease Management in Horticultural Crops*. Daya Publishing House, Delhi.
2. Biswas T D and Mukharjee S K. 1987. *A Text Book of Soil Science*. Tata McGraw-Hill publishing Co. Ltd.
3. Brady N C and Ray R Weill. 2002. *The Nature and Properties of Soil*. Pearson Education Inc. New Delhi.
4. Chadha K L. 2003. *Handbook of Horticulture*. ICAR Publication, New Delhi.
5. Das D K. 2020. *Introductory to Soil Science*. Kalyani publication, Ludhiana.
6. Dey G C. 2013. *Fundamentals of Agronomy*. Jain Book Depot.
7. Ghildyal B P and Tripathy R P. 1987. *Soil Physics*. Wiley Eastern Ltd., New Delhi.
8. Hillel D. 1982. *Introduction to Soil Physics*. Academic Press, New York.
9. Indian Society of soil science. 2002. *Fundamentals of Soil Science*. ISSC, IARI, New Delhi.

10. Janick J. 1979. *Horticultural Science*. Surjeet Publications, Delhi.
11. Kumar N. 2017. *Introduction to Horticulture*. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
12. Muthukrishnan N, Ganapathy N, Nalini R and Rajendran R. 2005. *Pest Management in Horticultural Crops*. New Madura Publishers, Madurai, Tamil Nadu.
13. Reddy S R. 2020. *Principles of Agronomy*. Kalyani Publisher.
14. Reddy Yellamanda T and Reddy Shankar G H. 1995. *Principles of Agronomy*. Kalyani Publishers Ludhiana.
15. Sehgal J L. 1996. *Soil Pedology*. Kalyani publication, Ludhiana.
16. Singh Jitendra. 2018. *Fundamentals of Horticulture*. Kalyani Publishers, Ludhiana.
17. Singh S S and Singh R. 2013. *Principles and practices of Agronomy*. Kalyani Publisher.
18. Sudheer K P and Indira V. 2016. *Post harvest Technology of Horticultural Crops*. New India Publishing Agency, New Delhi.

Introduction to Agricultural Engineering

4 (3+1)

Objective

To enable the students to have basic idea on different agricultural engineering applications and the machinery involved in different farm operations, post-harvest and allied activities

Theory

Agricultural Engineering as a discipline; Major divisions of Agricultural Engineering; Importance of Agricultural Engineering for today's agriculture; Different sectors of employment for Agricultural Engineers; Scope of research and higher studies in Agricultural Engineering in India and abroad.

Farm mechanization needs and strategy; Classification of farm machinery on the basis of unit operations; Principles of selection of machinery for different sizes of land and matching power sources; Different types of equipment for tillage, sowing, planting and transplanting, fertilizer application, weed control, plant protection; Harvesting and threshing equipment for rice, wheat, maize, cotton, sugarcane, fruits, tuber crops and other locally important crops; Functions and capabilities of tractor and power tillers; Introduction to the IC engine systems, fuel and air supply systems, cooling and lubricating systems, and electrical systems in a tractor; Basic parts of a power tiller; Hitching system.

Introduction to renewable energy systems; Types of biogas plants, Types of solar energy collectors; Solar water heating systems, solar dryers, solar photovoltaic systems; Wind mills and their different parts.

Importance of soil and water conservation; Different agronomic measures for control of water erosion, mixed cropping, crop rotation, tillage practices, mulching; Different engineering measures; gully control measures.

Use of topographical survey and contour maps.

Different types of water harvesting structures.