

<b>Semester</b>	<b>:</b>	<b>I</b>
<b>Course No.</b>	<b>:</b>	<b>AGEN-111</b>
<b>Course Title</b>	<b>Crop Production and Protection Technologies</b>	

## **SYLLABUS**

### **Objectives:**

- (i) To enable the students to have basic idea on crop production and protection practices to understand the domain of agricultural sciences,
- (ii) To impart the basic knowledge of the different types of machineries/equipments that can be adopted for the said operations.

## **THEORY**

### **AGRONOMY:**

Introduction and scope of Agronomy; Classification of crops; Effect of different weather parameters on crop growth and development; Principles of tillage, tilth 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 SCIENCE:**

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.

### **HORTICULTURE:**

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

**AGRONOMY:** 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.

**SOIL SCIENCE:** 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.

**HORTICULTURE:** 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 [AGEN-111]:

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 Textbook 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.

## **TEACHING SCHEDULE**

### **THEORY [AGEN-111]**

<b>Lecture No.</b>	<b>Topic with Sub-topics</b>	<b>Weightage (%)</b>
<b>AGRONOMY</b>		
<b>1</b>	Introduction and scope of Agronomy	2
<b>2</b>	Classification of crops (with e.g.)	2
<b>3</b>	Effect of different weather parameters on crop growth and development	2
<b>4</b>	Principles of tillage, tilth and its characteristics	2
<b>5</b>	Crop seasons	2
<b>6</b>	Time and methods of sowing of major field crops, Seed rate for important crops	2
<b>7-8</b>	Methods and time of application of manures and fertilizers, Fertigation	3
<b>9-10</b>	Basic principles of Natural farming, Organic farming and Sustainable Agriculture	4
<b>11-12</b>	Soil-Water-Plant relationship, Crop coefficients, Water requirement of crops and Critical stages for irrigation	4
<b>13-14</b>	Weeds and their management in crops	4
<b>15-16</b>	Crop rotation, Cropping systems, Cropping schemes, Relay cropping, Mixed cropping and Intercropping	4
<b>Sub-Total =</b>		<b>33</b>
<b>SOIL SCIENCE</b>		
<b>17</b>	Soil forming processes	2
<b>18</b>	Classification and composition of soil, Soil taxonomy orders	2
<b>19-20</b>	Important soil physical properties and their importance; Soil particle distribution	4
<b>21</b>	Soil inorganic colloids– their composition, properties and origin of charge	2
<b>22</b>	Ion exchange in soil and nutrient availability	2
<b>23-24</b>	Soil organic matter– its composition and decomposition, effect on soil fertility	4
<b>25-26</b>	Soil reaction – acidic, saline and sodic soils	4
<b>27</b>	Quality of irrigation water	2
<b>28</b>	Essential plants nutrients- their functions and deficiency symptoms in plants	4
<b>29-30</b>	Important inorganic fertilizers and their reactions in soils	4
<b>31</b>	Gypsum requirement for reclamation of sodic soils and neutralizing RSC	2
<b>32</b>	Liquid fertilizers and their solubility and compatibility	2
<b>Sub-Total =</b>		<b>34</b>

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<b>HORTICULTURE</b>		
<b>33-34</b>	Types of horticultural crops (with e.g.)	4
<b>35</b>	Sowing and planting time and methods	4
<b>36</b>	Seed rate and seed treatment for major/ important vegetable crops	3
<b>37-38</b>	Macro- and micro-propagation methods	5
<b>39-40</b>	Types of plant growing structures	4
<b>41-42</b>	Pruning and training	4
<b>43</b>	Water requirements and critical stages	2
<b>44-45</b>	Management of orchard	3
<b>46-48</b>	Major pests and diseases of horticultural crops and their management	4
<b>Sub-Total =</b>		<b>33</b>
<b>Total =</b>		<b>100</b>

**PRACTICAL [AGEN-111]**

<b>Exercise No.</b>	<b>Exercise Title</b>
<b>AGRONOMY</b>	
<b>1-2</b>	Identification of crops and their varieties, seeds and weeds
<b>3</b>	Study of different fertilizer application methods and weed control methods
<b>4</b>	Judging the maturity time for harvesting of crop
<b>5</b>	Study of seed viability and germination test
<b>SOIL SCIENCE</b>	
<b>6</b>	Identification of rocks and minerals; Examination of soil profile in the field
<b>7</b>	Determination of bulk density, particle density and porosity of soil
<b>8</b>	Determination of organic carbon of soil
<b>9</b>	Identification of nutrient deficiency symptoms of crops in the field
<b>10</b>	Determination of gypsum requirement of sodic soils
<b>HORTICULTURE</b>	
<b>11</b>	Identification and description of important fruits, flowers and vegetables crops
<b>12</b>	Study of different garden tools
<b>13</b>	Preparation of nursery bed; Study of cultural operations for vegetable crops (sowing, fertilizer application, mulching, irrigation and weed control)
<b>14</b>	Practices of pruning and training in some important fruit crops
<b>15</b>	Seed extraction techniques
<b>16</b>	Visit to commercial greenhouse/ polyhouse