

<b>Semester</b> : I	
<b>Course No.</b> : AGRO-111	<b>Credit Hrs.</b> : 3(2+1)
<b>Course Title</b> : Fundamentals of Agronomy	

## SYLLABUS

**Objective:** To impart the basic and fundamental knowledge of Agronomy.

### THEORY

Agronomy and its scope: Definition, meaning and scope of Agronomy; Art, science and business of crop production, Relation of Agronomy with other disciplines of Agricultural Science. Field crops: Classification, Importance, Ecology and ecosystem. Seeds and sowing: Definitions of Crop, Variety and Seed. Factors affecting crop stands establishment: good quality seed, proper tillage, time of sowing, seed rate, depth and methods of sowing (broadcasting, drilling, dibbling, sowing behind country plough and transplanting etc.). Tillage and tilth: Definition, Objectives, types, advantages and disadvantages of tillage including Conservation tillage, Modern Concept of Tillage. Crop density and Geometry: Plant geometry and Planting geometry, its effect on growth and yield. Crop nutrition: Definition of essential nutrients, Criteria of essentiality, Functional elements, Classification of essential nutrients, Role of macro and micro nutrients. Nutrient absorption, Active and Passive absorption of nutrients, forms of plant nutrients absorbed by plants, Combined/ Un-combined forms. Manures and fertilizers, Nutrient use efficiency: Sources of nutrients: Inorganic (fertilizers), organic (manures) and biofertilizers; their classification and characteristics, method of preparation and role of organic manures in crop production. Integrated Nutrient Management (INM): Meaning, different approaches and advantages of INM. Green manures- role in crop production: Definition, objectives, types of green manuring, desirable characteristics, advantages and limitations of green manuring. Water management: Water resources of the World, India and the State; Soil Moisture Constants: gravitational water, capillary water, hygroscopic water. Weeds:

Definition, importance and basis of classification of weeds and their control. Agro-climatic zones of India and the State. Cropping systems: Factors affecting cropping systems, major cropping patterns and systems in the country. Sustainable crop production: Definition, importance and practices, natural resources and conservation, pollution and pollutants. Allelopathy: Meaning and importance in crop production. Growth and development of crops:

Definition, meaning and factors affecting growth and development.

### PRACTICAL

A visit to Instructional Crop Farm and study of field crops, Identification of crops, seeds, fertilizers, pesticides; Crops and cropping systems in different Agro-climatic zones of the state; Study of some preparatory tillage implements; Study of inter-tillage implements, Practice of ploughing/ puddling; Study and practice of inter-cultivation in field crops; Numerical exercises on calculation of seed, plant population and fertilizer requirement; Study of yield contributing characters and yield estimation of crops; Identification of weeds in different crops; Seed germination and viability test of seed; Practice on time and method of application of manures and fertilizers.

## THEORY [AGRO-111]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1-2	Agronomy and its Scope	Definition, Meaning and Scope of Agronomy, Art, science and business of crop production. Relation of Agronomy with other disciplines of Agricultural Science. Role of Agronomist.	6
3	Field crops	Classification and importance of field crops, Ecology and ecosystem.	6
4	Growth and Development of crops	Definition, Meaning, Factors affecting growth and development, Growth curve.	4
5-7	Seeds and Sowing:	Definitions- Crops, Variety and Seed. Factors affecting crop stand and its establishment; good quality seed, proper tillage, sowing time, seed rate, sowing depth, seed treatment; Methods of sowing/planting: (broadcasting, drilling, dibbling and transplanting, sowing behind plough etc.), Advantages, Disadvantages, Crops to be sown.	10
8	Tillage and Tilth	Definition, Objectives, Types, Advantages and Disadvantages of tillage, including Conservation tillage.	4
9-10	Modern Concept of Tillage	Modern Concept of Tillage: Types, Definition, Concept, Advantages and Disadvantages.	8
11	Crop Density and Geometry	Definitions- Crop density, Crop geometry and Plant geometry. Effects of planting geometry on growth and yield.	5
12-13	Crop Nutrition	Definition of Essential nutrients; Criteria of essentiality, Functional elements, Classification of essential nutrients; Role of macro- and micro- nutrients in plant growth and development.	8

<b>14</b>	Nutrient Absorption	Active and Passive absorption of nutrients, Forms of major plant nutrients (NPK) absorbed by plants; Combined/ Un-combined forms.	
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<b>15-17</b>	Manures and Fertilizers	Classification of manures and fertilizers including biofertilizers with examples; Methods of preparation (FYM and Compost) and Role of organic manures in crop production.	8
<b>18</b>	INM and NUE	Definition, Meaning, Different approaches and Advantages of Integrated Nutrient Management (INM); Concept of Nutrient Use Efficiency (NUE)	6
<b>19</b>	Role of Green Manures in Crop Production	Definition, Objectives and Types of Green manuring; Desirable characteristics, Advantages and Limitations of Green manuring.	6
<b>20</b>	Water Management	Water resources of the World, India and State (Maharashtra)	
<b>21-24</b>	Soil Moisture Constants and Methods of Irrigation	Soil Moisture Constants- Field capacity, Saturation point and PWP; Soil water: Gravitational water, Capillary water, Hygroscopic water; Methods of irrigation, Scheduling of irrigation, Different approaches of scheduling irrigation	10
<b>25-26</b>	Weed Management	Definition, Importance and classification of weeds on season and life cycle basis; Weed control methods- preventive, curative (cultural, physical, mechanical, biological and chemical)	8
<b>27</b>	Allelopathy	Meaning, its effect on crops and weed; Importance in crop production	
<b>28-29</b>	Major Cropping Patterns and Systems in India.	Cropping system: Definition, Classification with examples. Factors affecting cropping systems, Major cropping patterns and Systems in the country.	5

<b>30-32</b>	Sustainable Crop Production	Definition, Components, Importance and Limitations; Practices, Natural resources and Conservation, Pollution and pollutants.	6
<b>Total =</b>			<b>100</b>

### PRACTICAL [AGRO-111]

Exercise No.	Exercise	Practical Sub-topics/ Titles
1	Instructional Crop Farm Visit	Visit to Instructional Crop Farm and Study on field crops.
2	Identification of crops, seeds, fertilizers and pesticides	Identification of crops, seeds, fertilizers and pesticides; Preparation of Seed Album.
3	Crops and cropping systems in different Agro-climatic state zones	Study of crops and cropping systems in Agroclimatic zones of Maharashtra.
4	Study of some preparatory tillage implements	Study of implements required for primary tillage and secondary tillage operations.
5	Study of inter-tillage implements	Study of implements required for inter tillage or after cultivation operations.
6	Practice of ploughing/ puddling	Study of ploughing/ puddling in rice.
7-8	Study and practice of intercultivation in field crops	Study and Practices of inter-cultivation in field crops with tools and implements.
9-10	Numerical exercises on calculation of seed, plant population and fertilizer requirement	Numerical problems on seed rate and plant population.
		Calculation of fertilizer doses.
11	Study of yield contributing characters and yield estimation of crops	Study of yield contributing characters and yield estimation of major crops of region.
12	Identification of weeds in different crops	Identification and preparation of Weed Herbarium of 20 major weeds in different crops [ <i>Parthenium</i> , <i>Lavala</i> , <i>Hariayali</i> , <i>Ekdandi</i> , <i>Kena</i> , <i>Math</i> , <i>Dudhani</i> (small, medium and large), <i>Ghaneri</i> , <i>Kunjru</i> , <i>Reshimkata</i> etc.].
13	Seed germination and viability test of seed	Study of seed germination test of major crops; Methods of viability test of seed of major crops.

<b>14</b>	Practice on time and method of application of manures and fertilizers.	Organic Manure application; Basal application, top dressing and foliar application of fertilizers.
<b>15</b>	Determination of soil moisture	Determination of soil moisture using gravimetric method
<b>16</b>	Determination of field capacity	Determination of field capacity by field method

### **Suggested readings:**

1. William L Donn. 1965. Meteorology. McGraw-Hill Book Co. New York.
2. Yawalkar K S and Agarwal J P. 1977. Manures and Fertilizers. Agricultural Horticultural Publishing House, Nagpur.
3. Rao V S. 1992. Principles of Weed Science. Oxford and IBH Publishing Co. Ltd., New Delhi.
4. Reddy Yellamanda T and Shankar Reddy G H. 1995. Principles of Agronomy. Kalyani Publishers, Ludhiana.
5. Reddy S R. 2008. Principles of Crop Production, Kalyani Publisher, Ludhiana.



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