

<b>INSTITUTE</b>	<b>FACULTY OF AGRICULTURE</b>
<b>PROGRAM</b>	<b>BACHELOR OF SCIENCE (Hons.) AGRICULTURE</b>
<b>SEMESTER</b>	<b>3</b>
<b>COURSE TITLE</b>	<b>FUNDAMENTALS OF CROP PHYSIOLOGY</b>
<b>COURSE CODE</b>	<b>16AS0309</b>
<b>COURSE CREDITS</b>	<b>3</b>

**Objective:**

- 1 To describe in detail the physiology and biochemistry of crop seed and germination.
- 2 To examine the physiological aspects of crop growth and phenological development.
- 3 To define and analyze the mechanisms by which crop plants acquire and utilize resources like carbon, water, light and mineral nutrients.
- 4 To discuss the concepts of assimilate translocation and partitioning in a crop plant.

**Course Outcomes:** After completion of this course, student will be able to:

- 1 Knowing the role of crop physiology in crop health.
- 2 Students will be able to identify deficiency symptoms of nutrients.
- 3 To understand the metabolic and synthetic pathway of bio-molecules.
- 4 Students will differentiate about C3, C4 and CAM plant.
- 5 Develop understanding about the importance of growth hormones in agriculture.

**Pre-requisite of course:** Students will be familiarize with the physiological system of plants.

**Teaching and Examination Scheme**

<b>Theory Hours</b>	<b>Tutorial Hours</b>	<b>Practical Hours</b>	<b>ESE</b>	<b>IA</b>	<b>CSE</b>	<b>Viva</b>	<b>Term Work</b>
2	0	2	50	30	20	25	25

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview.</b> Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview.	2
2	<b>Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology.</b> Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology.	2

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
3	<b>Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms.</b> Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms.	2
4	<b>Photosynthesis: Light and Dark reactions, C3, C4 and CAM plants; Respiration: Glycolysis, TCA cycle and electron transport chain.</b> Photosynthesis: Light and Dark reactions, C3, C4 and CAM plants; Respiration: Glycolysis, TCA cycle and electron transport chain.	3
5	<b>Plant growth regulators: Physiological roles and agricultural uses, Physiological aspects of growth and development of major crops: Growth analysis, Role of Physiological growth parameters in crop productivity.</b> Plant growth regulators: Physiological roles and agricultural uses, Physiological aspects of growth and development of major crops: Growth analysis, Role of Physiological growth parameters in crop productivity.	2
6	<b>Absorption of water, ascent of sap and antitranspirants. Photoperiodism and Vernalization. Translocation of solutes.</b> Absorption of water, ascent of sap and antitranspirants. Photoperiodism and Vernalization. Translocation of solutes.	3
<b>Total Hours</b>		<b>14</b>

#### Suggested List of Experiments:

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Study of plant cells</b> Study of plant cells	2
2	<b>Structure and distribution of stomata</b> Structure and distribution of stomata	2
3	<b>Imbibitions</b> Imbibitions	2
4	<b>Osmosis</b> Osmosis	2
5	<b>Plasmolysis</b> Plasmolysis	2
6	<b>Measurement of root pressure</b> Measurement of root pressure	2
7	<b>Rate of transpiration, photosynthesis and respiration</b> Rate of transpiration, photosynthesis and respiration	2
8	<b>Separation of photosynthetic pigments through paper chromatography</b> Separation of photosynthetic pigments through paper chromatography	2

### Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
9	<b>Tissue test for mineral nutrients</b> Tissue test for mineral nutrients	2
10	<b>Estimation of relative water content</b> Estimation of relative water content	2
11	<b>Measurement of absorption spectrum of chlorophyll</b> Measurement of absorption spectrum of chlorophyll	2
<b>Total Hours</b>		<b>22</b>

### Textbook :

- 1 NA, NA, NA, NA

### References:

- 1 Introductory Plant Physiology, Introductory Plant Physiology, Noggle, G.R. and Fritz, G.J., Prentice Hall Publishers, 1983
- 2 Physiology of Crop Plants, Physiology of Crop Plants, Gardner, F.P., Pearce, R.B., and Mitchell, R.L., Scientific Publishers, 1985
- 3 Plant Physiology 5th edition, Plant Physiology 5th edition, Taiz, L. and Zeiger, E., Sinauer Associates, 2010

### Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking
25.00	25.00	20.00	10.00	10.00	10.00

### Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board may also use any of tools such as demonstration, role play, quiz, brain storming, MOOCs etc.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.