Syllabus for B.Sc. (Hons) Agriculture Year – III (Sem. V)

Subject Code: 16AS0517

Subject Short Name: Pl. Phy. 5.1

Subject Name: Fundamentals of Crop Physiology

Objective:

1. To enable students with complete knowledge of plant cell and water relations
2. To provide knowledge of basic physiological process of plant, mineral nutrition, carbon metabolism
3. To examine the physiological aspects of crop growth and phenological development
4. To define and analyze the mechanisms by which crop plants acquire and utilize resources like carbon, water, light and mineral nutrients

Credits Earned: 3 Credits (2+1)

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

- Know the role of crop physiology in crop health.
- Identify deficiency symptoms of nutrients.
- Understand the metabolic and synthetic pathway of bio-molecules.
- Differentiate about C3, C4 and CAM plant.
- Develop understanding about the importance of growth hormones in agriculture

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Progressive Assessment (PA)	Viva (V)	Term work (TW)	
2	0	2	3	40	20	20	10	10	100

Theory Content:

Unit	Topics	Contact Hours
1	Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview.	**3**

2	Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology.	**2**
3	Structure of chloroplast, Examples of different photosynthetic pigments; Difference between chlorophyll a and chlorophyll b, Structure of chlorophyll a and chlorophyll b, Short discussion on quantum requirement and quantum yield, Red drop and Emerson enhancement effect, Pigment system I and II.	**3**
4	Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms.	**3**
5	Photosynthesis: Light and Dark reactions, C3, C4 and CAM plants; Respiration: Glycolysis, TCA cycle and electron transport chain.	**5**
6	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.	**4**
7	Absorption of water, ascent of sap and antitranspirants. Translocation of solutes; Photoperiodism and Vernalization.	**4**
	Total	**24**

Practical Content:

Unit	**Topics**	**Contact Hours**
1	Study of plant cells	**2**
2	Structure and distribution of stomata	**2**
3	Demonstration of Imbibition, Osmosis, Plasmolysis	**2**
4	Separation of photosynthetic pigments through paper chromatography	**2**
5	Tissue test for mineral nutrients	**2**
6	Estimation of relative water content	**2**
7	Identification of nutrients by hydroponics	**2**
8	Plant growth analysis; Study on senescence and abscission	**2**
9	Demonstration of the effects of different PGRs on plants	**2**

10	Leaf anatomy of C3 and C4 plants	**2**
	Total	**20**

Reference Books:

- Introductory Plant Physiology, Introductory Plant Physiology, Noggle, G.R. and Fritz, G.J., Prentice Hall Publishers, 1983
- Physiology of Crop Plants, Physiology of Crop Plants, Gardner, F.P., Pearce, R.B., and Mitchell, R.L., Scientific Publishers, 1985
- 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 per 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	Understand	Apply	Analyze	Evaluate	Create
25%	25%	20%	10%	10%	10%

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 white 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 class-rooms.
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory/ field.
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.