



**AMITY UNIVERSITY**  
 ——— UTTAR PRADESH ———

### FORMAT FOR COURSE CURRICULUM

**Course Title:** CROP AND SEED PHYSIOLOGY

**Course Code:** AGRI716

**Course Level:** PG

**Credit Units:**4

L	T	P/S	SW/FW	No. of PSDA	TOTAL CREDIT UNITS
2	-	2	2	4	4

**Course Objectives:**

The objective of this course is to acquaint the students with the basic concepts of plant physiology and their application in agriculture

**Pre-requisites:**

Fundamental understanding and knowledge of the basic concepts of plant physiology and their application in agriculture

**Course Contents/Syllabus:**

	Weightage (%)
<b>Module I Introduction</b>	<b>15%</b>
<b>Descriptors/Topics</b> Cell organelles and their physiological functions, structure and physiological functions of cell wall, cell inclusions; cell membrane structure and functions.	
<b>Module II Soil and Water Relations</b>	<b>30%</b>
<b>Descriptors/Topics</b> Soil and plant water relations, water and its role in plants, properties and functions of water in the cell water relations-cell water terminology, water potential of plant cells. Mechanism of water uptake by roots-transport in roots, aquaporins, movement of water in plants – Mycorrhizal association on water uptake. Water loss from plants- Energy balance-Solar energy input-energy dissipation at crop canopy level- evapotranspiration, transpiration –	

Driving force for transpiration, plant factors influencing transpiration rate..	
<b>Module III Crop Physiology</b>	<b>30%</b>
<p><b>Descriptors/Topics</b></p> <p>Stomata structure and function – mechanism of stomatal movement, antitranspirants. Physiology of water stress in plants: Influence of water stress at cell, organ, plant and canopy levels. Indices for assessment of drought resistance. The role of mineral nutrients in plant metabolism: Essential elements, classification based on function of elements in plants.</p> <p>Uptake of mineral elements in plants –Mechanisms of uptake-translocation of minerals in plants. Physiological and metabolic functions of mineral elements, critical levels, deficiency symptoms, nutrient deficiency and toxicity. Foliar nutrition.</p> <p>Photosynthesis and its importance in bio productivity. Calvin cycle, supplementary pathway of C fixation in C4 and CAM plants and its significance. Photorespiration. Translocation of photosynthates and its importance in sink growth.</p>	
<b>Module IV Important Plant Mechanisms</b>	
<p>Nitrogen metabolism,. Lipid metabolism. Biosynthesis of fatty acids, diacyl and triacyl glycerol, fatty acids of storage lipids. Secondary metabolites and their significance in plant defense mechanism..</p> <p>Hormonal regulation of growth and differentiation, plant growth hormones and their physiological role, senescence, fruit growth, abscission. Photomorphogenesis: ,Photoreceptors, phytochrome, cryptochrome. Physiology of flowering: Photoperiodism and vernalization.</p>	<b>15%</b>
<b>Module V Seed Physiology</b>	<b>10%</b>
Seed Physiology, seed composition, germination, dormancy	

**Course learning outcome:**

Student will be able to:

- Understand the basic concepts of plant physiology and its application in agriculture.

**Pedagogy for Course Delivery:**

The course pedagogy will include lectures, discussion on applications of the topics covered.

**List of Professional Skill Development Activities (PSDA):**

- Prepare Soil and plant water relationship models
- Study of important Plant Mechanisms in support of quantity and quality management of crops
- Understand the modern concepts of plant physiology and their application in agriculture
- Preparation of reports based on seed composition, germination and seed dormancy

**Lab/ Practicals details, if applicable:**

- Field measurement of root-shoot relationship in crops at different growth stages
- Estimation of growth evaluating parameters like CGR, RGR, NAR, LAI etc., at different stages of crop growth
- Computation of harvest index of various crops
- Assessment of crop yield on the basis of yield attributing characters
- Construction of crop growth curves based on growth analysis data
- Computation of competition functions, viz. LER, IER aggressively competition index etc in intercropping
- Senescence and abscission indices
- Analysis of productivity trend in un-irrigated areas

**Assessment/ Examination Scheme:**

<b>Theory L/T (%)</b>	<b>Lab/Practical/Studio (%)</b>
75	25

**Theory Assessment (L&T):**

<b>Continuous Assessment/Internal Assessment (40%)</b>					<b>End Term Examination (60%)</b>
<b>Components (Drop down)</b>	<b>HA</b>	<b>Q</b>	<b>C</b>	<b>A</b>	<b>End Sem Exam</b>
<b>Linkage of PSDA with Internal Assessment Component, if any</b>	<b>PSDA-1 to 4</b>		<b>PSDA-1 to 4</b>		
<b>Weightage (%)</b>	10	15	10	05	60

**Lab/ Practical/ Studio Assessment:**

<b>Continuous Assessment/Internal Assessment</b>					<b>End Term Examination</b>
<b>Components (Drop down)</b>	<b>Q</b>	<b>Viva Voce</b>	<b>P</b>	<b>A</b>	<b>End Sem Exam</b>
<b>Weightage (%)</b>	15	10	10	5	60

**Mapping Continuous Evaluation Components/PSDA with CLOs:**

<b>Bloom's Level &gt;</b>	Remembering	Understanding	Applying and Analysing	Evaluating and Creating
<b>Course Learning Outcomes</b>	CLO1	CLO2	CLO3	CLO4

Assessment type/PSDA				
Assessment Component 1	✓		✓	
•		✓		
•	✓			
•	✓	✓	✓	✓
•				
•			✓	✓
Assessment Component 'n'	✓	✓		✓

**Text Reading:**

**References:**

- Salisbury, F.B. and Ross, C.W. 1986. Plant Physiology, CBS Publishers & Distributors, New Delhi.
- sTaize, L. and Zeiger, E. 2006. Plant Physiology. Sinauer Associates, Inc, Publishers, Sunderland, Massachusetts, USA.

**Additional Reading:**

**Any other Study Material:**