ODD SEMESTER LECTURE PLAN (AY 2025-2026)

Name of the college: Government College of Arts, Science and Commerce, Sanquelim Goa

Name of Faculty: Dr. Nisha Kevat	**Subject: Plant Physiology (THEORY)**	
Paper code: BOT 201	**Program/Course: S.Y B.Sc.**	**Division: - --**
Academic year: 2025 - 2026	**Semester: III**	**Total Lectures: 45 (Theory)**

Course Objectives:

1. Develop an understanding of the physiological processes occurring in plants and their responses.
2. Enable the analysis of plant responses to various factors and understand their effects on physiological processes.
3. Impart practical skills essential for planning and executing research in plant physiology and allied fields

Course Learning Outcome:

1. Enlist the role of mineral nutrients, plant pigments and phytohormones in plant growth.
2. Understand and describe various physiological processes such as absorption, transpiration, photosynthesis, photorespiration, translocation and nitrogen metabolism involved in plant growth.
3. Apply the knowledge of mineral nutrients and phytohormones in regulating plant growth.
4. Analyze plant responses to various growth and environmental factors and plan the experimental layout for research work.

Month	Lectures From:	To:	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/Assignments	ICT Tools	Reference books
July 2025	23/06/	28/06	03	**Lecture 1**: Introduction to Syllabus	List the types of solutes transported in plants	Power Point Presentation, Chalk	Bajracharya, D (1999).

				Lecture 2- Module 1: Transport of water, inorganic and organic solutes **Lecture 3:** Plant water relations: Water potential and its components;	Define water potential in one sentence.	And Board, You Tube Study Videos	Experiments in Plant Physiology - A Laboratory Manual. Narosa Publishing House, New Delhi. 2. Evert, RF (2012). Raven Biology of Plants. International Edition. 8th edition. Palgrave Macmillan, U.K. 3. Hopkins, WG and Huner, NP (2009). Introduction to Plant Physiology. 4 th
June/ July 2025	30/06/	05/07	03	Lecture 4: water transport through xylem (ascent of sap); Lecture 5: transpiration and its significance; factors affecting transpiration; Lecture 6: root pressure and guttation.	dentify the main tissue involved in the ascent of sap. Name one factor that affects transpiration. Describe root pressure in one sentence.	Power Point Presentation, Chalk And Board, You Tube Study Videos	
July 2025	07/07/	12/07	03	Lecture, 7: Mineral nutrition: Criteria for determining essentiality of elements; Lecture 8: macronutrients and micronutrients; Lecture 9: role and deficiency symptoms of essential elements;	List two criteria for determining the essentiality of an element. Differentiate between macronutrients and micronutrients. Name one deficiency symptom of nitrogen in plants.	Power Point Presentation, Chalk And Board, You Tube Study Videos	
July 2025	14/07/	19/07	03	Lecture 10: carriers and pumps. Lecture 11: Translocation of organic solutes; composition of phloem sap; Lecture 12: path of translocation (girdling experiment)	Identify one type of pump involved in solute transport. Mention one component of phloem sap. Explain the girdling experiment.	Power Point Presentation, Chalk And Board, You Tube Study Videos	

July 2025	21/07/	26/08	03	Lecture 13: mechanism of translocation of organic solutes (Pressure Flow Model);	Describe the Pressure Flow Model in one sentence.	Power Point Presentation, Chalk And Board, You Tube Study Videos	edition. John Wiley & Sons, U.S.A. 4. Jain, VK (2022). Fundamentals of Plant Physiology. S. Chand and Company, Delhi. 5. Kochar, SL and Gujral, SK (2020). Plant Physiology: Theory and Applications. Cambridge University
				Lecture 14: assimilate partitioning.	Explain assimilate partitioning in one sentence.		
				Lecture 15: **Module 2: Plant metabolism** **Photosynthesis:** Structure of photosynthetic apparatus;	Name the process of biological nitrogen fixation.		
July/August 2025	28/07/	02/08	03	Lecture 16: photosynthetic pigments (chlorophyll a, chlorophyll b, carotenoids, phaeophytins and phycobillins).	List and briefly describe the major photosynthetic pigments found in plants.	Power Point Presentation, Chalk And Board, You Tube Study Videos	
				Lecture 17: Light reaction: Photosystems and harvesting of light;	Draw and label the structure of a photosystem and explain its role in light harvesting.		
				Lecture 18: electron transport pathways (cyclic and non-cyclic);	Differentiate between cyclic and non-cyclic electron transport pathways in one sentence.		
August 2025	04/08/	09/08	03	Lecture 19: mechanism of ATP synthesis (photophosphorylation).	Write a short note on photophosphorylation and how it leads to ATP formation.	Power Point Presentation, Chalk And Board, You Tube Study Videos	
				Lecture 20: mechanism of ATP synthesis (photophosphorylation).			
				Lecture 21: Dark reaction: C_3,	Describe the Calvin cycle (C3 cycle) in brief with any two key enzymes involved.		
August 2025	04/08/	09/08	03	Lecture 22: C_4 and	Explain how C4 plants minimize photorespiration using Kranz anatomy.	Power Point Presentation, Chalk And Board, You Tube Study Videos	
				Lecture 23: CAM pathways of carbon fixation.	What adaptations help CAM plants survive in arid conditions? Give examples.		
				Lecture 24: Mechanism of photorespiration.	Define photorespiration and state one reason why it is considered wasteful.		

August 2025	11/08/	16/08	03	Lecture 25: **Respiration:** Glycolysis, TCA cycle, oxidative phosphorylation, Pentose Phosphate Pathway; anaerobic respiration.	Outline the stages of cellular respiration with at least one product of each.	Power Point Presentation, Chalk And Board, You Tube Study Videos	Press India Private Limited, New Delhi. 6. Pandey, SN and Sinha, BK (2006). Plant Physiology. Vikas Publication House, New Delhi. 7. Sinha, R (2015). Modern Plant Physiology. Narosa Publishing House, New Delhi. 8. Taiz, L, Zeiger, E, Moller, IM and Murphy, A (2015). Plant Physiology
				Lecture 26: **Respiration:** Glycolysis,	Write the steps of glycolysis and mention its net ATP gain.		
				Lecture 27: TCA cycle,	Illustrate the TCA cycle and mark any two key enzymes involved.		
August 2025	18/08/	23/08	03	Lecture 28: oxidative phosphorylation,.	Explain the role of the electron transport chain in oxidative phosphorylation.		
				Lecture 29: Pentose Phosphate Pathway;	What is the significance of the Pentose Phosphate Pathway in plants?		
				Lecture 30: anaerobic respiration	Compare aerobic and anaerobic respiration in terms of energy yield.		
August 2025	25/08/	26/08	02	Lecture 31: **Module 3: Nitrogen metabolism, phytohormones and plant responses** **Nitrogen metabolism:** Biological nitrogen fixation - I	Define biological nitrogen fixation and name two organisms that perform it.	Power Point Presentation, Chalk And Board, You Tube Study Videos	
				Lecture 32: **Module 3: Nitrogen metabolism, phytohormones and plant responses** **Nitrogen metabolism:** Biological nitrogen fixation II	Write any two enzymes involved in biological nitrogen fixation and their role.		
GANESH CHATURTHI BREAK							
September 2025	01/09/	06/09	03	Lecture 33: Assimilation of nitrate and ammonia - I	Explain how nitrate is reduced to ammonia in plants.	Power Point Presentation, Chalk	

				Lecture 34: Assimilation of nitrate and ammonia - II	Describe the steps involved in the assimilation of ammonia into amino acids.	And Board, You Tube Study Videos	
				Lecture 35: Phytohormones: Discovery and physiological roles of auxins,	State how ammonia is assimilated in plants.		
September 2025	08/09/	13/09	03	Lecture 36: physiological roles of auxins,	Identify one physiological role of auxins.	Power Point Presentation, Chalk And Board, You Tube Study Videos	
				Lecture 37: Discovery and physiological roles of gibberellins,	List one physiological role of gibberellins.		
				Lecture 38: Discovery and physiological roles of cytokinins,	Describe one function of cytokinins.		
September 2025	15/09/	20/09	03	Lecture 39: Discovery and physiological roles of abscisic acid.	Describe one function of abscisic acid..	Power Point Presentation, Chalk And Board, You Tube Study Videos	
				Lecture 40: Discovery and physiological roles of ethylene.	Describe one function of ethylene.		
				Lecture 41: Plant responses to light, temperature and stress	Identify one plant response to light.		
September , 2025	22/09/	27/09/	03	Lecture 42: : Discovery and role of phytochrome and cryptochrome;	Define phytochrome in one sentence.	Power Point Presentation, Chalk And Board, You Tube Study Videos	
				Lecture 43: Responses of red and far-red light on photomorphogenesis;	Mention the effect of red light on photomorphogenesis.		
				Lecture 44: technique, mechanism and applications of vernalization	Describe vernalization in one sentence.		
September/October, 2025	29/09/	4/10	03	Lecture 45: Plant responses to stress (drought)	List one plant response to drought stress.	Power Point Presentation, Chalk	

				Lecture 46: Plant responses to stress (salt).	State one plant response to salt stress.	And Board, You Tube Study Videos	
				Lecture 47: Plant responses to stress (metals and radiations).	State one plant response to salt stress.	Power Point Presentation, Chalk And Board, You Tube Study Videos	
October , 2025	6/10/	11/10	03	Lecture 48: REVISION	REVISION	Power Point Presentation, Chalk And Board, You Tube Study Videos	
				Lecture 49: REVISION	REVISION		
				Lecture 50: REVISION	REVISION		
October , 2025	13/10	18/10	03	Lecture 51: REVISION	REVISION		
				Lecture 52: REVISION	REVISION		
				Lecture 53: REVISION	REVISION		

*****Note: Data filled in the above form is sample data.

*** Assessment Rubrics**

Component	**Max Marks**
ISA 1	**7.5**
ISA 2	**7.5**
ISA 3 (Best 2 of 3)	**7.5**
Practical	**NA**
Project	**NA**
Semester End Exam	**80**