

DEPARTMENT OF BOTANY

CURRICULUM PLAN 2026-2027 ((ODD- SEMESTER)

Dr Kalpana Kumari

B. Sc. (H) Botany (NEP) Semester V

Paper: DSC-15 Plant Physiology

Topic	Approximate Schedule (Month wise)	Assignment/ Class Test/Presentation	Suggested Reading
Theory			
Unit 1: Plant-water relations Water potential and its components, water absorption by roots, water movement via symplast, apoplast and aquaporins, root pressure, guttation, ascent of sap, cohesion-tension theory, transpiration, factors affecting transpiration, anti-transpirants	July-August		Hopkin, W. G., Hunner, N. P. (2009) Introduction to Plant Physiology John Willey and Sons 4th ed
Unit 2: Mineral nutrition Essential and beneficial elements, macro- and micro-elements, criteria for essentiality, roles of essential elements, chelating agents, phytosiderophores, mineral nutrition in hydroponics and aeroponics.	August September	Assignment	Taiz, L., Zeiger, E., Moller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.
Unit 3: Nutrient uptake Transport of ions across cell membrane, passive absorption, simple and facilitated diffusion (carrier and channel proteins), Fick's law, active absorption, proton ATPase pump, electrochemical gradient, ion flux, uniport, co-transport	September – October	Power Point Presentation	Kochhar, S.L., Gujral, S.K. (2020). Plant Physiology: Theory and Applications. New Delhi, Delhi: Foundation Books, 2ndEdn. Cambridge University Press India Pvt, Ltd.

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Unit 4: Translocation in the phloem 03 Hours Composition of phloem sap, phloem loading and unloading, Pressure-Flow Model, sourcesink relationship DISCIPLINE SPECIFIC CORE COURSE – 15: Plant Physiology	September – October		Bhatla, S.C., Lal, M.A. (2018). Plant Physiology, Development and Metabolism. Singapore: Springer Nature, Singapore Pvt. Ltd.
Unit 5: Plant growth regulators 08 Hours Chemical nature (basic structure, precursor), physiological roles, bioassays and applications of Auxins, Gibberellins, Cytokinins, Absciscic Acid, Ethylene; Other growth regulators - Jasmonic Acid, Brassinosteroids, Nitric Oxide. Mechanism of action of Auxin. Introduction to interactions among plant growth regulators.	September – October		
Unit 6: Physiology of photo-sensory molecules 03 Hours Discovery, chemical nature, mode of action and role of phytochrome, cryptochrome and phototropin in photomorphogenesis	October – November	Class Test	
Unit 7: Physiology of flowering Concept of florigen, photoperiodism, CO-FT Model of flowering, vernalization.	October- November		
Unit 8: Seed dormancy 01 hour Seed dormancy -causes and methods to induce and/or overcome dormancy Revision of Syllabus	October- November		
PRACTIALS: G1			
1.Determination of osmotic			Comprehensive

potential of plant cell sap by plasmolytic method 2. Determination of water potential of given tissue (potato tuber) by weight method. 3. Determination of water potential of potato tuber cells by falling drop method. Study of effect of light on the rate of transpiration in excised leafy twig. 4. Calculation of stomatal index and stomatal frequency from the two surfaces of leaves of a mesophyte and xerophyte.	August-September		Practical Plant Physiology by S. L. Kochar, Sukhbir Kaur Gujral, Macmilan Publication
5. To calculate the area of an open stoma and percentage of leaf area open through stomata in a mesophyte and xerophyte (both surfaces). 6. To study the effect of different concentrations of ABA on stomatal closure. 7. To study the induction of amylase activity in germinating barley grains.	August-September		
8. To study the effect of light and dark on seed germination. 9. To study induction of amylase activity in germinating barley grains. 10. To study the effect of ethylene on fruit ripening. 19. To study the effect of auxin on rooting.	October-November		
Revision of Syllabus	October-November	Mock Examination	

Course: B. Sc. Life Sc. (P) 3rd Year Semester: V
Paper: Plant Physiology and Metabolism (DSC)

Topic	Approximate Schedule (Month wise)	Assignment/Class Test/Presentation	Suggested Reading
Practical: Group G1			
1. Determination of osmotic potential of plant cell sap by plasmolytic method. 2. To separate photosynthetic pigments by paper chromatography. 3. Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte. 4. To study the activity of catalase and study the effect of pH on the activity of enzyme. 5. To Study Hill's reaction.	July-August		Bajracharya, D. (1999) Experiments in Plant Physiology. A Laboratory Manual. Narosa Publishing House, New Delhi Kochhar, S.L. & Gujral, S.K. 2020. Plant Physiology: Theory and applications, 2nd Edition. Cambridge University Press, UK.
6. To study the effect of the environmental factor light on transpiration by excised twig. 7. To study the effect of light intensity on O ₂ evolution in photosynthesis. 8. Comparison of the rate of respiration in any two parts of a plant. 9. To demonstrate	September-October		Bhojwani, S.S., Bhatnagar, S.P., Dantu, P.K. (2015). The Embryology of Angiosperms, 6th edition. New Delhi, Delhi: Vikas Publishing House.

Respiratory Quotient (RQ). 10. Bolting / Effect of auxins on rooting. 11. To demonstrate the delay of senescence by cytokinins/ effect of ethylene on fruit ripening. 12.To study the phenomenon of seed germination (effect of light and darkness).			
Revision of Syllabus	November	Mock Examination	

B. Sc. (H) Botany (NEP) Semester I

Paper: DSC-2Cell Biology: Organelles and Biomolecules

Topic	Approximate Schedule (Month wise)	Assignment/Class Test/Presentation	Suggested Reading
PRACTIALS: GROUP G1			
1. Study of cell and its organelles with the help of electron micrographs and other digital resources. 2. Study of plant cell structure with the help of epidermal peel mount of Allium/Rhoeo/Crinum.	July-August		2. Karp, G. (2010). Cell Biology, 6th edition. New Jersey, U.S.A.: John Wiley & Sons. 3. Majumdar, R., Sisodia, R. (2019). Laboratory Manual of Cell Biology, with reference to Plant Cells. New Delhi, Delhi: Prestige

			Publication.
3. Microchemical tests for carbohydrates (reducing, non-reducing sugars and starch), lipids and proteins. 4. Separation of chloroplast pigments by paper chromatography/ Thin Layer Chromatography.	September-October		4. Nelson, D.L., Cox, M.M. (2008). Lehninger Principles of Biochemistry, 5th edition. New York, NY: W.H. Freeman and Company. 5. Reven, F.H., Evert, R.F., Eichhorn, S.E. (1992). Biology of Plants. New York, NY: W. H. Freeman and Company.
5. Separation of amino acids by paper chromatography. 6. Study the effect of organic solvent and temperature on membrane permeability. 7. Demonstration of the phenomenon of protoplasmic streaming in Hydrilla leaf. 8. Demonstration of the phenomenon of plasmolysis and deplasmolysis. 9. Demonstration of separation of biomolecules by dialysis.	October-November		6. Tymoczko, J.L., Berg, J.M., Stryer, L. (2012). Biochemistry: A short course, 2nd edition. New York, NY: W. H. Freeman and Company
Revision of Syllabus	November	Mock Examination	