FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF BOTANY
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Life sciences *(Degree/Honors)*			**Semester - VI**	Session: **2024-2025**
1	**Course Code**	**BOSC-06 T**		
2	**Course Title**	**Plant Physiology and Economic Botany**		
3	**Course Type**	**Discipline Specific course (DSC)**		
4	**Pre-requisite** (if, any)	**As per program**		
5	**Course Learning. Outcomes (CLO)**	At the end of this course, the students will understand to ➢ Gain a deep understanding of the fundamental physiological processes in plants, including photosynthesis, respiration, transpiration, and nutrient uptake, and their regulation. ➢ Acquire practical skills in conducting experiments and using various techniques. ➢ Develop a comprehensive understanding of the economic value and utilization of plant resources. ➢ Acquire knowledge and skills to identify and classify economically important plant species.		
6	**Credit Value**	**3 Credits**	***Credit = 15 Hours - learning & Observation***	
7	**Total Marks**	**Max. Marks: 100**	**Min Passing Marks: 40**	

PART -B: Content of the Course

Total No. of Teaching–learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Plant-water relations & Mineral nutrition** Importance of water, water potential and its components; Transpiration and its significance; Factors affecting transpiration; Root pressure and guttation. Essential elements, macro and micronutrients; Criteria of essentiality of elements; Role of essential elements; Symptoms of mineral deficiency in major crops, Transport of ions across cell membrane, active and passive transport.	12
II	**Photosynthesis and Lipid Metabolism** Historical background, photosynthetic pigments and their role photochemical reactions, PSI, PSII, Q cycle, C4pathways; Crassulacean acid metabolism; Factors affecting CO_2 reduction. Synthesis and breakdown of triglycerides, β-oxidation, glyoxylate cycle, gluconeogenesis and its role in mobilization of lipids during seed germination, α oxidation	11
III	**Respiration and Nitrogen Metabolism** Glycolysis, anaerobic respiration, TCA cycle; Oxidative phosphorylation, Glyoxylate, Oxidative Pentose Phosphate Pathway. Electron transport and mechanism of ATP synthesis; C3, C4 and CAM pathways of carbon fixation, Photorespiration. Nitrate assimilation, biological nitrogen fixation, Physiology and biochemistry of nitrogen fixation, Ammonia assimilation (GS-GOGAT), reductive amination and transamination, amino acid synthesis.	11
IV	**Economic Botany:** Origin of Cultivated Plants, Examples of major plant introductions; Crop domestication and loss of genetic diversity; evolution of new crops/varieties, importance of germplasm diversity. Brief account of crops, millets, legumes, spice, Beverages, oils, drug, fiber, and timber yielding plant.	11
Keywords	**Osmosis, Transport, Hill reaction, Genetic diversity.**	

Signature of Convener & Members (CBoS) :

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Taiz, L., Zeiger, E., MØller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.
2. B. P. Pandey (2017) Economic Botany. S. Chand Publication, New Delhi.
3. Kochhar, S.L. (2012). Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
4. Bajracharya, D., (1999). Experiments in Plant Physiology- A Laboratory Manual. Narosa Publishing House, New Delhi.

Reference Books Recommended-

1. . Wickens, G.E. (2001). Economic Botany: Principles & Practices. Kluwer Academic Publishers, The Netherlands.
2. Chrispeels, M.J. and Sadava, D.E. 1994 Plants, Genes and Agriculture. Jones & Bartlett Publishers.
3. Harborne, J.B. (1973). Phytochemical Methods. John Wiley & Sons. New York.
4. Hopkins, W.G., Huner, N.P., (2009). Introduction to Plant Physiology. John Wiley & Sons, U.S.A. 4th Edition.

Online Resources–

- **e-Resources / e-books and e-learning portals**
- **https://education.nationalgeographic.org/resource/photosynthesis/**
- **https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242210/**
- **https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/nitrogen-metabolism**
- **https://en.wikipedia.org/wiki/Lipid_metabolism**

Online Resources–

- **e-Resources / e-books and e-learning portals**
- **www.swayam.ac.in**
- **www.ignou.ac.in**
- **www.egyankosh.ac.in**
- **www.iitm.ac.in**
- **www.eskillindia.org**
- **www.eshiksha.mp.gov.in**
- **www.vlab.co.in**
- **www.internshala.com**
- **www.ndl.iitkgp.ac.in**

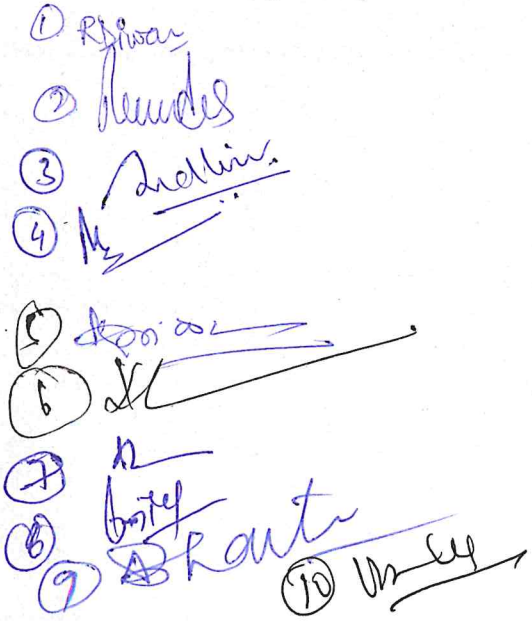
PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks
Continuous Internal Assessment (CIA): 30 Marks
End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE): 70	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:



FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF BOTANY
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Sciences *(Degree/ Honors)*		**Semester - VI**	Session: **2024-2025**
1	Course Code	**BOSC-06**	
2	Course Title	**Lab. Course -06 (Plant Physiology and Economic Botany)**	
3	Course Type	**Laboratory course**	
4	Pre-requisite (if, any)	**As per program**	
5	Course Learning. Outcomes (CLO)	Acquire practical skills in conducting experiments and using various techniques to measure and analyze plant physiological parameters, enabling students to design and execute experiments in plant physiology research. ○ Acquire knowledge and skills to identify and classify economically important plant species, and understand their ecological requirements, cultivation techniques, and potential for sustainable utilization. ○ Apply critical thinking and problem-solving skills to analyze and evaluate the impacts of human activities on plant resources, and develop strategies for the conservation, sustainable management, and utilization of plant biodiversity.	
6	Credit Value	**1 Credits**	***Credit =30 Hours Laboratory or Field learning/Training***
7	Total Marks	**Max. Marks: 50**	**Min Passing Marks: 20**

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
Lab./Field Training/ Experiment Contents of Course	1. Determination of osmosis and plasmolysis. 2. Determination of osmotic potential of plant cell sap by plasmolytic method. 3. Demonstration of the process of transpiration. 4. To find out rate of transpiration by potometer method. 5. To find out stomatal frequency and stomatal index. 6. Chemical separation of photosynthetic pigments. 7. To find out that oxygen evolved during the process of photosynthesis. 8. To study the effect of quality and intensity of light on photosynthesis. 9. To find out the effect of carbon dioxide concentration on the rate of photosynthesis. 10. To find out the Respiratory Quotient of different respiratory substrates by respirometer method. 11. To compare the rate of respiration in different parts of a plant. 12. Study of amylase and catalase enzymes. 13. Morphological features and economic importance of cereals, millets, legumes, oil, spices, drug, fiber, and timber yielding plant.	**30**
Keywords	Physiology, Economic Botany, Beverages, Enzyme.	

Signature of Convener & Members (CBoS) :

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. . Bajracharya, D., (1999). Experiments in Plant Physiology- A Laboratory Manual. Narosa Publishing House, New Delhi.
2. Kochhar, S.L. (2012). Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
3. Wickens, G.E. (2001). Economic Botany: Principles & Practices. Kluwer Academic

Reference Books Recommended –

1. Taiz, L., Zeiger, E., MØller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.
2. Hopkins, W.G., Huner, N.P., (2009). Introduction to Plant Physiology. John Wiley & Sons, U.S.A. 4th Edition.

Online Resources–

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- **www.ignou.ac.in**
- **www.egyankosh.ac.in**
- **www.iitm.ac.in**
- **www.eskillindia.org**
- **www.eshiksha.mp.gov.in**
- **www.vlab.co.in**
- **www.internshala.com**
- **www.ndl.iitkgp.ac.in**

Online Resources–

- **e-Resources / e-books and e-learning portals**
- **https://education.nationalgeographic.org/resource/photosynthesis/**
- **https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242210/**
- **https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/nitrogen-metabolism**
- **https://en.wikipedia.org/wiki/Lipid_metabolism**

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): 15 **(By Course Teacher)**	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE): 35	**Laboratory / Field Skill Performance: On spot Assessment** **A. Performed the Task based on lab. work - 20 Marks** **B. Spotting based on tools & technology (written) – 10 Marks** **C. Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS:

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