

For 2 years PG programme

(Scheme B-1)

Botany Core (Practicum) Syllabus

M.Sc.III Sememester

Part A :Introduction				
Program 2 years PG		Class- M.Sc.	Sem III	Session 2025-2026
1	Course code		PC31	
2	Course Title		Plant physiology and Biochemistry	
3	Coursetype		Practicum course	
4	Course Learning outcome(CLOs)		On completion of this course students will able to explain and apply knowledge of plant processes like photosynthesis, respiration, and mineral nutrition. Students should also be able to understand water and solute transport, and how plants respond to environmental stresses. Practical skills in conducting experiments, analyzing data, and interpreting results related to plant physiologyand biochemistry.	
5	Credit value		Pratical-04	
6	Total marks		Max marks:100) University Exam:60 CCE:40	Minimum passing marks=40
Part:B:Content of the course				

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Total No of Lectures-Tutorial-practicals(08 Hours per week)	
L-T_P:0-0-120(Total hours)	
G. Assignments/Practice/Survey/Fieldwork	No of Hours:120
B.List of practicals to be performed in the laboratory	
Suggested Laboratory Exercise: 1) Effect of time and enzyme concentration on the rate of reaction of enzyme C e.g. acid phosphatase, nitrate reductase. 2) Effect of substrate concentration on activity of any enzyme C (Catalase, amylase). 3) Demonstration of the substrate inducibility of the enzyme nitrate reductase. 4) Determination of succinate dehydrogenase activity, its kinetics and sensitivity to inhibitors. 5) Separation of isoenzyme of esterase, peroxidase by native polyacrylamide gel electrophoresis. 6) To demonstrate photophosphorylation in intact chloroplast, resolve the photoproteins by SDS-PAGE and perform autoradiography desalting of proteins by gel filtration chromatography employing Sephadex G-25. 7) Extraction of seed proteins depending upon the solubility. 8) Desalting of proteins by gel filtration chromatography employing Sephadex G-25. 9) Preparation of standard curve of protein and estimation of protein contents in extracts of plant material by Lowry's Bradford's method. 10) Fraction of proteins using gel filtration chromatography by Sephadex G-100 or Sephadex G-200. 11) Radioisotope methodology, autoradiography, instrumentation (GM counter and scintillation counter) and principles involved. 12) Principles of colorimetry, spectrophotometry, and fluorimetry / calorimetry. 13) Determine rate of transpiration by Ganong's photometer. 14) Determine rate of respiration in germination/young buds by Gannong's respirometer.	

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- 15) Determination of Osmotic Potential by incipient plasmolysis.
- 16) Determination of DPD by Schardakov's method.
- 17) Effect of light intensity on the rate of Photosynthesis.
- 18) Separation of chlorophyll pigment by paper chromatography.

Part C: Learning Resources

(Textbooks, Reference books, other resources)

Suggested Readings:

- Heldt, H.W. and Piechulla, B. 2011. Plant Biochemistry (4th Ed.) Academic Press, London, UK.
- Chitra K Y A practical manual of ecology, cytology ,genetics, plant physiology,biochemistry,M/S Agrobios (India),2019
- Moore, T.C. 1989. Biochemistry and Physiology of Plant Harmones (2nd Ed.) Springer-Verlag, New York USA.
- Verma SK and Verma M.A text book of plant physiology ,Biochemistry and Biotechnology
- Shingote Prashant.A practical manual for plant physiology and biochemistry,Lap Lambert Academic press,2017.

Suggestive digital platforms web links

<https://www.ncbi.nlm.nih.gov/books>

<https://bio.libretexts.org/Bookshelves/>

Suggested equivalent online courses:

<https://nptel.ac.in/>

<https://swayam.gov.in/>

<https://www.mooc.org/MOOC.org>

Part D-Assessment and Evaluation



Suggested Evaluation methods

Maximum marks:100

Internal Assessment(CCE): 40

External assessment(UE): 60

Internal assessment: Continuous Comprehensive Evaluation(CCE):40	a)Class test b)Assignmnt/Presentation/Project report c)Appropriate weightage of attendance in the class	40 marks
External Assessment	Practical paper as per university examination	60 marks
	Grand total	100

Remarks/Suggestions:

1 .Assessment mode for internal evaluation will be basedon the guidelines issued byUGC on:Evaluation reforms in higher educational InstitutionsNov 2019,and pedagogicalApproaches and evaluation reforms2021.

2. Internal assessment will be further distributed as per table given in Appendix 3 of 14(2), as applicable from time to time.

3 .The pass percentage will be 40 %(Grade P) both for theory and practicum. A student has to obtain 40%marks in internal as well as in End term examination separately to pass a course.



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Part A :Introduction				
Program 2 years PG		Class- M.Sc.	Sem III	Session 2025-2026
1	Course code		PC32	
2	Course Title		Cytology,Genetics and Biostatistics	
3	Coursetype		Practicum course	
4	Course Learning outcome(CLOs)		On completion of this course students will able to understand cell structure and function, apply genetic principles, and analyze biological data using statistical methods. They will learn in identifying cell organelles, understanding cell division, analyzing inheritance patterns, and interpreting statistical results from biological experiments.	
5	Credit value		Practical-04	
6	Total marks		Max marks:100) University Exam:60 CCE:40	Minimum passing marks=40
Part:B:Content of the course				
Total No of Lectures-Tutorial-practicals(08 Hours per week) L-T_P:0-0-120(Total hours)				



H. Assignments/Practice/Survey/Fieldwork	No of Hours:120
B.List of practicals to be performed in the laboratory	
1. Collection and growth of plant materials for study of Mitosis / Meiosis. 2. To study different stages of Mitosis. 3. To determine the mitotic index of given plant material. 4. Study of Meiosis in given plant material. 5.Effect of Mutation on germination of seed eg. <i>Trigonella</i>. 6. To prove Mendel's law of Segregation. 7. To prove Mendelian Monohybrid ratio. 8. Numerical exercise on Mendel's dihybrid crosses, gene interaction and genetical mapping. 9. To calculate the value of X^2 to test the goodness fit of experimental results. 10. Exercise on Laws of probability (single coin toss and double coin toss) 11.Numerical problem on mean ,mode and medium 12. To determine the standard deviation and standard error	
Part C: Learning Resources	
(Textbooks,Reference books, other resources)	
Suggested Readings: ➤ Sen S and Kar Dipak.2005.Cytology and Genetics,Narosa Publication House,NewDelhi ➤ Mukherjee Pranab.2016.Introduction to Biostatistics, SChand &Co Pvt. Ltd. ➤ Hariprasad N and henna BP .Cellbiology and genetics Lab manual. ➤ Satguruprasad.Fundamentals of biostatistics ,Emkay publication. ➤ Raghuvanshi R K. and Siddique Practical exercise in Cytology ,Genetics plant breeding and biostatistics,CBS publishers	

- Practical Cytology ,Applied Genetics and Biostatistics,Himalaya publishing House pvt.Ltd.

Suggestive digital platforms web links .

<https://www.ncbi.nlm.nih.gov/books>

<https://bio.libretexts.org/Bookshelves/>

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<https://nptel.ac.in/>

<https://swayam.gov.in/>

<https://www.mooc.org>MOOC.org

Part D-Assessment and Evaluation

Suggested Evaluation methods

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Remarks/Suggestions:

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on:Evaluation reforms in higher educational InstitutionsNov 2019,and pedagogicalApproaches

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