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**FIRST YEAR OF BACHELOR OF SCIENCE  
MAJOR/MINOR BOTANY REVISED SYLLABUS  
ACCORDING TO CBCS NEP2020**

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**COURSE TITLE: BOTANY PRACTICAL SEMESTER-I, W.E.F. 2023-2024**

**RECOMMENDED BY THE BOARD OF STUDIES IN BOTANY  
AND**

**APPROVED BY THE ACADEMIC COUNCIL**

Devrukh Shikshan Prasarak Mandal's

Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and  
Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh.  
Tal.Sangmeshwar, Dist. Ratnagiri-415804, Maharashtra, India

Academic Council Item No: 3 dated 08/07/2023

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangmeshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Bachelor of Science
Name of the Department	:	Botany
Name of the Class	:	First Year
Semester	:	First
No. of Credits	:	04
Title of the Course	:	Botany Practical
Course Code	:	S102BTP
Name of the Vertical in adherence to NEP 2020	:	Major and Minor
Eligibility for Admission	:	12 <sup>th</sup> Science Pass seeking Admission to Degree Programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra
Passing Marks	:	40%
Mode of Assessment	:	SSE
Level	:	UG
Pattern of Marks Distribution for TE and CIA	:	60:40
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2023-2024
Ordinances /Regulations (if any)	:	

*Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce and Vid. Dadasaheb Pitre Science College, Devrukh (An Autonomous College Affiliated with University of Mumbai)*

## Syllabus for First Year of Bachelor of Science in Botany

(With effect from the academic year 2023-2024)

**SEMESTER-I**

**Paper No.– Botany Paper – II**

**Course Title: Botany Practical**

**No. of Credits - 02**

**Type of Vertical: Major and Minor**

**COURSE CODE: S102BTP**

### Learning Outcomes Based on BLOOM's Taxonomy:

After completion of the course, the learner will be able to...

Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CLO-01	Remember	Recall the occurrence, structure, reproduction of Nostoc, Spirogyra, Rhizopus, Aspergillus and Riccia, Definition of cell biology, ecology, ecosystem, multiple alleles, Types of Cells, ecosystems, phenotypes and genotypes
CLO-02	Understand	Describe the identification and classification of algae, fungi and bryophytes on basis of general characters and principles of taxonomy, type of cells with their differences, ultrastructure and function of Cell wall, plasma membrane, endoplasmic reticulum and chloroplast, ecological concepts, gene interaction and Mendelian Genetics
CLO-03	Apply	Demonstrate the Botanical Understanding to local area problems related to diversity and nutrition pattern of algae, fungi and bryophytes, local ecological diversity and pattern of cell divergence and its expression.
CLO-04	Analyse	Differentiate the changing patterns of reproduction in algae, fungi and bryophytes, changing behavior of cell and its expression in ecological conditions.
CLO-05	Evaluate	Justify the role of algae, fungi and bryophytes nature, Role of cell biology, ecology and genetics in the evolution of living organism

**Syllabus for First Year of Bachelor of Science in Botany****(With effect from the academic year 2023-2024)****SEMESTER-I****Paper No.– Botany Paper –III****Course Title: Botany Practical****No. of Credits - 02****Type of Vertical: Major and Minor****COURSE CODE: S102BTP**

<b>Course Content</b>			
<b>Module</b>	<b>Practicals</b>	<b>Cr</b>	<b>L</b>
		<b>02</b>	<b>60</b>
I	1. Electron micrographs/Models of viruses – T-Phage and TMV 2. Gram staining of bacteria 3. Study of stages in the life cycle of <i>Nostoc</i> from fresh/preserved material and permanent slides 4. Study of stages in the life cycle of <i>Spirogyra</i> from fresh/preserved material and permanent slides 5. Economic importance of algae: <i>Ulva</i> (Biofuel), <i>Spirulina</i> (Neutraceutical), <i>Gelidium</i> (Agar) 6. Study of stages in the life cycle of <i>Rhizopus</i> from fresh/preserved material and permanent slides 7. Economic importance of Fungi: Mushroom, yeast, wood rotting fungi (any bracket fungus) 8. Study of stages in the life cycle of <i>Riccia</i> from fresh/preserved material and permanent slides 9. Economic importance of Bryophytes: <i>Sphagnum</i>	01	30
II	1. Identification of cell organelles with the help of photomicrograph: Plastids: Chloroplast, Amyloplast, Endoplasmic Reticulum and Nucleus 2. Cell inclusions: Starch grains ( <i>Solanum tuberosum</i> and <i>Oryza sativa</i> ); Aleurone Layer ( <i>Zea mays</i> ); Cystolith ( <i>Ficus</i> ); Raphides ( <i>Pistia</i> ); Sphaeraphides ( <i>Opuntia</i> ) 3. Examining various stages of mitosis in root tip cells ( <i>Allium</i> ) 4. Identification of plants adapted to different environmental conditions: Hydrophytes: Floating: Free floating ( <i>Pistia/Eichornia</i> ); Rooted floating ( <i>Nymphaea</i> ); Submerged ( <i>Hydrilla</i> ) 5. Mesophytes (any common plant); Hygrophytes ( <i>Typha/Cyperus</i> ) 6. Xerophytes: Succulent ( <i>Opuntia</i> ); Woody Xerophyte ( <i>Nerium</i> ); Halophyte ( <i>Avicennia</i> pneumatophore) (No sections in ecology, only identification and description of specimens. Morphological adaptations only) 7. Calculation of mean, median and mode 8. Calculation of standard deviation 9. Frequency distribution, graphical representation of data-frequency polygon, histogram, pie chart	01	30

	10. Study of Karyotypes: Human: Normal male and female, Plant: <i>Allium cepa</i>		
		Total	02 60

### Required Previous Knowledge

To study module -I the basic knowledge of fundamentals of Biology, branches of Biology, basics of Viruses, Bacteria, Algae, Fungi and Bryophytes is necessary before starting to learn the course

To study module -II the basic knowledge of fundamentals of Biology, branches of Biology, basics of Cell biology, Ecology and Genetics is necessary before starting to learn the course

### Access to the Course

The course is available for all the students admitted for Bachelor of Science as a Major or a minor. The students seeking admission in other disciplines may select the course as a minor considering the terms and conditions laid down by the University of Mumbai, the Government of Maharashtra, and the college, from time to time.

### Forms of Assessment

Courses having laboratory sessions shall be assessed at the end of each semester. The pattern will be followed as passed in Academic Council of the college.

### Grading Scale

The grading scale used is O to F. Grade O is the highest passing grade on the grading scale, and grade F is a fail. The Board of Examinations of the college reserves the right to change the grading scale.

## Reference Books

1. College Botany Volume I and II by Gangulee, Das and Dutta. Central Education Enterprises
2. Cryptogamic Botany Volume I and II by G M Smith, McGraw Hill.
3. Text book of Fungi by O.P. Sharma, Tata McGraw
4. Morphology and Evolution of Vascular Plants by Gifford, E. M. and Foster, A. S., W.H. Freeman & Co., New York.
5. Cryptogamic Botany Vol. I & II (2nd Edition) by Gilbert, M. S., Tata McGraw Hill Publishing Co., Ltd New Delhi.
6. Introductory Phycology by Kumar, H. D. 1988, Affiliated East-West Press Ltd., New York.
7. Comparative Morphology of Vascular Plants by Foster, A. S. and Gifford, A.E.M. jr. Vakils, Peffer & Simons Pvt., Ltd.
8. The Morphology of Angiosperms by Sporne, K.R. B.I. Publication, Bombay.

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9. Taxonomy of Vascular Plants by Lawrance. G.H.M. 1951. MacMillan, New York.
10. Environmental Science: A Global Concern by Cunningham.W.P. and Saifo S.W. 1997. WCB. McGraw Hill.
11. Biochemistry and Molecular Biology of Plants. by Buchanan. B.B. Grussem. W. and Jones. R.L. 2000. American Society of Plant Physiologists, Maryland, USA.
12. Plant Metabolism (2nd Edition) by Collins. H.A. and Edwards D.H. Lefebvre. D.D. and Layzell. D.B. (eds) 1997. Longman, Essex, England
13. Genetics by Russel. Wesley Longman inc publishers. ( 5th edition)
14. Plant Physiology by Taiz and Zeiger Sinauer Associates inc. publishers
15. Fundamentals of Ecology by E P Odum and G W Barrett. Thompson Asia Pvt Ltd. Singapore.
16. Cell Biology by De Robertis
17. A Text Book of Systematic Botany by Sutaria R N
18. Taxonomy of Angiosperms by Pandey S N and Mishra S D
19. A text book of Plant Ecology by Ambasht R.S.
20. Fundamentals of Cytology by L. W. Sharp.
21. Taxonomy of Angiosperms by V.N. Naik, Tata McGraw Hill
22. Plant Systematics: An integrated Approach by Gurcharan Singh, Science Publ.
23. Prescott, L.M., Harley J.P., Klein D. A. (2005). Microbiology, McGraw Hill, India. 6th edition.
24. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata McGraw-Hill Co, New Delhi.