

T. Y. B. Sc.

SEMESTER-VI

**NEW SYLLABUS
CBCS PATTERN**

HAND BOOK OF BOTANY PRACTICALS

BOTANY (BO-367, BO-368 & BO-369)

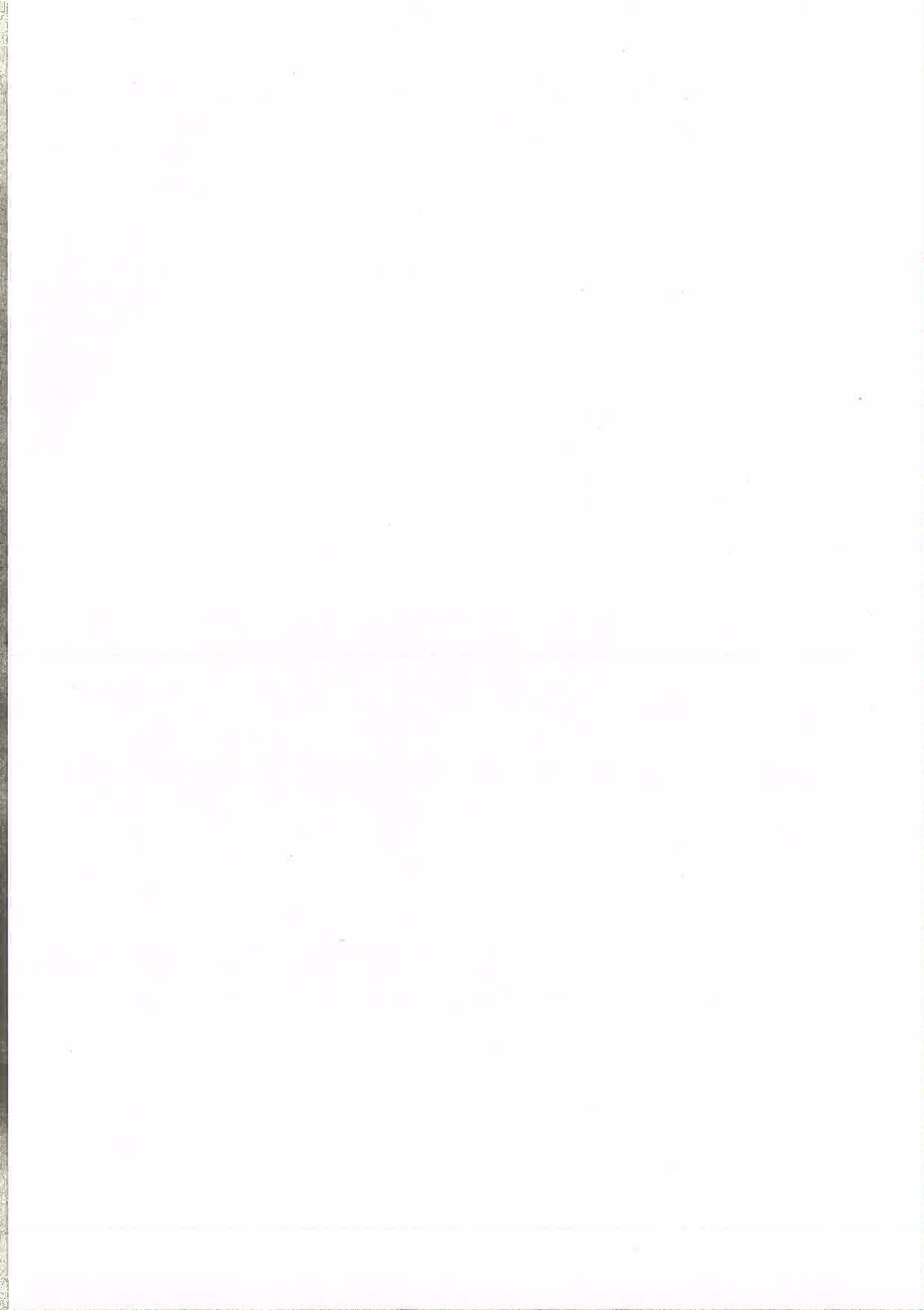
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Dr. A. M. BHOSALE**



NIRALI
PRAKASHAN
ADVANCEMENT OF KNOWLEDGE



SPPU New Syllabus

Hand Book Of

BOTANY PRACTICALS

for

T.Y. B.Sc. Botany CBCS Pattern

BO-367, BO-368 and BO-369, Semester VI

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Price ₹ 250.00



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N5909

HAND BOOK OF BOTANY PRACTICALS

ISBN 978-93-5451-585-9

First Edition : May 2022

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Published By :
NIRALI PRAKASHAN

Abhyudaya Pragati, 1312, Shivaji Nagar,
Off J.M. Road, Pune – 411005
Tel - (020) 25512336/37/39
Email : niralipune@pragationline.com

Printed By :
YOGIRAJ PRINTERS AND BINDERS

Survey No. 10/1A, Ghule Industrial Estate
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Food for Thought

*"Botany I Rank
with the Most
Valuable Science".*

- Thomas Jefferson

"Botany, the eldest daughter of medicine".

- Johann Hermann Baas

"Botany, the Science of the vegetable Kingdom is one of the most attractive, most useful and most extensive department of human knowledge. It is above every other, the science of beauty".



Preface ...

This Hand Book of Botany Practicals for T.Y.B.Sc. Botany, Semester VI students is written according to CBCS pattern of Savitribai Phule Pune University (SPPU), which is implemented from the Academic year 2021.

BO 367 (Practicals based on BO 361 and BO 362), BO 368 (Practicals based on BO 363 and BO 364) and BO 369 (Practicals based on BO 365 and BO 366). In each practical course there are about 16 practicals. Thus about 48 different practicals devoted to the subjects like Physiology and Biochemistry, Plant Pathology and Evolution, Advanced Biotechnology, Plant Breeding and Seed Technology. All the practicals are written in a mode of "Hand on experience" as the students are performing the experiments in Lab. All the experiments have very short introduction, Principle of the experiment, Requirements such as Glass wares, Chemicals, Plant material, instruments etc.

The students will perform every experiment very easily even on their own without any help. Wherever possible diagrams are also included. Preparations of chemicals are given in detail. Every experiment has tabular observations to be recorded. Formulae for calculations are given and the students will calculate the results very easily. At the end they will write conclusion if they wish.

At the end there are some Annexures depicting some simple definitions, concentration of solutions, units of length, conversion units of temperature, SI units of mass, constants of acids and bases, preparation of buffers, method of drawing standard graph using computer. These will be very useful to the students while performing the practical.

Not only this but we have emphasized on precautions to be taken (smart tips) while performing the experiments. So that our students will complete the practicals without wasting time and they will not have to repeat the experiment.

The interesting point of writing the Hand Book of Botany Practical is that the procedure is given at length and stepwise in a highly illustrative fashion. The references are also quoted at the end.

This book also contains the format of writing the Report of visits to institutes, laboratories, etc. So the Hand Book of Botany Practicals is "All in One". We are very sure that it will serve the purpose of students and the teachers. It is very nicely prepared by highly experienced teachers fulfilling all the demands of students.

The basic aim of writing this book is providing necessary help to our students by all means.

We are highly impressed by the overwhelming response of students and staff to our all books of Sem. V and Sem. VI. Taking the spirit and inspiration from them our team of authors decided to write this novel Hand Book of Botany Practicals, which was the Genuine need of students.

We greatly thank the whole team of Nirali Prakashan and the dynamic leader Mr. Jignesh Furia for taking urgent step for publication of this book.

We expect positive suggestions from students and staff for improvement of this book in future.

Authors

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1. Practical BO 367: Practical Based on Plant physiology and Metabolism, and Biochemistry

Sr. No.	Title	No. of Practical
1.	Determination of osmotic potential of plant cell sap by plasmolysis method.	01
2.	Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte.	01
3.	Demonstrate the activity of catalase and study the effect of pH and enzyme concentration.	01
4.	To study the effect of light intensity and bicarbonate concentration on O ₂ evolution in photosynthesis.	01
5.	Comparison of the rate of respiration in any two parts of a plant.	01
6.	Separation of amino acids by paper chromatography.	01
7.	Demonstration experiments (any four) (i) Bolting. (ii) Effect of auxins on rooting. (iii) Suction due to transpiration. (iv) R.Q. (v) Respiration in roots.	01
8.	Estimation of total free amino acids by spectrophotometry	01
9.	Estimation of soluble proteins by Lowery <i>et. al.</i> method.	01
10.	Demonstration of Enzyme activity: Amylase/invertase /catalase	01
11.	Estimation of reducing sugars by DNSA method	01
12.	Estimation of Vitamin C (Ascorbic acid) from plants.	01
13.	Qualitative tests for starch, lipids and proteins.	01
14.	Determination of the iodine number of lipids using Hanus method.	01

2. Practical BO 368: Practicals Based on Plant Pathology and Evolution and Population Genetics

Sr. No.	Title	No. of Practical
1.	Preparation of any one culture media for isolation of plant pathogens.	01
2.	Culture technique- Streak plate methods, pour plate methods, Spread plate methods.	01
3.	Study of any two of fungal. (Downy mildew of Grapes, Head smut of Jowar, Tikka diseases of Groundnut) diseases	01
4.	Study of any two of each bacterial and mycoplasma diseases	01
5.	Study of any two of each viral and non-parasitic diseases of plants.	01
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12.	Demonstration of any three evidences of Organic Evolution	01
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14.	Numerical Problem based on Hardy-Weinberg Equilibrium	01
15.	Study of Sympatric and Allopatric speciation with suitable example	01
16.	Study of Isolation mechanism : Prezygotic and Postzygotic (Any one example from each)	01
17.	Submission of Report on Visit to Paleobotany Laboratory/ Museum/Fossil Garden	01

3. Practical BO 369: Practicals Based on Advanced Plant Biotechnology and Plant Breeding and Seed Technology

Sr. No.		No. of Practicals
1.	Preparation and sterilization of MS Medium and Callus Induction using leaf primordia	01
2.	Production of secondary metabolites in any suitable plant material	01
3.	Artificial seed production by Sodium Alginate method encapsulation (somatic embryogenesis)	01
4.	Demonstration to equipments used in genetic engineering like gene gun, PCR, gel doc, microcentrifuge, electrophoresis, micropipettes, incubator, shaker etc. (live/videos/photographs/visit to research labs)	01
5.	Study of Transgenic plants- Arabidopsis thaliana as a model plant, Bt-Brinjal, Flr-svr Tomato, and other GM crops like soybean, maize, tobacco as a pharmaceuticals, banana as a edible vaccine etc. (live/videos/photographs/visit to research labs)	01
6.	Preparation of plant based nano-particles	01
7.	Demonstration to Fermentation of fruit juice and wine production from grapes/pomegranate/jamun/ apple/ber (live/videos/photographs/visit to research labs)	01
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