B.SC., BOTANY

From the Academic Year2023 – 2024

Programme Out comes (PO)	
The B.Sc. Botany program is designed to achieve the following objectives	
PO1	Apply the knowledge of science and technology fundamentals for findings solution for complex problems.
PO2	To provide up to date theoretical knowledge on various forms of plants, theirinteractions with biotic and abiotic entities in the ecosystem and relevant practical skills.
PO3	To comprehend and interpret various facets of Botany including the importance and judicious utilization of plant sources.
PO4	Exploration of diverse plant life-forms and to nature the conservation of biodiversity.
PO5	To understand the principles and applications of various traditional and modern techniques used in Botany.
PO6	To disseminate knowledge on the design and execution of experiments in Botanywith emphasis on the operation of relevant sophisticated instruments.
PO7	To impart knowledge on the economic importance of plant/microbial resources andtheir products and to promote entrepreneurship skill.
PO8	To promote proficiency in designing the research problems, review of literature, laboratory experiments, data analyses and preparation of reports with professional ethics.
PO9	To motivate the students to take up innovative and cutting-edge research in frontier areas of Botany and related biology subjects.
PO10	To enable the students to take up various qualifying examinations concerning Botanyand to face the challenges in career opportunities.

Program specific Outcomes (PSO)	
On successful completion of the B.Sc. Botany program, the students are expected to	
PSO1	Implement the concept of science and technology to foster the traditional and modern techniques for solving the complex problems in Plant Biology.
PSO2	Ensure the use of contemporary tools and techniques in understanding the scope and significance of Botany
PSO3	Develop the scientific problem solving skills during experimentation, research projects, analysis and interpretation of data
PSO4	Design scientific experiments independently and to generate useful information to address various issues in Botany.
PSO5	Enhanced capacity to think critically; ability to design and execute experiments independently and/or team under multidisciplinary settings
PSO6	Design and standardize protocols for public health and safety, and cultural, societal, and environmental considerations
PSO7	Apply appropriate techniques, resources, and modern ICT tools for understanding plant resources.
PSO8	Demonstrate the contextual knowledge in sustainable exploitation of medicinal, economically important and endangered plants as per the National Biodiversity Act.
PSO9	Follow the concept of professional ethics and bioethics norms for practicing the value of plant kingdom.
PSO10	Communicate proficiently with various stakeholders and society, to comprehend and to write and present reports effectively

Methods of Assessment	
Recall (K1)	Simple definitions, MCQ, Recall steps, Concept definitions
Understand/ Comprehend (K2)	MCQ, True/False, Short essays, Concept explanations, Short summary or overview
Application (K3)	Suggest idea/concept with examples, Suggest formulae, Solve problems, Observe, Explain
Analyze (K4)	Problem-solving questions, Finish a procedure in many steps, Differentiate between various ideas, Map knowledge
Evaluate (K5)	Longer essay/ Evaluation essay, Critique or justify with pros and cons
Create (K6)	Check knowledge in specific or offbeat situations, Discussion, Debating or Presentations

Year I

Semester I

CORE I : CORE-I PLANT DIVERSITY I ALGAE

Course outcomes	**On completion of this course, students will be able to:**	
CO1	Relate to the structural organization, reproduction and significance of algae.	K1
CO2	Demonstrate knowledge in understanding the various life cycle patterns and the fundamental concepts in algal growth	K2
CO3	Explain the benefits of various algal technologies on the ecosystem.	K3
CO4	Compare and contrast the thallus organization and modes of reproduction in algae.	K4
CO5	Determine the emerging areas of Algal Biotechnology for identifying commercial potentials of algal products and their uses.	K5

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO6**	**PSO7**	**PSO8**	**PSO9**	**PSO10**
CO1	3	3	1	3	2	1	2	2	2	1
CO 2	3	3	2	2	3	3	2	`1	3	3
CO 3	2	2	1	1	2	2	1	3	2	2
CO 4	3	3	3	3	3	2	3	3	3	2
CO 5	3	3	2	3	2	3	3	3	2	3

S-Strong (3) **M-Medium (2)** **L-Low(1)**

CORE-II PLANT DIVERSITY I ALGAE - PRACTICAL-I

Course outcomes: CO	**On completion of this course, the students will be able to Programme**	**outcomes**
CO1	Recall and identify algae using key identification characters.	K1
CO2	Demonstrate practical skills in preparation of fresh mount and identification of algal forms from algal mixture.	K2
CO3	Describe the internal structure of algae prescribed in the syllabus	K3
CO4	Decipher the algal diversity in fresh/marine water and their economic significance	K4
CO5	Evaluate the various techniques used to culture algae for commercial purposes	K5

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	1	3	2	1	2	3	2	1
CO 2	3	3	2	2	3	3	2	3	3	3
CO 3	2	2	3	3	1	2	1	3	1	2
CO 4	3	3	3	3	3	2	3	3	3	2
CO 5	3	3	2	2	2	3	3	3	2	3

S-Strong (3) **M-Medium (2)** **L-Low(1)**

Core-Allied-I: ELECTIVE ALLIED BOTANY-I

Course outcomes: CO	**On completion of this course, the students will be able to:**	**Programme outcomes**
CO1	Increase the awareness and appreciation of human friendly algae and their economic importance.	K1
CO2	Develop an understanding of microbes and fungi and appreciate their adaptive strategies.	K2
CO3	Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.	K3
CO4	Compare the structure and function of cells and explain the development of cells.	K4
CO5	Understand the core concepts and fundamentals of plant biotechnology and genetic engineering.	K5

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	1	3	3	3	3
CO 4	3	3	2	3	3	3	2	3	2	3
CO 5	3	2	2	2	2	2	2	1	2	1

S-Strong (3) M-Medium (2) L-Low(1)

Core-Allied Practicals-I: ELECTIVE ALLIED BOTANY PRACTICALS

Course outcomes: CO	**On completion of this course, the students will be able to**	**Programme Outcomes**
CO1	To study the internal organization of algae and fungi.	K1
CO2	Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.	K2
CO3	To study the classical taxonomy with reference to different parameters.	K3
CO4	Understand the fundamental concepts of plant anatomy and embryology.	K4
CO5	To study the effect of various physical factors on photosynthesis.	K5

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	1	3	3	1	3
CO 4	3	3	2	3	3	3	3	2	3	3
CO 5	3	2	2	2	2	2	2	1	2	2

S-Strong (3) **M-Medium (2)** **L-Low(1)**

SKILL ENHANCEMENT COURSE - SEC – 1

Non-Major Elective-I

Course outcomes: CO	**On completion of this course, the students will be able to:**	**Programme Outcomes**
CO1	Recognize the different forms of biofertilizers and their uses.	K1
CO2	Explain and interpret the components, patterns, and processes of bacteria for growth in crop production.	K2
CO3	Apply techniques for synthesizing green manure and develop strategies to increase crop yield.	K3
CO4	Analyze and decipher the significance of biofertilizers in soil fertility	K4
CO5	Develop new strategies to enhance growth and quality check of medicinal herbs considering the practical issues pertinent to India.	K5

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	2	1	3	2	1	2	2	2	2
CO 2	3	3	2	1	2	3	2	3	2	3
CO 3	2	2	3	3	1	2	2	3	2	3
CO 4	3	2	1	1	2	3	2	3	2	3
CO 5	3	3	2	3	1	2	3	3	3	3

S-Strong (3) **M-Medium (2)** **L-Low(1)**

SKILL ENHANCEMENT COURSE - SEC – 1

Non-Major Elective-I: ENVIRONMENTAL BIOTECHNOLOGY

Course outcomes: CO	**On completion of this course, the students will be able to:**	**Programme Outcomes**
CO1	Recognize the various causes of pollution and control measures.	K1
CO2	Explain about the beneficially role of GMOs on environment.	K2
CO3	Reflect upon various sustainable environmental protection strategies.	K3
CO4	Analyze the different methods of air, water, and soil quality monitoring process.	K4
CO5	Evaluate the implications of international legislations and policies for environmental protection.	K5

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	1	3	2	1	2	2	1	3
CO 2	3	3	2	2	2	3	2	3	2	2
CO 3	2	2	3	3	1	2	1	3	3	3
CO 4	3	3	3	3	3	2	3	3	3	3
CO 5	3	3	2	3	2	3	3	3	2	3

S-Strong (3) **M-Medium (2)** **L-Low(1)**

SKILL ENHANCEMENT COURSE - SEC – 1

Non-Major Elective-I : NURSERY AND LANDSCAPING

Course outcomes: CO	**On completion of this course, the students will be able to:**	**Programme Outcomes**
CO1	Recognize the basic principles and components of gardening.	K1
CO2	Explain about bio-aesthetic planning and conceptualize flower arrangement.	K2
CO3	Apply techniques for design various types of gardens according to the culture and art of bonsai.	K3 & K6
CO4	Compare and contrast different garden styles and landscaping patterns.	K4
CO5	Establish and maintain special types of gardens for outdoor and indoor landscaping.	K5 & K6

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	2	1	3	2	1	2	2	1	3
CO 2	3	3	2	2	3	3	2	2	2	2
CO 3	2	2	3	1	1	1	1	3	3	1
CO 4	3	2	2	1	3	2	1	3	2	1
CO 5	3	3	2	3	2	1	2	3	2	3

S-Strong (3) M-Medium (2) L-Low(1)

FOUNDATION COURSE FOR BOTANY

BASICS OF BOTANY

Course outcomes CO	**On completion of this course, the students will be able to**	**Programme Outcomes**
CO1	Increase the awareness and appreciation of human friendly algae and their economic importance.	K1
CO2	Develop an understanding of microbes and fungi and appreciate their adaptive strategies.	K2
CO3	Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.	K3
CO4	Compare the structure and function of cells and explain the development of cells.	K4
CO5	Understand the core concepts and fundamentals of plant biotechnology and genetic engineering.	K5

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	1	3	3	1	3
CO 4	3	3	2	3	3	3	3	2	3	3
CO 5	3	2	2	2	2	2	2	1	2	2

S-Strong (3) M-Medium (2) L-Low(1)

Semester II

CORE-III PLANT DIVERSITY II FUNGI, BACTERIA, VIRUSES, PLANT PATHOLOGY AND LICHENS

Course outcomes: CO	**On completion of this course, the students will be able to:**	**Programme outcomes**
CO1	Recognize the general characteristics of microbes, fungi and lichens and disease symptoms.	K1
CO2	Develop an understanding of microbes, fungi and lichens and appreciate their adaptive strategies based on structural organization.	K2
CO3	Identify the common plant diseases, according to geographical locations and device control measures.	K3
CO4	Analyze the emerging trends in fungal biotechnology with special reference to agricultural and pharmaceutical applications.	K4
CO5	Determine the economic importance of microbes, fungi and lichens	K5

Mapping with Programme Outcomes:

COs	**COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	3	1	3	2	1	2	2	2	2
CO 2	3	3	2	2	3	3	2	1	2	1
CO 3	2	2	3	3	1	2	1	3	1	3
CO 4	3	3	3	3	3	2	3	3	3	3
CO 5	3	3	2	3	2	3	3	3	3	3

S-Strong (3) **M-Medium (2)** **L-Low(1)**

CORE-IV PLANT DIVERSITY II FUNGI, BACTERIA, VIRUSES, PATHOLOGY AND LICHENS - PRACTICAL-II

Course outcomes On **CO**	**Completion of this course, the students will be able to:**	**Programme Outcomes**
CO1	Identify microbes, fungi and lichens using key identifying characters	K1
CO2	Develop practical skills for culturing and cultivation of fungi.	K2
CO3	Identify and select suitable control measures for the common plant diseases.	K3
CO4	Analyze the characteristics of microbes, fungi and plant pathogens	K4
CO5	Access the useful role of fungi in agriculture and pharmaceutical industry	K5

Mapping with Programme Outcomes:

COs	**COs**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	3	1	3	2	1	2	2	2	1
CO 2	2	3	2	2	3	3	2	3	3	3
CO 3	2	2	3	3	1	2	1	3	1	2
CO 4	3	3	3	3	3	2	3	3	3	2
CO 5	3	3	2	3	2	3	3	3	2	3

S-Strong (3) **M-Medium (2)** **L-Low(1)**

ELECTIVE ALLIED III : BOTANY-II

Course outcomes: CO	**On completion of this course, the students will be able to**	**Programme Outcomes**
CO1	Understand the fundamental concepts of plant anatomy and embryology.	K1
CO2	Analyze and recognize the different organs of plants and secondary growth.	K2
CO3	Understand water relation of plants with respect to various physiological processes	K3
CO4	Classify aerobic and anaerobic respiration.	K4
CO5	Classify plant systematics and recognize the importance of herbarium and virtual herbarium.	K5

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	1	3	3	3	3
CO 4	3	3	2	3	3	3	3	2	3	2
CO 5	3	2	2	2	2	2	2	1	2	2

S-Strong (3) **M-Medium (2)** **L-Low(1)**

Core-Allied Practicals-I : ELECTIVE ALLIED BOTANY PRACTICALS

Course outcomes: CO	**On completion of this course, the students will be able to**	**Programme Outcomes**
CO1	To study the internal organization of algae and fungi.	K1
CO2	Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.	K2
CO3	To study the classical taxonomy with reference to different parameters.	K3
CO4	Understand the fundamental concepts of plant anatomy and embryology.	K4
CO5	To study the effect of various physical factors on photosynthesis.	K5

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	1	3	3	1	3
CO 4	3	3	2	3	3	3	3	2	3	3
CO 5	3	2	2	2	2	2	2	1	2	2

S-Strong (3) **M-Medium (2)** **L-Low(1)**

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	1	3	3	1	3
CO 4	3	3	2	3	3	3	3	2	3	3
CO 5	3	2	2	2	2	2	2	1	2	2

S-Strong (3) **M-Medium (2)** **L-Low(1)**

SKILL ENHANCEMENT COURSE - SEC – 2

Non-Major Elective-II : MUSHROOM CULTIVATION

Course outcomes: CO	**On completion of this course, the students will be able to:**	**Programme Outcomes**
CO1	Recall various types and categories of mushroom.	K1
CO2	Explain about various types of food technologies associated with mushroom industry.	K2
CO3	Apply techniques studied for cultivation of various types of mushroom.	K3
CO4	Analyze and decipher the environmental factors and economic value associated with mushroom cultivation.	K4
CO5	Develop new methods and strategies to contribute to mushroom production.	K5 & K6

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	S			S	M	L	M	M
CO 2	S			M		S	M	S
CO 3	M			S		M		S
CO 4	S	S	S	S		M		S
CO 5	S	S	M				S	S

S-Strong (3) **M-Medium (2)** **L-Low(1)**

Non-Major Elective-II : HERBAL MEDICINE

Course outcomes: CO	**On completion of this course, the students will be able to**	**Programme Outcomes**
CO1	Define and describe the principle of cultivation of herbal products.	K1
CO2	Explain about the phytochemistry of economically important medicinal herbs.	K2
CO3	Apply techniques for evaluation of drug adulteration through biological testing.	K3
CO4	Formulate the value added processing / storage / quality control for the better use of herbal medicine.	K4
CO5	Develop the skills for cultivation of plants and their value added processing/storage/quality control.	K5 & K6

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	2	1	2	1	2	1	3	2	1
CO 2	3	3	2	1	1	2	2	2	2	2
CO 3	2	2	1	3	1	2	1	3	2	1
CO 4	3	2	1	2	1	2	3	3	2	3
CO 5	3	3	2	2	1	1	3	3	1	3

S-Strong (3) **M-Medium (2)** **L-Low(1)**

Non-Major Elective-II : GLOBAL CLIMATE CHANGE

Course outcomes: CO	**On completion of this course, the students will be able to**	**Programme Outcomes**
1.	Relate to the anthropogenic pressure on the environment and carbon footprint.	K1
2.	Explain about the physical basis of natural green gas house effect on man and materials.	K2
3.	Evaluate human influenced driver of our climate system and its applications.	K3
4.	Analyze the causes and effects of depletion of the stratospheric ozone layer.	K4
5.	Develop new strategies to mitigate issues of global environmental change.	K5 &K6

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	1	3	2	1	2	2	1	3
CO 2	3	2	1	2	3	3	2	3	1	2
CO 3	2	2	3	1	1	2	3	2	3	1
CO 4	3	3	3	2	1	1	3	2	3	2
CO 5	3	2	2	3	2	3	1	2	2	3

S-Strong (3) **M-Medium (2)** **L-Low(1)**

SKILL ENHANCEMENT COURSE 3

BOTANICAL GARDEN AND LANDSCAPING

Course outcomes: CO	**On completion of this course, the students will be able to**	**Programme Outcomes**
CO1	Recognize fundamental concepts of gardening and landscaping.	K1
CO2	Explain about significance of garden adornments and propagation structures.	K2
CO3	Apply techniques of landscaping for aesthetic purposes and gardening for recreation.	K3 & K6
CO4	Distinguish between formal, informal and free style gardens and their applications.	K4
CO5	Develop and design outdoor and indoor gardens and inculcate entrepreneurial skills for landscaping.	K5 & K6

Mapping with Programme Outcomes:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	1	3	2	1	1	2	3	1
CO 2	3	3	2	2	1	3	2	3	3	2
CO 3	2	2	3	2	1	2	1	3	2	3
CO 4	3	3	2	3	1	2	3	3	3	2
CO 5	3	3	2	3	2	3	1	3	3	2

S-Strong (3) **M-Medium (2)** **L-Low(1)**