M.Sc BOTANY

FROM THE ACADEMIC YEAR 2023 – 2024

Programme Outcomes (Pos)	**PO1: Problem Solving Skill** Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context. **PO2: Decision Making Skill** Foster analytical and critical thinking abilities for data-based decision-making. **PO3: Ethical Value** Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities. **PO4: Communication Skill** Ability to develop communication, managerial and interpersonal skills. **PO5: Individual and Team Leadership Skill** Capability to lead themselves and the team to achieve organizational goals. **PO6: Employability Skill** Inculcate contemporary business practices to enhance employability skills in the competitive environment. **PO7: Entrepreneurial Skill** Equip with skills and competencies to become an entrepreneur. **PO8: Contribution to Society** Succeed in career endeavours and contribute significantly to society.
	PO 9 Multicultural competence Possess knowledge of the values and beliefs of multiple cultures and a global perspective. **PO 10: Moral and ethical awareness/reasoning** Ability to embrace moral/ethical values in conducting one's life.
Programme Specific Outcomes (PSOs)	**PSO1 – Placement** To prepare the students who will demonstrate respectful engagement with others' ideas, behaviours, beliefs and apply diverse frames of reference to decisions and actions. **PSO 2 - Entrepreneur** To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate start-ups and high potential organizations. **PSO3 – Research and Development** Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development. **PSO4 – Contribution to Business World** To produce employable, ethical and innovative professionals to sustain in the dynamic business world. **PSO 5 – Contribution to the Society** To contribute to the development of the society by collaborating with stakeholders for mutual benefit.

Programme outcomes (PO)	
The M.Sc. Botany program is designed to achieve the following objectives	
PO 1	To impart knowledge on the fundamental, advanced and emerging concepts in Botany.
PO 2	To provide up-to-date theoretical knowledge on various forms of plants, their interactions with biotic and abiotic entities in the ecosystem and relevant practical skills.
PO 3	To comprehend and interpret various facets of Botany including the importance and judicious utilization of plant sources.
PO 4	To address various critical issues in conserving the biodiversity with special reference to economically important plants and the plants listed in RED data.
PO 5	To understand the principles and applications of various traditional and modern techniques used in Botany.
PO 6	To disseminate knowledge on the design and execution of experiments in Botany with emphasis on the operation of relevant sophisticated instruments.
PO 7	To impart knowledge on the economic importance of plant/microbial resources and their products and to promote entrepreneurship skill.
PO 8	To promote proficiency in designing the research problems, review of literature, laboratory experiments, data analyses and preparation of reports with professional ethics.
PO 9	To motivate the students to take up innovative and cutting-edge research in frontier areas of Botany and related biology subjects.
PO 10	To enable the students to take up various qualifying examinations concerning Botany and to face the challenges in career opportunities.

Program Specific Outcomes (PSO)

On successful completion of the M.Sc. Botany program, the students are expected to	
PSO1	Familiarize with the fundamental, advanced and emerging concepts in Botany.
PSO2	Understand the role of plants and their interactions with other organisms in various ecosystems.
PSO3	Identify the potency of plant resources in contemporary research and visualize future thrust areas in Botany.
PSO4	Design scientific experiments independently and to generate useful information to address various issues in Botany.
PSO5	Acquire basic knowledge on principles and applications of laboratory instruments and adequate skills to handle them.
PSO6	Choose and apply appropriate tools, techniques, resources, etc. To perform various experiments in Botany.
PSO7	Carryout scientific experiments independently or in collaboration with inter-disciplinary or multidisciplinary approaches.
PSO8	Disseminate knowledge on conservation of biodiversity and protection of environment.
PSO9	Awareness on the sustainable utilization of plant/microbial resources following the bioethical norms.
PSO10	Demonstrate proficiency in communicating with various stakeholders like students, teachers, scientists and society.

Year I

Semester I

CORE I: PLANT DIVERSITY – I: ALGAE, FUNGI, LICHENS AND BRYOPHYTES

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Relate to the structural organizations of algae, fungi, lichens and bryophytes	K1
CO 2	Demonstrate both the theoretical and practical knowledge in understanding the diversity of basic life forms and their importance	K2
CO 3	Explain life cycle patterns in algae, fungi, lichens and Bryophytes	K3
CO 4	Compare and contrast the mode of reproduction in diverse groups of basic plant forms.	K4
CO 5	Discuss and develop skills for effective conservation and utilization of lower plant forms	K5 & K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	3	2	3	2	1	2	2	2	2
CO2	3	3	2	2	3	3	2	3	2	3
CO3	2	2	3	3	1	2	1	3	1	3
CO4	3	3	3	3	3	2	3	3	3	3
CO5	3	3	2	3	2	3	3	3	3	3

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

CORE II : PLANT DIVERSITY – II (PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY)

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Recall on classification, recent trends in phylogenetic relationship, General characters of Pteridophytes and Gymnosperms.	K1 & K4
CO 2	Learn the morphological/anatomical organization, life history of major types of Pteridophytes and Gymnosperms	K2
CO 3	Comprehend the economic importance of Pteridophytes, Gymnosperms and fossils.	K3
CO 4	Understanding the evolutionary relationship of Pteridophytes and Gymnosperms.	K5
CO 5	Awareness on fossil types, fossilization and fossil records of Pteridophytes and Gymnosperms.	K5 & K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	1	3	1	3
CO3	3	3	3	3	3	3	2	3	2	3
CO4	3	3	2	1	2	2	1	2	1	3
CO5	3	3	3	3	3	3	3	2	3	2

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

Core – Laboratory course - 1 COVERING THEORY PAPER I

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Recall and applying the basic keys to distinguish at species level Identification of important algae and fungi through its structural organizations	K1 & K4
CO 2	Demonstrate practical skills in thallophytes.	K2
CO 3	Describe the structure of algae, fungi, lichens and bryophytes	K3
CO 4	Determine the importance of structural diversity in the evolution of plant forms.	K5
CO 5	Formulate techniques to isolate and culture of alga and fungi as well as to understand the diversity of plant forms	K5 & K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	1	3	1	3
CO3	3	3	3	3	3	3	2	3	2	3
CO4	3	3	2	1	2	2	1	2	1	3
CO5	3	3	3	3	3	3	3	2	3	2

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

Core – Laboratory course- 1 COVERING THEORY PAPER II

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Recall and applying the basic keys to distinguish at species level Identification of important algae and fungi through its structural organizations	K1 & K4
CO 2	Demonstrate practical skills in thallophytes.	K2
CO 3	Describe the structure of algae, fungi, lichens and bryophytes	K3
CO 4	Determine the importance of structural diversity in the evolution of plant forms.	K5
CO 5	Formulate techniques to isolate and culture of alga and fungi as well as to understand the diversity of plant forms	K5 & K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	1	3	1	3
CO3	3	3	3	3	3	3	2	3	2	3
CO4	3	3	2	1	2	2	1	2	1	3
CO5	3	3	3	3	3	3	3	2	3	2

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

ELECTIVE I : MICROBIOLOGY, IMMUNOLOGY AND PLANT PATHOLOGY

Course outcomes:		
CO	**On completion of this course the student will be able to**	**Programme outcomes**
CO1	Recognize the general characteristics of microbes, plant defense and immune cells	K1
CO2	Explain about the stages in disease development and various defense mechanisms in plants and humans.	K2
CO3	Elucidate concepts of microbial interactions with plant and humans.	K3
CO4	Analyze the importance of harmful and beneficial microbes and immune system	K4
CO5	Determine and interpret the detection of pathogens and appreciate their adaptive strategies.	K5 & K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	2	3	2
CO2	3	3	2	2	3	3	2	1	2	1
CO3	3	3	3	3	3	3	1	3	1	3
CO4	3	3	2	2	3	3	2	1	2	1
CO5	3	3	3	3	3	3	3	2	3	2

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

ELECTIVE-I CONSERVATION OF NATURAL RESOURCES AND POLICIES

Course outcomes:	On completion of this course the student will be able to CO	Programme outcomes
CO1	Understand the concept of different natural resources and their utilization.	K1
CO2	Critically analyze the sustainable utilization land, water, forest and energy resources	K2 & K6
CO3	Evaluate the management strategies of different natural resources	K3
CO4	Reflect upon the different national and international efforts in resource management and their conservation.	K4
CO5	State the various environmental policy passed to conserve the natural resources.	K5

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	S	M	S	M	S
CO2	S	S	S	S	M	M	L	S	L	S
CO3	S	S	S	M	M	M	L	S	L	S
CO4	S	S	S	M	M	M	L	S	L	S
CO5	S	S	S	M	M	M	L	S	L	S

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

ELECTIVE-I MUSHROOM CULTIVATION

Course Outcomes: CO	On completion of this course the student will be able to	Programme outcomes
CO1	Knowledge on identification of edible and toxic mushrooms belonging toAscomycota and Basidiomycota.	K1, K3
CO2	Outline the nutraceutical properties of edible mushrooms.	K2, K4
CO3	Knowledge on cultivation techniques of edible and medicinal mushrooms.	K3, K6
CO4	Understand the harvest and post-harvest techniques of mushroom crops.	K4
CO5	Knowledge on the production and marketing strategies for mushrooms.	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	2	2
CO2	3	3	2	2	3	3	2	3	2	3
CO3	3	3	2	2	1	3	1	3	1	2
CO4	3	3	3	3	3	2	3	3	3	3
CO5	3	3	2	3	2	3	3	3	3	3

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

ELECTIVE I – PHYTOPHARMACOGNOSY

Course outcomes: CO	On completion of this course the student will be able to	Programme outcomes
CO1 derived	Review on the traditional knowledge and classification of plant drugs.	K1
CO2	Knowledge on biosynthetic pathway of different classes of plant metabolites.	K2
CO3	Knowledge on modern instrumentation on characterization of plant metabolites.	K3,K6
CO4	Discuss various aspects of Pharmacological action of herbal drugs.	K4, K5
CO5	Understanding medical and non-medical potential of plant derived in various sectors.	K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	2	1	2	1
CO2	3	2	3	3	3	2	2	1	2	1
CO3	3	2	3	3	3	3	2	2	3	2
CO4	3	2	2	3	3	3	3	2	3	2
CO5	3	2	2	3	3	3	3	2	3	2

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

ELECTIVE-II ALGAL TECHNOLOGY

Course outcomes: CO	On completion of this course, the students will be able to:	Programme outcomes
CO1	Understand the applied facet of botany and acquire a complete knowledge about the cultivation methods in algae.	K1& K3
CO2	Realization of the commercial potential of algal products.	K5
CO3	Analyze emerging areas of algal biotechnology for identifying therapeutic importance of algal products and their uses.	K2 & K4
CO4	Gain more information about algae genetics.	K4
CO5	Translate various algal technologies for the benefit of the ecosystem.	K3 & K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	1	3	1
CO2	3	3	3	2	3	3	3	2	3	2
CO3	3	2	3	2	2	3	1	1	1	1
CO4	3	3	3	3	3	3	3	2	3	2
CO5	3	2	3	3	3	3	3	1	3	1

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

ELECTIVE - II ETHNOBOTANY, NATUROPATHY AND TRADITIONAL HEALTHCARE

Course outcomes:	On completion of this course, the students will be able to: CO	Programme outcomes
CO1	Recall or remember concept of ethnobotany.	K1
CO2	Understand the life style and traditional practices of plants by Indian tribals.	K2 & K6
CO3	Highlight the role of Non-Timber Forest products for livelihood of tribal people of India	K3
CO4	Assess the methods to transform ethnobotanical knowledge into value added products.	K4
CO5	Build idea to make digitization of ethnobotanical knowledge.	K5

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	2	3	3	3
CO3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	3	3	2	3	3	3	2	3
CO5	3	3	3	3	3	3	3	3	3	3

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

ELECTIVE - II HORTICULTURE

Course outcomes:	On completion of this course, the students will be able to: CO	Programme outcomes
CO1	Identify and categorize various horticultural plants and the conditions that affect their growth and productivity.	K1
CO2	Explain the various structures and growth processes of horticultural plants.	K2
CO3	Demonstrate the propagation, growth, and maintenance of plants in horticulture systems.	K3
CO4	Correlate the soil characteristics and fertility to good plant growth.	K4
CO5	Utilize the role plant tissue culture techniques in the production of quality planting stock in horticulture.	K5
CO6	Apply horticultural skills and knowledge to explore career opportunities in horticulture industry.	K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3
CO2	2	1	3	3	3	3	3	3	3	2
CO3	3	1	3	3	3	3	3	2	3	3
CO4	3	3	3	1	1	2	2	3	1	3
CO5	3	3	3	3	3	3	2	3	3	2

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

ELECTIVE - II HERBAL TECHNOLOGY

Course outcomes: to: CO	On completion of this course, the students will be able	Programme outcomes
CO1	Recollect the importance of herbal technology.	K1
CO2	Understand the classification of crude drugs from various botanical sources.	K2
CO3	Analyze on the application of secondary metabolites in modern medicine.	K3
CO4	Create new drug formulations using therapeutically valuable phytochemical compounds for the healthy life of society.	K4
CO5	Comprehend the current trade status and role of medicinal plants in socio economic growth.	K5 & K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	2	1	3
CO2	3	3	3	3	3	3	3	1	3	3
CO3	3	3	3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	3	3	1	3	3
CO5	3	3	3	3	3	3	3	1	2	3

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

SEMESTER II

CORE – III: TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Recollect the basic concepts of morphology of leaves, flowers. Identify the types of compound leaves, inflorescence and fruits Describe their characteristic features	K1, K2 K3
CO 2	Explain the principles of taxonomy. Summarize the taxonomic hierarchy. Define Binomial nomenclature. Group Activity –Construct key preparation	K1, K2 K5, K6
CO 3	Explain the various types of classification. Distinguish its advantages and disadvantages Construction of floral formula and floral diagram.	K1, K2 K3, K4
CO 4	Illustrate and explain the characteristic features and list out the economic importance of the families Field trip to local botanical garden and regional botanical garden.	K1, K2 K3, K4
CO 5	Illustrate and explain the characteristic features and list out the Economic importance of the families.	K1, K2 K3, K5

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	2	2	1	2	2
CO3	3	3	2	3	1	3	2	3	3	1
CO4	3	2	3	3	2	3	3	1	3	3
CO5	3	3	2	2	1	2	1	3	2	1

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

CORE – IV: PLANT ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

Course outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO1	Learn the structures, functions and roles of apical *vs* lateral meristems in monocot and dicot plant growth.	K1 & K2
CO2	Study the function and organization of woody stems derived from secondary growth in dicot and monocot plants.	K1 &K4
CO3	Apply their idea on sectioning and dissection of plants to demonstrate various stages of plant development.	K2 & K6
CO4	Understand the various concepts of plant development and reproduction.	K3 & K6
CO5	Profitably manipulate the process of reproduction in plants with a professional and entrepreneurial mindset.	K5

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	3	3	3	3	3	3	3	3	3
CO2	3	1	3	3	3	3	3	3	3	3
CO3	3	1	3	3	3	3	3	2	3	1
CO4	3	3	3	1	1	2	3	2	2	1
CO5	3	3	3	3	3	3	2	3	3	2

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

CORE – V: ECOLOGY, PHYTOGEOGRAPHY, CONSERVATION BIOLOGY & INTELLECTUAL PROPERTY RIGHTS

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Understand the scope and importance of population ecology, plant communities and ecosystem ecology	K1 & K2
CO 2	Understand the applied aspect of environmental botany.	K1 & K4
CO 3	Identify different plant communities, categorize plant biomes and identify threatened, endangered plant species and create awareness program in protection of biodiversity.	K2 & K6
CO 4	Illustrate and explain the characteristic features and list out the economic importance of the families Field trip to local botanical garden and regional botanical garden.	K3 & K6
CO 5	Analyze insight into the vegetation types, species interaction and their importance and the factors influencing the environmental conditions.	K5

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	3	2	1	2	3
CO2	3	3	2	3	3	2	3	3	2	3
CO3	3	2	3	2	2	3	1	1	2	1
CO4	3	3	2	3	3	2	2	3	1	3
CO5	3	3	3	3	3	3	3	3	3	2

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

CORE - LABORATORY COURSE – 2 COVERING PAPER – III

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	To gain recent advances in plant morphological and floral characteristics.	K1
CO 2	Understand about different floral characteristics and artificial key preparation which employed for plant identification and conservation.	K2
CO 3	Identification of genus and species of locally available wild plants.	K4 & K5
CO 4	Familiarize immense knowledge on economic importance of higher plants.	K3
CO 5	Gain hands on experience on herbarium preparation techniques.	K3

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	S	3	3
CO2	3	3	2	3	3	2	1	2	3	2
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	1	2	3
CO5	3	2	2	3	3	3	3	2	3	3

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

CORE - LABORATORY COURSE – 2 COVERING PAPERS IV AND V

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Recall or remember the information including basic and advanced in relation with plant anatomy and embryology.	K1 & K2
CO 2	Apply their idea on sectioning and dissection of plants to demonstrate various stages of plant development.	K1 & K4
CO 3	Know about different vegetation sampling methods.	K2 & K6
CO 4	Know about the water and soil analysing technique	K3 & K6
CO 5	Gain knowledge about the remote sensing and mapping	K5

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	S	3	3
CO2	3	3	2	3	3	2	1	2	3	2
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	1	2	3
CO5	3	2	2	3	3	3	3	2	3	3

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

ELECTIVE - III MEDICINAL BOTANY

Course Outcomes

CO	**Course outcomes – on completion of this course, the students will be able to**	Programme outcomes
CO 1	Recognize plants and relate to their medicinal uses.	K1
CO 2	Explain about the phytochemistry, pharmacognosy and bioprospecting of medicinal plant extracts.	K2
CO 3	Apply techniques for conservation and propagation of medicinal plants.	K3
CO 4	Analyze and decipher the significance of various methods of harvesting, drying and storage of medicinal herbs.	K4
CO 5	Develop new strategies to enhance growth and quality check of medicinal herbs considering the practical issues pertinent to India.	K5 & K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	2	1	3	3
CO2	3	2	3	3	3	2	2	1	3	2
CO3	3	2	3	3	3	3	3	2	3	3
CO4	3	2	2	3	3	3	3	2	3	3
CO5	3	2	2	3	3	3	3	2	3	3

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

ELECTIVE III - PHYTOCHEMISTRY

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Understand the role of plants in the survival of human beings and other Organisms.	K1
CO 2	Recognition of the contribution made by primitive people in exploration of plant knowledge to alleviate common diseases and development of systems of medicine	K2
CO 3	Gaining knowledge on different classes of phytochemicals present in higher and lower plants species.	K3
CO 4	Demonstrate the various aspects of extraction, isolation and characterization of secondary metabolites	K4 & K5
CO 5	Know the methods of screening of secondary metabolites for various biological properties.	K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	1	3	3	3	3
CO2	3	3	3	2	2	1	2	3	2	3
CO3	3	3	3	3	3	2	1	2	1	3
CO4	2	3	3	3	3	2	2	3	2	3
CO5	2	3	3	3	3	2	2	2	3	2

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

ELECTIVE - III RESEARCH METHODOLOGY, COMPUTER APPLICATIONS & BIOINFORMATICS

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Realize the need of centrifuges and chromatography and their uses in research.	K1
CO 2	Learn the principles and applications of electrophoresis	K2
CO 3	Construct the phylogenetic trees for similar characteristic feature of \ plant genomes and study *de novo* drug design through synthetic biology.	K3
CO 4	Understand the concept of pairwise alignment of DNA sequences using algorithms.	K4 & K5
CO 5	Interpret the features of local and multiple alignments.	K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	2	3	3	3	1	3	3
CO2	3	2	2	3	3	3	3	2	3	3
CO3	3	1	2	3	3	3	3	1	3	3
CO4	3	2	1	3	3	3	2	1	3	2
CO5	3	1	2	2	3	3	3	2	3	3

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

ELECTIVE III - BIOPESTICIDE TECHNOLOGY

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Understand the issues in use of chemical pesticides and their harmful effects on life.	K1& K2
CO 2	Aware the significance of biopesticides and their beneficial role in controlling insect pests, diseases, nematodes and weeds.	K1 & K4
CO 3	Knowledge on identification of promising biopesticides and their mechanisms of action against insect pests, diseases, nematodes and weeds.	K2 & K6
CO 4	Learn the mass production and formulation technology of selected biopesticides using algorithms.	K3 & K6
CO 5	Knowledge on product development for commercialization of biopesticides.	K5

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	2	3	2	3	1	3	3
CO3	3	3	3	3	1	2	S	2	3	2
CO4	3	2	2	2	3	3	2	1	2	1
CO5	3	3	3	3	2	2	2	3	2	3

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

ELECTIVE –IV: APPLIED BIOINFORMATICS

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Familiarize with the tools of DNA sequence analysis.	K1& K2
CO 2	Use and explain the application of bioinformatics.	K1 & K4
CO 3	Master the aspects of protein – protein interaction, BLAST and PSI - BLAST	K2 & K6
CO 4	Describe the features of local and multiple alignments	K3 & K6
CO 5	Interpret the characteristics of phylogenetic methods and Bioinformatics applications.	K5

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3
CO2	2	3	3	3	3	2	2	3	2	2
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	1	3	3
CO5	3	2	2	2	3	3	3	3	3	3

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

ELECTIVE IV : BIOSTATISTICS

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Create and interpret visual representations of quantitative information, such as graphs or charts.	K5 & K6
CO 2	Solve problems quantitatively using appropriate arithmetical, algebraic, or statistical methods	K3 & K5
CO 3	Know the latest version using in statistical tools and apply the tools to interpret the results	K2
CO 4	To develop their competence in hypothesis testing and interpretation	K4
CO 5	Understand why biologists need a background in statistics	K1

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	3	3	3	3	1	3	1
CO2	3	2	2	3	3	3	2	1	2	1
CO3	3	1	2	3	3	3	3	2	2	2
CO4	3	2	1	3	2	2	3	3	3	3
CO5	3	2	3	3	3	3	3	1	3	1

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

ELECTIVE – IV: INTELLECTUAL PROPERTY RIGHTS

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Recall the history and foundation of Intellectual Property.	K1
CO 2	Understand the differences of Property and Assets and Various Categories of Intellectual Creativity.	K2
CO 3	Apply the methods to protect the Intellectual Property.	K3
CO 4	Differentiate if the Said Intangible property be protected under law or protected by strategy.	K4
CO 5	Create a recommendation document on the methods and procedures of protecting the said IP and search documents to substantiate them.	K5 & K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	2	3	2	3	2
CO2	3	3	3	3	3	3	2	2	3	3
CO3	3	2	3	2	2	3	3	3	2	1
CO4	3	2	3	2	2	3	1	3	2	3
CO5	3	2	1	3	2	3	2	3	2	3

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

ELECTIVE - IV : NANOBIOTECHNOLOGY

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Recall the essential features of biology and nanotechnology that are converging to create the new area of bionanotechnology.	K1
CO 2	Formulate procedures for the synthesis of nanoparticles which are of medical importance which could be used to treat specific diseases.	K2
CO 3	Characterize the various types of nano particle synthesis and advocate promotes the use of nano materials and anno composites.	K3
CO 4	Analyze and apply the important of nanoparticles in plant diversity.	K4
CO 5	Construct various types of nanomaterial for application and evaluate the impact on environment.	K5 & K6

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	2	1	2	3
CO3	3	3	3	2	3	3	3	2	2	3
CO4	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3

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

SKILL ENHANCEMENT COURSE (SE2) :AGRICULTURE AND FOOD MICROBIOLOGY

Course Outcomes

CO	Course outcomes – on completion of this course, the students will be able to	Programme outcomes
CO 1	Recognize the general characteristics of microbes and factors affecting its growth	K1
CO 2	Explain the significance of microbes in increasing soil fertility	K 2
CO 3	Elucidate concepts of microbial interactions with plant and food.	K 3
CO 4	Analyze the impact of harmful microbes in agriculture and food Industry.	K 4
CO 5	Determine and appreciate the role of microbes in food preservation and as biocontrol.	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	2	1
CO2	3	3	2	2	3	3	2	3	3	3
CO3	2	2	3	3	1	2	1	3	1	2
CO4	3	3	3	3	3	2	3	3	3	2
CO5	3	3	2	3	2	3	3	3	2	3

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