

# **Holy Cross College (Autonomous), Nagercoil**

**Kanyakumari District, Tamil Nadu.**

**Accredited with A<sup>+</sup> by NAAC - IV cycle – CGPA 3.35**

Affiliated to

**Manonmaniam Sundaranar University, Tirunelveli**



**Semester I – IV**

**POs, PSOs & COs**

**DEPARTMENT OF BOTANY**



**2023-2026**

**(With effect from the academic year 2024-2025)**

### Programme Educational Objectives (PEOs)

<b>PEOs</b>	<b>Upon completion of B.Sc. Degree Programme, the graduates will be able to:</b>	<b>Mapping with Mission</b>
<b>PEO1</b>	apply appropriate theory and scientific knowledge to participate in activities that support humanity and economic development nationally and globally, developing as leaders in their fields of expertise.	<b>M1&amp; M2</b>
<b>PEO2</b>	use practical knowledge for developing professional empowerment and entrepreneurship and societal services.	<b>M2, M3, M4 &amp; M5</b>
<b>PEO3</b>	pursue lifelong learning and continuous improvement of the knowledge and skills with the highest professional and ethical standards.	<b>M3, M4, M5 &amp; M6</b>

### Programme Outcomes (POs)

<b>POs</b>	<b>Upon completion of B.Sc. Degree Programme, the graduates will be able to:</b>	<b>Mapping with PEOs</b>
<b>PO1</b>	obtain comprehensive knowledge and skills to pursue higher studies in the relevant field of science.	<b>PEO1</b>
<b>PO2</b>	create innovative ideas to enhance entrepreneurial skills for economic independence.	<b>PEO2</b>
<b>PO3</b>	reflect upon green initiatives and take responsible steps to build a sustainable environment.	<b>PEO2</b>
<b>PO4</b>	enhance leadership qualities, team spirit and communication skills to face challenging competitive examinations for a better developmental career.	<b>PEO1 &amp; PEO3</b>
<b>PO5</b>	communicate effectively and collaborate successfully with peers to become competent professionals.	<b>PEO2&amp;PEO3</b>
<b>PO6</b>	absorb ethical, moral and social values in personal and social life leading to highly cultured and civilized personality	<b>PEO2 &amp; PEO3</b>
<b>PO7</b>	participate in learning activities throughout life, through self-paced and self-directed learning to improve knowledge and skills.	<b>PEO1&amp;PEO3</b>

### Program Specific Outcomes (PSOs)

On successful completion of the B.Sc. Botany program, the students are expected to:		Mapping with Pos
<b>PSO1</b>	implement the concept of science and technology to foster the traditional and modern techniques for solving the complex problems in Plant Biology.	<b>PO4</b>
<b>PSO2</b>	ensure the use of contemporary tools and techniques in understanding the scope and significance of Botany	<b>PO1&amp; PO3</b>
<b>PSO3</b>	develop the scientific problem solving skills during experimentation, research projects, analysis and interpretation of data	<b>PO4 &amp; PO7</b>
<b>PSO4</b>	design scientific experiments independently and to generate useful information to address various issues in Botany.	<b>PO6 &amp; PO7</b>
<b>PSO5</b>	enhanced capacity to think critically; ability to design and execute experiments independently and/or team under multidisciplinary settings	<b>PO2 &amp; PO5</b>
<b>PSO6</b>	design and standardize protocols for public health and safety, and cultural, societal, and environmental considerations	<b>PO6 &amp; PO3</b>
<b>PSO7</b>	apply appropriate techniques, resources, and modern ICT tools for understanding plant resources.	<b>PO2 &amp; PO7</b>
<b>PSO8</b>	demonstrate the contextual knowledge in sustainable exploitation of medicinal, economically important and endangered plants as per the National Biodiversity Act.	<b>PO6</b>
<b>PSO9</b>	follow the concept of professional ethics and bioethics norms for practicing the value of plant kingdom.	<b>PO6</b>
<b>PSO10</b>	communicate proficiently with various stakeholders and society, to comprehend and to write and present reports effectively	<b>PO4 &amp; PO6</b>

## Course Outcomes

### SEMESTER --I

#### CORE COURSE-I PLANT DIVERSITY I ALGAE

Course Code: BU231CC1

<b>On the successful completion of the course, student will be able to:</b>		
<b>1.</b>	relate to the structural organization, reproduction and significance of algae.	<b>K2 &amp;K5</b>
<b>2.</b>	demonstrate knowledge in understanding the various life cycle patterns and the fundamental concepts in algal growth	<b>K3 &amp;K1</b>
<b>3.</b>	explain the benefits of various algal technologies on the ecosystem.	<b>K1</b>
<b>4.</b>	compare and contrast the thallus organization and modes of reproduction in algae.	<b>K4 &amp; K5</b>
<b>5.</b>	determine the emerging areas of Algal Biotechnology for identifying commercial potentials of algal products and their uses.	<b>K5 &amp; K6</b>

### SEMESTER --I

#### CORE LAB COURSE I - PLANT DIVERSITY I: ALGAE

Course Code: BU231CP1

<b>On the successful completion of the course, student will be able to:</b>		
<b>1.</b>	recall and identify algae using key identification characters.	<b>K1</b>
<b>2.</b>	demonstrate practical skills in preparation of fresh mount and identification of algal forms from algal mixture.	<b>K3 &amp;K2</b>
<b>3.</b>	describe the internal structure of algae prescribed in the syllabus	<b>K2</b>
<b>4.</b>	decipher the algal diversity in fresh/marine water and their economic significance.	<b>K4 &amp;K6</b>
<b>5.</b>	evaluate the various techniques used to culture algae for commercial purposes	<b>K5</b>

**SEMESTER --I**  
**ELECTIVE COURSE I: ALLIED BOTANY -I**

**Course Code: BU231EC1**

<b>On the successful completion of the course, student will be able to:</b>		
<b>1.</b>	increase the awareness and appreciation of human friendly algae and their economic importance.	<b>K3</b>
<b>2.</b>	develop an understanding of microbes and fungi and appreciate their adaptive strategies	<b>K2</b>
<b>3.</b>	develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.	<b>K2</b>
<b>4.</b>	compare the structure and function of cells and explain the development of cells.	<b>K4</b>
<b>5.</b>	understand the core concepts and fundamentals of plant biotechnology and genetic engineering.	<b>K2</b>

**SEMESTER --I**

**ELECTIVE LAB COURSE I: ALLIED BOTANY PRACTICAL**

**Course Code: BU231EP1**

<b>On the successful completion of the course, student will be able to:</b>		
<b>1.</b>	to study the internal organization of algae and fungi.	<b>K1</b>
<b>2.</b>	develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.	<b>K2</b>
<b>3.</b>	to study the classical taxonomy with reference to different parameters.	<b>K4</b>
<b>4.</b>	understand the fundamental concepts of plant anatomy and embryology	<b>K2</b>
<b>5.</b>	to study the effect of various physical factors on photosynthesis.	<b>K3</b>

**SEMESTER --I**

**NON-MAJOR ELECTIVE NME I: NURSERY AND LANDSCAPING**

**Course Code: BU231NM1**

<b>On the successful completion of the course, student will be able to:</b>		
<b>1.</b>	recognize the basic principles and components of gardening.	<b>K2</b>

2.	explain about bio-aesthetic planning and conceptualize flower arrangement.	<b>K1</b>
3.	apply techniques for design various types of gardens according to the culture and art of bonsai.	<b>K3</b>
4.	compare and contrast different garden styles and landscaping patterns	<b>K4</b>
5.	establish and maintain special types of gardens for outdoor and indoor landscaping.	<b>K2</b>

### **SEMESTER - I**

#### **FOUNDATION COURSE: BASICS OF BOTANY**

**Course Code: BU231FC1**

<b>On the successful completion of the course, student will be able to:</b>		
1.	increase the awareness and appreciation of human friendly algae and their economic importance	K1
2.	develop an understanding of microbes and fungi and appreciate their adaptive strategies	K1
3.	develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms	K2
4.	compare the structure and function of cells and explain the development of cells.	K4
5.	understand the core concepts and fundamentals of plant biotechnology and genetic engineering.	K2

### **SEMESTER I**

#### **SPECIFIC VALUE ADDED COURSE : ART OF BONSAI**

**Course Code: BU231V01**

<b>On the successful completion of the course, student will be able to:</b>		
1.	develop the ability to analyze various tree species and create balanced and aesthetically pleasing bonsai designs.	<b>K5</b>
2.	will acquire hands-on skills in techniques such as pruning, wiring, and repotting.	<b>K1 &amp; K4</b>
3.	maintain the health and vitality of their bonsai trees.	<b>K2</b>

4.	appreciate the philosophy behind bonsai and how it reflects harmony with nature and the passage of time.	<b>K5</b>
5.	compose different styling techniques, including branch placement, trunk positioning, and foliage arrangement, enabling them to create captivating bonsai compositions.	<b>K3 &amp; K6</b>

**K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

**SEMESTER I**  
**SPECIFIC VALUE -ADDED COURSE**  
**LEMON GRASS - CULTIVATION AND OIL EXTRACTION**  
**Course Code: BU231V02**

<b>On the successful completion of the course, student will be able to:</b>		
1.	understand lemongrass cultivation techniques.	<b>K1</b>
2.	learn the harvesting and processing methods.	<b>K2</b>
3.	acquire knowledge of oil extraction from lemongrass.	<b>K3</b>
4.	explore the properties and applications of lemongrass oil.	<b>K4</b>
5.	implement sustainable practices in cultivation and extraction.	<b>K5</b>

**K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate

**SEMESTER -I**  
**SPECIFIC VALUE -ADDED COURSE**  
**POISONOUS AND ALLERGIC PLANTS**  
**Course Code: BU231V03**

<b>On the successful completion of the course, student will be able to:</b>		
1.	comprehend the influence of environmental factors such as climate, season, and rainfall on plant toxicity.	<b>K2</b>
2.	identify various poisonous compounds found in plants, including alkaloids, polypeptides, and amines.	<b>K4</b>
3.	recognize the toxicity mechanisms of oxalates, resins, and phytotoxins (Toxalbumins) in plants.	<b>K2</b>
4.	distinguish between different poisonous plant species	<b>K4</b>
5.	demonstrate knowledge of appropriate responses and treatments for poisoning incidents.	<b>K5</b>

**K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate

**SEMESTER -II**  
**CORE COURSE II: PLANT DIVERSITY II: FUNGI, BACTERIA,**  
**VIRUSES, PLANT PATHOLOGY AND LICHENS**  
**Course Code: BU232CC1**

<b>On the successful completion of the course, student will be able to:</b>		
<b>1.</b>	recognize the general characteristics of microbes, fungi and lichens and disease symptoms.	<b>K1</b>
<b>2.</b>	develop an understanding of microbes, fungi and lichens and appreciate their adaptive strategies based on structural organization.	<b>K2 &amp; K1</b>
<b>3.</b>	identify the common plant diseases, according to geographical locations and devise control measures.	<b>K3 &amp; K4</b>
<b>4.</b>	analyze the emerging trends in fungal biotechnology with special reference to agricultural and pharmaceutical applications.	<b>K4</b>
<b>5.</b>	determine the economic importance of microbes, fungi and lichens.	<b>K2</b>

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze;**

**SEMESTER --II**  
**CORE LAB COURSE II: PLANT DIVERSITY II: FUNGI, BACTERIA,**  
**VIRUSES, PATHOLOGY AND LICHENS - PRACTICAL-II**  
**Course Code: BU232CP1**

<b>On the successful completion of the course, student will be able to:</b>		
1.	identify microbes, fungi and lichens using key identifying characters	<b>K1 &amp; K4</b>
2.	develop practical skills for culturing and cultivation of fungi.	<b>K3</b>
3.	identify and select suitable control measures for the common plant diseases.	<b>K1</b>
4.	analyze the characteristics of microbes, fungi and plant pathogens	<b>K2 &amp; K4</b>
5.	access the useful role of fungi in agriculture and pharmaceutical industry.	<b>K2</b>

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze**



**SEMESTER --II**  
**ELECTIVE COURSE II: ALLIED BOTANY – II**  
**Course Code: BU232EC1**

<b>On the successful completion of the course, student will be able to:</b>		
<b>1</b>	understand the fundamental concepts of plant anatomy and embryology.	<b>K2</b>
<b>2</b>	analyze and recognize the different organs of plants and secondary growth.	<b>K4</b>
<b>3</b>	understand water relation of plants with respect to various physiological processes.	<b>K2</b>
<b>4</b>	to know about the fundamental concepts of aerobic and anaerobic respiration.	<b>K1</b>
<b>5</b>	classify plant systematics and recognize the importance of herbarium and virtual herbarium.	<b>K3</b>

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze;**

**SEMESTER --II**  
**ELECTIVE LAB COURSE II: ALLIED BOTANY PRACTICALS**  
**Course Code: BU232EP1**

<b>On the successful completion of the course, student will be able to:</b>		
<b>1.</b>	study the internal organization of algae and fungi.	<b>K2</b>
<b>2.</b>	develop critical understanding on morphology, anatomy and reproduction of bryophytes, pteridophytes and gymnosperms.	<b>K4</b>
<b>3.</b>	study the classical taxonomy with reference to different parameters.	<b>K1</b>
<b>4.</b>	understand the fundamental concepts of plant anatomy and embryology	<b>K2</b>
<b>5.</b>	study the effect of various physical factors on photosynthesis.	<b>K2</b>

**K1 - Remember; K2 - Understand; K4 - Analyze;**

**SEMESTER --II**  
**NON-MAJOR ELECTIVE NME II: MUSHROOM CULTIVATION**  
**Course Code: BU232NM1**

<b>On the successful completion of the course, student will be able to:</b>		
<b>1.</b>	recall various types and categories of mushroom.	<b>K1</b>
<b>2.</b>	explain about various types of food technologies associated with mushroom industry.	<b>K2</b>
<b>3.</b>	apply techniques studied for cultivation of various types of mushrooms.	<b>K3</b>

4.	analyze and decipher the environmental factors and economic value associated with mushroom cultivation	<b>K4</b>
5.	develop new methods and strategies to contribute to mushroom production.	<b>K3</b>

**K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze

## SEMESTER --II

### SKILL ENHANCEMENT COURSE SEC I: BOTANICAL GARDEN AND LANDSCAPING

**Course Code: BU232SE1**

On the successful completion of the course, student will be able to:		
1.	to know about the fundamental concepts of gardening and landscaping	<b>K1</b>
2.	to provide an overview of various gardening styles and its scope in recreation and bio-aesthetic planning.	<b>K2</b>
3.	to illustrate the significance of garden adornments and propagation structures.	<b>K3 &amp; K6</b>
4.	to create the design outdoor and indoor gardens and inculcate entrepreneurial skills for landscaping.	<b>K4</b>
5.	to inculcate entrepreneurial skills in students for creative landscaping design using cad software.	<b>K5 &amp; K6</b>

**K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

## SEMESTER I & II

### Life Skill Training I: Catechism

**Course Code: UG232LC1**

Course Outcome	Upon completion of this course the students will be able to
1	understand the aim and significance of value education
2	develop individual skills and act confidently in the society
3	learn how to live lovingly through family values
4	enhance spiritual values through strong faith in God
5	learn good behaviours through social values

**SEMESTER I & II**  
**Life Skill Training I: Moral**  
**Course Code: UG232LM1**

<b>Course Outcome</b>	<b>Upon completion of this course the students will be able to</b>
1	understand the aim and significance of value education
2	develop individual skills and act confidently in the society
3	learn how to live lovingly through family values
4	enhance spiritual values through strong faith in God
5	learn good behaviours through social values

**SEMESTER III**  
**CORE COURSE III: PLANT DIVERSITY-III BRYOPHYTES AND**  
**PTERIDOPHYTES**  
**Course Code: BU233CC1**

<b>On the successful completion of the course, students will be able to:</b>		
<b>1.</b>	recognize morphological variations of Bryophytes and Pteridophytes	<b>K2 &amp; K4</b>
<b>2.</b>	explain the anatomy and reproduction of Bryophytes and Pteridophytes.	<b>K2 &amp; K4</b>
<b>3.</b>	compare and contrast the variations in the internal cellular organization, gametophyte and sporophyte of Bryophytes and Pteridophytes.	<b>K4</b>
<b>4.</b>	decipher the stages of plant evolution and their transition to land habitat.	<b>K1&amp; K2</b>
<b>5.</b>	access the useful role of Bryophytes and Pteridophytes.	<b>K4</b>

**K1 - Remember; K2 - Understand; K4 - Analyze;**

**SEMESTER --III**  
**CORE LAB COURSE I: PLANT DIVERSITY-III BRYOPHYTES AND**  
**PTERIDOPHYTES**

**Course Code: BU233CP1**

<b>On the successful completion of the course, students will be able to:</b>		
<b>1</b>	recognize the major groups of non-vascular and vascular cryptogams	<b>K2 &amp; K4</b>
<b>2</b>	describe the structure of bryophytes and pteridophytes forms prescribed in the syllabus	<b>K4 &amp; K2</b>
<b>3</b>	identify and illustrate the morphological and anatomical features of bryophytes and pteridophytes	<b>K2</b>
<b>4</b>	develop comprehensive skills in sectioning and micro preparation	<b>K1&amp; K2</b>
<b>5</b>	interpret the significance of reproductive structures in bryophytes and pteridophytes	<b>K2</b>

**K1 - Remember; K2 - Understand; K4 - Analyze;**

**SEMESTER --III**  
**ELECTIVE COURSE III: ALLIED BOTANY -III**

**Course Code: BU233EC1**

<b>On the successful completion of the course, student will be able to:</b>		
1.	increase the awareness and appreciation of human friendly algae and their economic importance.	<b>K1</b>
2.	develop an understanding of microbes and fungi and appreciate their adaptive strategies	<b>K2</b>
3.	interpret the significance of reproductive structures in bryophytes and pteridophytes and gymnosperms.	<b>K2</b>
4.	compare the structure and function of cells and explain the development of cells.	<b>K4</b>
5.	understand the core concepts and fundamentals of plant biotechnology and genetic engineering.	<b>K2</b>

**K1 - Remember; K2 - Understand; K4 - Analyze;**

**SEMESTER --III**  
**ELECTIVE LAB COURSE III: ALLIED BOTANY PRACTICAL - III**  
**Course Code: BU233EP1**

<b>On the successful completion of the course, student will be able to:</b>		
<b>1.</b>	to study the internal organization of algae and fungi.	<b>K1</b>
<b>2.</b>	develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.	<b>K2</b>
<b>3.</b>	to study the classical taxonomy with reference to different parameters.	<b>K4</b>
<b>4.</b>	understand the fundamental concepts of plant anatomy and embryology	<b>K2</b>
<b>5.</b>	to study the effect of various physical factors on photosynthesis.	<b>K4</b>

**K1 - Remember; K2 - Understand; K4 - Analyze**

**SEMESTER --III**  
**SKILL ENHANCEMENT COURSE – SEC II**  
**ENTREPRENEURIAL OPPORTUNITIES IN BOTANY**  
**Course Code: BU233SE1**

<b>On the successful completion of the course, student will be able to:</b>		
1.	explain the concept of entrepreneurial opportunities in Botany.	<b>K1</b>
2.	relate to how various fields of botany could be understood with an entrepreneurial approach.	<b>K2</b>
3.	make use of the knowledge gained to start new venture with the help of government agencies	<b>K3</b>
4.	decipher effective ways of making value added products from coconut, banana, and jack fruit	<b>K4</b>
5.	develop strategies to cultivate algae and ornamental plants	<b>K5</b>

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate;**

**SEMESTER - III / IV**  
**SKILL ENHANCEMENT COURSE SEC - IV**  
**DIGITAL FLUENCY**  
**Course Code: UG23CSE2**

<b>On the successful completion of the course, students will be able to:</b>		
<b>1.</b>	work with text, themes and styles	<b>K1</b>
<b>2.</b>	produce a mail merge	<b>K2</b>
<b>3.</b>	secure information in an Excel workbook	<b>K2</b>
<b>4.</b>	perform documentation and presentation skills	<b>K2, K3</b>
<b>5.</b>	add special effects to slide transitions	<b>K3</b>

**K1 - Remember; K2 - Understand; K3 – Apply**

**SEMESTER --III**  
**SPECIFIC VALUE ADDED COURSE**  
**MINIATURE GARDEN IN LIMITED SPACE**

**Course Code: BU233V01**

<b>On the successful completion of the course, student will be able to:</b>		
1.	differentiate between formal and informal garden styles.	<b>K4</b>
2.	design and assemble their own terrariums, Miniature Fairy Garden, Kokedama.	<b>K6</b>
3.	grasp the concept of vertical gardening and its benefits.	<b>K2</b>
4.	understand how indoor plants can break office monotony and improve the overall workspace environment.	<b>K2</b>
5.	acquire skills in laying soil, manuring, and watering for optimal plant growth.	<b>K3</b>

**K2 - Understand; K3 - Apply; K4 - Analyze; K6– Create**

**SEMESTER --III**  
**SPECIFIC VALUE -ADDED COURSE – CULTIVATION OF ALGAE**

**Course Code: BU233V02**

<b>On the successful completion of the course, student will be able to:</b>		
1.	obtain an in-depth knowledge on culture and mass cultivation of algae and its different methods.	<b>K1</b>
2.	explore and recommend commercial potential of algal products.	<b>K2</b>

3.	understand the apply facet of algology and acquire a complete knowledge about the cultivation methods in algae	<b>K3</b>
4.	describe the preparation of seaweed liquid fertilizers and their applications in agriculture and horticulture.	<b>K4</b>
5.	acquire the information about algal applications in different industries and agriculture fields in the current scenario.	<b>K5 &amp; K6</b>

**K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6**– Create

**SEMESTER --III**  
**SPECIFIC VALUE ADDED COURSE – FERMENTATION**  
**TECHNOLOGY**

**Course Code: BU233V03**

<b>On the successful completion of the course, student will be able to:</b>		
1.	enumerate the significance of industrially useful microbes.	<b>K1</b>
2.	explain the design and operation of industrial practices in mass production of fermented products.	<b>K2</b>
3.	explain the process of maintenance and preservation of microorganisms.	<b>K3</b>
4.	analyze the various aspects of the fermentation technology and apply for fermentative production.	<b>K4</b>
5.	validate the experimental techniques for microbial production of enzymes: amylase and protease, bio product recover.	<b>K5 &amp; K6</b>

**K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6**– Create

**SEMESTER -III / V**  
**SELF - LEARNING COURSE – NATURE’S WEALTH**  
**Course Code: BU233SL1/BU235SL1**

<b>On the successful completion of the course, student will be able to:</b>		
1.	learn the origin and history of various crop plants.	<b>K1</b>
2.	understand the cultivation of various economically important crops.	<b>K2</b>
3.	acquire knowledge on the binomial nomenclature and morphology of economic crops.	<b>K3</b>

4.	acquire the skill for preparation plant-based products.	<b>K4</b>
5.	produce beverages and narcotics from specific plants.	<b>K5</b>

**K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate

#### **SEMESTER IV**

### **CORE COURSE IV: PLANT DIVERSITY – IV – GYMNOSPERMS, PALEOBOTANY AND EVOLUTION**

**Course Code: BU234CC1**

<b>On the successful completion of the course, student will be able to:</b>		
1.	relate the general characteristics of Gymnosperms	<b>K1</b>
2.	explain about the morphology and anatomy of Gymnosperms.	<b>K2</b>
3.	compare and contrast the reproductive structures of Gymnosperms & fossil forms	<b>K4</b>
4.	analyze the anatomy and reproduction of Gymnosperms along with their ecological and economical importance.	<b>K4</b>
5.	understand the various fossilization methods and their significance in paleo botany.	<b>K2</b>

**K1** - Remember; **K2** - Understand; **K4** - Analyze;

#### **SEMESTER --IV**

### **CORE LAB COURSE IV: PLANT DIVERSITY –IV – GYMNOSPERMS, PALEOBOTANY & EVOLUTION- PRACTICAL -IV**

**Course Code: BU234CP1**

<b>On the successful completion of the course, student will be able to:</b>		
1.	analyze, observe and record the morphological features of selected species of gymnosperms.	<b>K4</b>
2.	describe the structure of fossil forms prescribed in the syllabus.	<b>K2</b>
3.	identify and illustrate the anatomical features of selected species of gymnosperms.	<b>K3</b>
4.	develop comprehensive skills in sectioning and micro preparation.	<b>K2</b>
5.	interpret the significance of reproductive structures in gymnosperms.	<b>K4</b>

**K2** - Understand; **K3** - Apply; **K4** - Analyze;



**SEMESTER --IV**  
**ELECTIVE COURSE IV: ALLIED BOTANY – IV**  
**Course Code: BU234EC1**

<b>On the successful completion of the course, student will be able to:</b>		
1	understand the fundamental concepts of plant anatomy and embryology.	<b>K2</b>
2	analyze and recognize the different organs of plants and secondary growth.	<b>K4</b>
3	understand water relation of plants with respect to various physiological processes.	<b>K2</b>
4	to know about the fundamental concepts of aerobic and anaerobic respiration.	<b>K1</b>
5	classify plant systematics and recognize the importance of herbarium and virtual herbarium.	<b>K3</b>

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze;**

**SEMESTER --IV**  
**ELECTIVE LAB COURSE IV: ALLIED BOTANY PRACTICAL – IV**  
**Course Code: BU234EP1**

<b>On the successful completion of the course, student will be able to:</b>		
1.	study the internal organization of algae and fungi.	<b>K2</b>
2.	develop critical understanding on morphology, anatomy and reproduction of bryophytes, pteridophytes and gymnosperms.	<b>K4</b>
3.	study the classical taxonomy with reference to different parameters.	<b>K1</b>
4.	understand the fundamental concepts of plant anatomy and embryology	<b>K2</b>
5.	study the effect of various physical factors on photosynthesis.	<b>K2</b>

**K1 - Remember; K2 - Understand; K4 - Analyze;**

**SEMESTER – III / IV**  
**SKILL ENHANCEMENT COURSE SEC-III: FITNESS FOR WELLBEING**  
**Course Code: UG23CSE1**

<b>On the successful completion of the course, student will be able to:</b>		
<b>1</b>	know physical, mental, and social aspects of health	<b>K1</b>
<b>2</b>	understand holistic health and the role of physical fitness.	<b>K2</b>
<b>3</b>	apply mindfulness and yoga for stress management and mental clarity.	<b>K3</b>

4	implement proper personal hygiene practices for cleanliness and disease prevention.	<b>K3</b>
5	evaluate and implement right nutritional choices.	<b>K5</b>

**K1-Remember; K2-Understand; K3-Apply; K5-Evaluate**

**SEMESTER – IV  
ENVIRONMENTAL STUDIES  
Course Code: UG234EV1**

<b>On the successful completion of the course, students will be able to:</b>		
1.	know the different kinds of resources, pollution and ecosystems	<b>K1</b>
2.	understand the biodiversity and its constituents	<b>K2</b>
3.	use the methods to control pollution and, to conserve the resources and ecosystem	<b>K3</b>
4.	analyse the factors behind pollution, global warming and health effects for sustainable development	<b>K4</b>
5.	evaluate various water, disaster and waste management systems	<b>K5</b>

**K1 - Remember; K2 - Understand; K3 – Apply; K4 - Analyse; K5 - Evaluate**

**SEMESTER -IV/ VI  
SELF - LEARNING COURSE – HERBAL FORMULATIONS  
Course Code: BU234SL1/BU236SL1**

<b>On the successful completion of the course, student will be able to:</b>		
1.	obtain the knowledge of herbal preparation using various types of medicinal plants.	<b>K1</b>
2.	learn the herbal decoction and herbal powder preparation	<b>K2</b>
3.	study and investigate the disease curing ability of medicinal plants in various ailments.	<b>K3</b>
4.	evaluate the herbal based formulations and products in pharmaceutical industries.	<b>K4</b>
5.	create new formulations using therapeutically valuable plant materials for the healthy life of society.	<b>K5, K6</b>

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6- Create**

**SEMESTER III & IV**  
**LIFE SKILL TRAINING II: MORAL**  
**Course Code: UG234LM1**

<b>Upon completion of this course the students will be able to</b>		
1	know the significance of life	K1
2	understand the importance of self-care	K2
3	realise the duty of youngsters in the society and live up to it	K3
4	analyse how to achieve success in profession	K4
5	develop mystical values by inculcating good thoughts	K5

**K1 - Remember; K2 - Understand; K3 – Apply; K4 - Analyse; K5 – Evaluate**

**SEMESTER III & IV**  
**LIFE SKILL TRAINING II: CATECHISM**  
**Course Code: UG234LC1**

<b>Upon completion of this course the students will be able to</b>		
<b>1</b>	know and understand the aim and importance of value education	<b>K1,K2</b>
<b>2</b>	get rid of inferiority complex and act confidently in the society	<b>K3</b>
<b>3</b>	live lovingly by facing loneliness and make decisions on their own	<b>K3</b>
<b>4</b>	develop human dignity and able to stand bravely in adversity	<b>K6</b>
<b>5</b>	learn unity in diversity and grow in a life of grace	<b>K6</b>

**K1 - Remember K2-Understand; K3-Apply; K6- Create**