

Semester-wise Titles of the Papers in B.Sc. (Botany)					
Year	Sem.	Course Code	Paper Title	Theory/ Practical	Credits
<i>Certificate Course In Microbial Technology &amp; Classical Botany</i>					
FIRST YEAR	I	B040101T	Microbiology & Plant Pathology	Theory	4
		B040102P	Techniques in Microbiology & Plant Pathology	Practical	2
	II	B040201T	Archegoniates & Plant Architecture	Theory	4
		B040202P	Land Plants Architecture	Practical	2
<i>Diploma in Plant Identification, Utilization &amp; Ethnomedicine</i>					
SECOND YEAR	III	B040301T	Flowering Plants Identification & Aesthetic Characteristics	Theory	4
		B040302P	Plant Identification technology	Practical	2
	IV	B040401T	Economic Botany, Ethnomedicine & Phytochemistry	Theory	4
		B040402P	Commercial Botany & Phytochemical Analysis	Practical	2
<i>Bachelor of Science</i>					
THIRD YEAR	V	B040501T	Plant Physiology, Metabolism & Biochemistry	Theory	4
		B040502T	Molecular Biology & Bioinformatics	Theory	4
		B040503P	Experiments in physiology, Biochemistry & molecular biology	Practical	2
		B040504R	*Project-I	Practical	3
	VI	B040601T	Cytogenetics, Plant Breeding & Nanotechnology	Theory	4
		B040602T	Ecology & Environment	Theory	4
		B040603P	Cytogenetics, Conservation & Environment management	Practical	2
		B040604R	*Project-II	Practical	3

#### Subject prerequisites:

1. To study Botany, a student must have had the subject Biology/Biotechnology learnt at 10+2 level.
2. Keen interest in plants and plant-related research, Potential in mathematics, biology and chemistry
3. Skills and aptitude for scientific study and research
4. Creativity and good comprehension while working on scientific procedures and research
5. Computer aptitude.

#### COURSE INTRODUCTION

The new curriculum of B.Sc. in Science (Botany) offers essential knowledge and technical skills to study plants in a holistic manner. Students would be trained in all areas of plant biology using a unique combination of core, elective and vocational papers with significant inter-disciplinary components. Students would be exposed to cutting-edge technologies that are currently used in the study of plant life forms, their evolution and interactions with other organisms within the ecosystem. Students would also become aware of the social and environmental significance of plants and their relevance to the national economy.

B.Sc. Botany Programme covers academic activities within the classroom sessions along with practical concepts at laboratory sessions. Infield, outstation activities and projects are also required to be organized for real-life experience and learning.

Candidates who have curiosity in plants kingdom, ecosystem, love exploring exotic places and wish to work as researchers or professions like Botanist, Conservationist, Ecologist, etc. can choose B.Sc. Botany course.

**Programme outcomes (POs):**

Transformed curriculum shall develop educated outcome-oriented candidature, fostered with discovery-learning, equipped with practice & skills to deal practical problems and versed with recent pedagogical trends in education including e-learning, flipped class and hybrid learning to develop into responsible citizen for nation-building and transforming the country towards the future with their knowledge gained in the field of plant science.

<b>PO 1</b>	CBCS syllabus with a combination of general and specialized education shall introduce the concepts of breadth and depth in learning
<b>PO2</b>	Shall produce competent plant biologists who can employ and implement their gained knowledge in basic and applied aspects that will profoundly influence the prevailing paradigm of agriculture, industry, healthcare and environment to provide sustainable development.
<b>PO 3</b>	Will increase the ability of critical thinking, development of scientific attitude, handling of problems and generating solutions, improve practical skills, enhance communication skill, social interaction, increase awareness in judicious use of plant resources by recognizing the ethical value system.
<b>PO 4</b>	The training provided to the students will make them competent enough for doing jobs in Govt. and private sectors of academia, research and industry along with graduate preparation for national as well as international competitive examinations, especially UGC-CSIR NET, UPSC Civil Services Examination, IFS, NSC, FCI, BSI, FRI etc.
<b>PO 5</b>	Certificate and diploma courses are framed to generate self- entrepreneurship and self-employability, if multi exit option is opted.
<b>PO 6</b>	Lifelong learning be achieved by drawing attention to the vast world of knowledge of plants and their domestication.

**Programme specific outcomes (PSOs):*****B.Sc. I Year / Certificate course in Microbial Technology & Classical Botany***

This Programme imparts knowledge on various fields of plant biology through teaching, interactions and practical classes. It shall maintain a balance between the traditional botany and modern science for shifting it towards the frontier areas of plant sciences with applied approach. This syllabus has been drafted to enable the learners to prepare them for self-entrepreneurship and employment in various fields including academics as well as competitive exams. Students would gain wide knowledge in following aspects:

1. Diversity of plants and microbes, their habitat, morphology, architecture and reproduction.
2. Plant disease causing microbes, symptoms & control.
3. Economic value of plants and their use in Human Welfare.

**Programme specific outcomes (PSOs):*****B.Sc. II Year/ (Diploma in Plant Identification, Utilization & Ethnomedicine)***

This course provides a broad understanding of identifying, growing and using plants. This course is primarily aimed to introduce people to the richness of plant diversity found in surrounding areas. Lecture sessions are designed to cover fundamental topics concerning classification of plants and their utilization required for understanding the flora and vegetation. Practical sessions are organized following theory for easy understanding of the various parts of the plants, structural organization of floral parts and diversity therein. Participants are taken to different locations covering a variety of habitats and forest types to acquaint them with the native flora. In the long run, will contribute towards building momentum for

people's participation in environmental conservation without compromising on academic rigor and our rich wealth of knowledge inherited over generations.

1. The course will cover conventional topics in Field Botany like Evolutionary History & Diversity of plants, Complete Morphology, Nomenclature of plants, Systems of Classification, Keys to important Families of Flowering Plants, Field Data Collection & Herbarium Techniques.
2. The course is designed to become a commercial crop grower, florist, protected cultivator, green belt plant advisor to industries, pharmacologist & taxonomist.

**Programme specific outcomes (PSOs):**  
***B.Sc. III Year / Bachelor of Science***

The learning outcomes of a three years graduation course are aligned with programme learning outcomes but these are specific to-specific courses offered in a program. The core courses shall be the backbone of this framework whereas discipline electives, generic electives and skill enhancement courses would add academic excellence in the subject together with a multi-dimensional and multidisciplinary approach.

1. Understanding of plant classification systematics, evolution, ecology, developmental biology, physiology, biochemistry, plant interactions with microbes and insects, morphology, anatomy, reproduction, genetics and molecular biology of various life-forms.
2. This course is suitable to produce expertise in conservation biology like ex-situ conservation, response to habitat change, genotype characterization and reproductive biology.
3. Understanding of various analytical techniques of plant sciences, use of plants as industrial resources or as a human livelihood support system and is well versed with the use of transgenic technologies for basic and applied research in plants.
4. Understanding of various life forms of plants, morphology, anatomy, reproduction, genetics, microbiology, molecular biology, recombinant DNA technology, transgenic technology and use of bioinformatics tools and databases and the application of statistics to biological data.
5. Entrepreneurship Skill Development, Understand the issues of environmental contexts and sustainable development, Inculcation of human values,
6. Strengthen mathematical and computational skills. Enable students to use ICT & AI effectively.
7. Develop good skills in the laboratory such as observation and evaluation by the use of modern tools and technology.

**PSO 1**

Understanding the nature and basic concepts of all the plant groups, their metabolism, components at the molecular level, biochemistry, taxonomy and ecology.  
The course will make them aware of natural resources and the environment and the importance of conserving it. Hands-on training in various fields will develop practical skills, handling equipment and laboratory use along with collection and interpretation of biological materials and data. Knowledge gained through theoretical and lab-based experiments will generate technical personnel in various priority areas such as genetics, cell and molecular biology, plant systematics and biotechnology.

<b>PSO 2</b>	Botanists are able to contribute to all these fields and therefore, are mainly employed with educational institutions, government or public sectors or companies in industries, such as agriculture or forestry, oil, chemical, biotechnology, geological survey, environmental protection, drugs, genetic research, plant resources laboratories, plant health inspection services, lumber and paper, food, fermentation, nursery, fruit and so on. Jobs available as a botanist: •Microbiologist, plant pathologist, Taxonomist • Plant Physiologist • Plant Biochemist • Researcher • Mycologist • Ecologist • Weed Scientist • Palaeobotanist • Conservationist • Fruit Grower • Morphologist • Cytologist • Ethnobotanist • Plant geneticists etc.
<b>PSO 3</b>	Inculcate strong fundamentals on modern and classical aspects of Botany, understand knowledge of Botany is an essential pre-requisite for the pursuit of many applied sciences. It will facilitate students for taking up and shaping a successful career in Botany and allied sciences.
<b>PSO 4</b>	Introduction of research project will inculcate research aptitude and passion for higher education and scientific research.

Proposed Year wise Structure of B.Sc. in Botany (CORE / ELECTIVE COURSES & PROJECTS)											
Subject: Botany										Total Credits /hrs/	
Course/Entry-Exit levels	Year	Sem.	Paper 1	Credit/hrs	Paper 2	Credit/hrs	Paper 3	Credits/hrs	Research Project	Credit/hrs	
<b>Certificate Course In Microbial Technology &amp; Classical Botany</b>	I	I	<b>Microbiology &amp; Plant Pathology</b>	4/60	<b>Techniques in Microbiology &amp; Plant Pathology</b>	2/60	--		Nil	Nil	6/120
		II	<b>Archegoniates &amp; Plant Architecture</b>	4/60	<b>Land Plants Architecture</b>	2/60	--		Nil	Nil	6/120
<b>Diploma in Plant Identification, Utilization &amp; Ethnomedicine</b>	II	III	<b>Flowering Plants Identification &amp; Aesthetic Characteristics</b>	4/60	<b>Plant Identification technology</b>	2/60	--		Nil	Nil	6/120
		IV	<b>Economic Botany, Ethnomedicine &amp; Phytochemistry</b>	4/60	<b>Commercial Botany &amp; Phytochemical Analysis</b>	2/60	-		Nil	Nil	6/120
<b>Bachelor of Science</b>		V	<b>Plant Physiology, Metabolism &amp; Biochemistry</b>	4/60	<b>Molecular Biology &amp; Bioinformatics</b>	4/60	<b>Experiments in physiology, Biochemistry &amp;</b>	2/60	<b>*Project-I</b>	3/45	13/205

	III					molecular biology				
	VI	Cytogenetics, Plant Breeding & nanotechnology	4/60	Ecology & Environment	4/60	Cytogenetics, Conservation & Environment management	2/60	*Project- II	3/45	13/205
Comments	Total Credits/Hrs. / lectures: (Credits can be earned from On-line Portals of UGC to create Academic Bank and 15% of the topics of each paper can be taught by on-line/ Virtual/ ICT based as per choice of the Institution) * Suggestive List of Projects mentioned in Detailed Paper Syllabus									50/890
<p>Botany Course is One of the Major Subjects for Biology Students and Minor or Elective for students of other faculties</p> <p>Second Major Subject Can be Zoology/ Biotechnology /Microbiology</p> <p>Third Major Subject can be from Science or Any other faculty of UGC /AICTE – (Arts/ Agriculture/ Education/ law/ Commerce)</p> <p>Fourth Subject is Minor or Elective to be selected from any one of other Faculties as per student's own interest</p> <p>One Vocational Course has to be opted from the list given in Syllabus as per NSDC guidelines</p> <p>One Co-curricular Course is compulsory</p>										
<b>Internal Assessment &amp; External Assessment</b>										
<b>Internal Assessment</b>				<b>Marks</b>	<b>External Assessment</b>				<b>Marks</b>	
Class Interaction				5	Viva Voce on Practicals				10	
Quiz				5	Report of Botanical Excursion/ Lab Visits/Industrial training/ Survey/Collection/ Models				10	
Seminar				7	Table work / Experiments				45	
Assignments (Charts/ Flora/ Rural Service/ Technology Dissemination/ Botanical Excursion/ Lab Visits/Industrial training)				8	Practical Record File				10	
<b>TOTAL</b>				<b>25</b>					<b>75</b>	
* Botanical Excursion/ Lab Visits/Industrial training Is compulsory										

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