

# UNDERGRADUATE PROGRAMME: COURSE OUTCOME

Name of the Programme: B.Sc. Botany

Name of the Class	Course Code	Course Title	Course Outcomes	
<b>SEMESTER I</b>				
F.Y. B.Sc.	BO - 111	Plant Life and Utilization - I	CO1	The students will develop understanding about the diversity, identification and classification of lower plants.
			CO2	The students will learn about structure, growth and propagation of a representative from each group, thus giving them a detailed understanding of each plant group.
			CO3	Economic importance of algae, fungi, bryophytes and lichens with their significance in ecological studies will also be understood by students.
F.Y. B.Sc.	BO - 112	Plant Morphology and Anatomy	CO1	Students will learn terms used in describing the morphology of flowering plants and anatomy in detail.
			CO2	They will become well versed with the structure and functions of various organs of flowering plants.
			CO3	Students will also get an insight into applications of morphology and anatomy in classification & phylogeny.
F.Y. B.Sc.	BO - 113	Practicals Based On BO 111 & BO 112	CO1	Students will be able to identify live specimens of cryptogams & phanerogams, apply terminology in their study.
			CO2	Students will be able to categorize plants into Monocot and Dicot on the basis of anatomical characters; identify type and development of fruits
			CO3	Through field trips, students will observe biodiversity, adaptations in plants according to their habitat and ecological significance of each plant group.
<b>SEMESTER II</b>				
F.Y. B.Sc.	BO - 121	Plant Life and Utilization II	CO1	The students will also get an insight into applications of morphology and anatomy in classification & phylogeny.
			CO2	Students will learn about the structure:

				morphology & anatomy, and propagation of a representative from each group, thus giving a detailed understanding of higher plants.
			CO3	Students will become aware of the importance of phanerogams in ecological studies and their services to mankind.
F.Y. B.Sc.	BO - 122	Principles of Plant Science	CO1	Students will be able to understand the various physiological life processes in plants and their importance.
			CO2	Students will be able to learn different types of cell divisions, their stages and importance.
			CO3	Students will focus on the central dogma of molecular biology by studying the structures of DNA & RNA with special reference to their regulatory role.
			CO4	Students will understand the principle mechanisms of DNA replication.
F.Y. B.Sc.	BO - 123	Practicals Based On BO 121 & BO 122	CO1	Students will be able to apply theoretical knowledge in studying live specimens in the laboratory and their industrial applications in human welfare.
			CO2	Students will gain expertise in preparing slides for cytological studies.
			CO3	Students will gain hands on experience in handling equipment for physiological experiments like plasmolysis, DPD and chlorophyll estimation.
<b>SEMESTER III</b>				
S.Y. B.Sc.	BO-231	Taxonomy of Angiosperms & Plant Ecology	CO1	Students will learn about the objectives and importance of taxonomy, exploration, identification, nomenclature and classification of plants using different systems as well as families as examples.
			CO2	The students will be introduced to ecology, its concept, scope, and interdisciplinary approach; concept and basis of 'hotspot' identification and ecological grouping of the plants
			CO3	Students will get well versed with methods of vegetation sampling, types of diversity & the application of all these concepts in case study.
S.Y. B.Sc.	BO-232	Plant Physiology	CO1	Students will be able to understand the various physiological life processes in plants and factors affecting these processes.
			CO2	During the course, students will gain knowledge about nitrogen fixation, seed dormancy and their applications in agriculture.
			CO3	Students will understand the role of various

				phytohormones & their applications in agriculture, horticulture, etc.
S.Y. B.Sc.	BO 233	Practical based on BO 231 & BO 232	CO1	Students will gain expertise in identifying and classifying angiospermic plants; identify plants based on ecological adaptations due to particular habitat.
			CO2	Students will be able to calculate seed germination percent, vigour, estimate proteins and starch in germinating/non germinating seeds, the steps in seed industry
			CO3	Experiments in physiology such as transpiration, DPD, etc. will give students a better understanding of their role in plant growth and development.
			CO4	Visit to seed testing centre and horticulture unit will give students a better understanding of functioning of the industries and also inculcate self employability.

### SEMESTER IV

S.Y. B.Sc.	BO-241	Plant Anatomy & Embryology	CO1	Students get an understanding of the scope of anatomy by studying different forms of mechanical tissues, epidermis, secondary growth: normal & anomalous.
			CO2	Students learn the entire process of development of male & female gametophytes, subsequent gametes, fertilization followed by embryogeny.
S.Y. B.Sc.	BO-242	Plant Biotechnology	CO1	Students will understand the basic properties of plant cell, tissue culture technique, and application of this knowledge in various fields for conservation and bioremediation.
			CO2	Students get well versed with concepts and applications of Genomics, Proteomics and Bioinformatics.
S.Y. B.Sc.	BO 243	Practical based on BO 241 & BO 242	CO1	Students will be able to understand the structure, distribution and importance of epidermal and mechanical tissues in the life of a plant and ecological importance of the same.
			CO2	Study of slides will give a detailed understanding of embryogenesis in students.
			CO3	Students will learn handling and care of laboratory equipment used in a tissue culture laboratory, sterilization methods and inoculation.
			CO4	Students will gain expertise in cultivation of economically importance alga <i>Spirulina</i>
			CO5	Visit to tissue culture laboratory will motivate students towards research.

## SEMESTER V

T.Y. B.Sc.	BO-351	Algae and Fungi	CO1	Students will learn about lower cryptogams in detail: classification, thallus organization and distribution.
			CO2	Students will be able to identify different examples of lower cryptogams by studying their life cycles in detail.
			CO3	Students will learn about the economic and ecological importance of lower cryptogams.
T.Y. B.Sc.	BO-352	Archegoniate	CO1	Students will be able to differentiate between different lower and higher cryptogams.
			CO2	Students will understand the evolutionary process of lower plant groups.
			CO3	Different types of life cycle with type study will be learnt by students.
T.Y.B.Sc.	BO-353	Spermatophyta and Paleobotany	CO1	Origin of angiospermic plants and the various systems of classification will be understood by students.
			CO2	Students will learn characters & economic importance of families, thus, they will be able to identify plants on field & also learn techniques of preservation.
			CO4	Students will gain knowledge about classification, distribution, characters & life cycle of gymnosperms.
			CO5	Formation process and different types of fossils will be understood by students.
T.Y. B.Sc.	BO-354	Plant Ecology	CO1	Students will get well versed with interrelationships between the living world and the environment, homeostasis and plant indicators.
			CO2	Concepts of population & community ecology will be understood.
			CO3	Students will be able to understand better the biogeochemical cycles, their types & significance in an ecosystem.
			CO4	Students will be introduced to a new concept: EIA, environmental audit and significance of each in sustainable development.
T.Y. B.Sc.	BO-355	Cell and Molecular Biology	CO1	Students will get an insight into structure & functions of basic unit of life i.e. cell and various organelles.
			CO2	Students will learn about genetic material DNA its structure, function and the process of replication.
			CO3	Students understanding on gene expression & regulation will be enhanced.

T.Y. B.Sc.	BO-356	Genetics	CO1	Different laws of Genetics will be correctly understood by students alongwith transfer of characters from parents to offspring, interaction of genes & structure of chromosome.
			CO2	Students will be introduced to concepts such as mutations and sex linked inheritance.
T.Y. B.Sc.	BO-3510	Medicinal Botany	CO1	Skill enhancement course will introduce students to different indigenous systems of medicine.
			CO2	Students will learn new skills to conserve and propagate medicinal plants used in traditional medicine.
			CO3	Students will get an insight about ethnobotany and folk medicine.
T.Y. B.Sc.	BO-3511	Plant Diversity and Human Health	CO1	Students get a chance to learn the concept of plant diversity & agrodiversity
			CO2	Students become aware of factors leading to loss of agrobiodiversity, and projected scenario for biodiversity loss.
			CO3	Detailed information on Conservation of Biodiversity, social approaches to conservation, biodiversity awareness programmes and sustainable development will be understood by students to get a better understanding of role of plants in human life.
			CO4	With new skills, social ethics and environmental sustainability are also inculcated in students.
T.Y. B.Sc.	BO 357	Practical based on BO 351 and BO 352	CO1	Students will be able to identify cryptogams and classify them based on morphology & reproductive structures.
			CO2	Techniques in anatomy will be enhanced in students.
			CO3	Evolutionary trends related to stelar evolution in pteridophytes will be understood better.
T.Y. B.Sc.	BO 358	Practical based on BO 353 and BO 354	CO1	Students will be able to describe diagnostic features of phanerogams and classify plants based on family characters.
			CO2	Identification of fossils, ecological studies using remote sensing will becomes easier for students.
			CO3	Students will be able to apply data to study

				ecosystem types.
T.Y. B.Sc.	BO 359	Practical based on BO 355 and BO 356	CO1	Students will be able to identify and observe the structural changes in a cell during cell divisions: mitosis & meiosis and colchicine treatment
			CO2	Students will gain expertise in techniques of DNA & RNA isolation & estimation
			CO3	Study of chromosomes, tetraploidy, structural heterozygotes will be better understood by students.
			CO4	Students will be able to apply and solve problems on genetics related to PTC sensitivity, multiple alleles, three point test cross, etc.

### SEMESTER VI

T.Y. B.Sc.	BO-361	Plant Physiology & Metabolism	CO1	Different mineral elements utilized by plants for their growth and the amount in which they are utilized will be understood by students.
			CO2	Students will learn about different metabolic cycles used by plants in different conditions and their significance.
			CO3	Students will learn about the process of translocation of food within the plant body.
			CO4	Types of plant growth regulators, their role and the concept of photomorphogenesis will be understood by students.
T.Y. B.Sc.	BO-362	Biochemistry	CO1	Students will learn about the structure, function and commercial significance of different biomolecules.
			CO2	Students will learn about the mechanism of action of enzymes.
			CO3	Students will be able to correctly identify the different metabolic pathways of different biomolecules.
T.Y. B.Sc.	BO-363	Plant Pathology	CO1	Students will learn different terminologies used in the study of plant diseases.
			CO2	Students will understand about defence mechanism in plants and methods of studying plant diseases.
			CO3	Students will develop an understanding of the importance of pathological studies in relation to crop plant diseases.
			CO4	Students will learn about the processes of controlling various plant diseases.
T.Y. B.Sc.	BO-364	Evolution and	CO1	Students will understand about the origin of

		Population genetics-		earth and life on earth.
			CO2	Different theories of evolution will be learnt by students.
			CO3	Students will get an insight about geological time scale and fossils.
			CO4	Students will learn about genetic frequency and genetic polymorphism within a population and species isolation.
T.Y. B.Sc.	BO-365	Advanced Plant Biotechnology	CO1	Students will understand the concept of tissue culture in detail from the time of its discovery and landmarks.
			CO2	Students will get to know about different techniques in genetic engineering used to prepare genetically modified plants, thus enhancing crop production.
			CO3	Students will understand the role of microorganisms in the synthesis of different commercial products.
			CO4	Students will learn about the application of nanotechnology in agriculture.
T.Y. B.Sc.	BO-366	Plant Breeding and Seed Technology	CO1	Students will be introduced to a field of agriculture called plant breeding, the concept, its history and scope.
			CO2	Students will learn traditional and advanced methods of plant breeding to enhance crop production.
			CO3	The set up of a seed industry - its working; seed production - its stages will be understood by students to develop employability skills in them.
T.Y. B.Sc.	BO-3610	Nursery and Gardening Management	CO1	Skill enhancement in nursery & gardening management will be inculcated in students.
			CO2	Propagation of plants and gardening operations will be learnt & understood by students in detail.
T.Y. B.Sc.	BO-3611	Biofertilizers	CO1	Students will get an opportunity to learn about biofertilizers, their types & importance in agriculture.
			CO2	Students will be able to learn the methods of cultivation of various biofertilizers, including manures, thus enhancing their skills.
T.Y. B.Sc.	BO 367	Practical based on BO 361 and BO 362	CO1	Students will be able to practically observe plasmolysis, determine stomatal frequency & stomatal index of leaves and their importance to plant physiology.
			CO2	Physiological processes, enzymology,

				estimation of proteins, vitamins, other biomolecules, spectrophotometry will be understood & applied by students in research, in the near future.
			CO3	Students will be able to use chromatography techniques for various isolations & estimations.
T.Y. B.Sc.	BO 368	Practical based on BO 363 and BO 364	CO1	Students will learn laboratory techniques such as preparation of media, sterilization techniques and inoculation.
			CO2	Students will be able to identify plant diseases, causal organisms, method of infection and control of diseases
			CO3	Fossil identification through specimen study and visit to museum will be clearly understood by students.
			CO4	Students will be able to solve problems based on allele and gene frequency; study sympatric and allopatric speciation.
T.Y. B.Sc.	BO 369	Practical based on BO 365 and BO 366	CO1	Students will gain expertise in handling equipment used in genetic engineering like gene gun, PCR, gel doc, microcentrifuge, electrophoresis, micropipettes, incubator, shaker, etc.; preparation of media and other techniques in plant tissue culture.
			CO2	Students will be able to understand genetic engineering and mutagenesis - their applications in agriculture, eg. transgenic plants.
			CO3	Students will be able to evaluate plant breeding methods for betterment of mankind and crop improvement, interpret application of conventional and non-conventional methods of plant breeding and learn methods of seed testing.