

DEPARTMENT OF BOTANY
PROGRAMMES OUTCOMES,
PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES

PROGRAMME SPECIFIC OUTCOMES

DEPARTMENT OF BOTANY	After successful completion of three years programme, the student will have the pleasure to learn so.
PROGRAMME OUTCOMES	<p>PO-1: The basic concepts and the rule of the biological world.</p> <p>PO-2: The basic instruments desired for the understanding the mystery of Biology</p> <p>PO.3: Sole the different problems and the development of logical thinking in solving the daily issues.</p> <p>PO.4:To explore the beauty of the diversity and their application in the everyday's life</p> <p>PO 5:To cultivate the scientific temperament to explore the beauty of life in the light of scientific flavor</p> <p>PO.6: To exploration of the scientific temperament for the judicious uses of natural resources for the sustainable development.</p> <p>PO.8:Use modern scientific techniques and devices to know the unknown</p> <p>PO.9: To formulate the different uses of the botanical knowledge for their livelihood.</p>

PROGRAMME SPECIFIC OUTCOMES	<p>PSO -1: To gather knowledge of botany through the theory and practical exposure</p> <p>PSO-II; To explain the biodiversity, nomenclature, microbial world, the different diverse plant life, plant metabolism, Reproductive biology along with the Environment and the modification of the living organisms for the sake of the development of human race and needs.</p> <p>PSO III; To identify the different issues in terms of environment and sustainability</p> <p>PSOIV; To understand the basic principles of biology for the welfare of the human beings and the civilization</p> <p>PSOV: To use modern tools and techniques for the sake of the health and hygiene of the plant and animal world including the human beings.</p> <p>PSOVI: To understand the manual of the biological world and how to address the different issues in this regard.</p> <p>PSOVII: To develop the skill for reasoning ability and its application to solve the mystery of the biological world</p> <p>PSOVIII: To learn the different values and ethics in the application of the biological organisms for the best of their knowledge.</p>
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COURSE OUTCOMES B.SC IN BOTANY

COURSE	OUTCOMES
BBOTCCHC101(Microbiology & Phycology)	<p>After completion of the course, the students will have the pleasure of knowledge in the following matters:</p> <p>CO-1: Understanding the diversity of the biological world in general and virus, bacteria & algae of lower group of plant life forms in particular</p> <p>CO-2: Understanding the growth and the beauty of reproduction</p> <p>CO-3: The application of the lower group of life forms in industry and growth of the economy of a country</p> <p>CO-4: To know the different pharmaceutical products and other products derived from microbes</p>
BBOTCCHC102 (Cell biology & Biomolecules)	<p>CO-1: To understand the basic chemistry in the exposure of the beauty of life</p> <p>CO-2: To know the application of enzymes, enzymetics and the mode of the action of enzymes in the welfare of the living world,</p> <p>CO-3: To have a brief and precise knowledge of bioenergetics, the</p>

	<p>principle of energy production in the biological world and the application of thermodynamics in the energy kinetics in the living world</p> <p>CO-3: The exposure of the different micro molecules, macromolecules and supra molecules like DNA, Protein , polysaccharides, Fats and their significance in the biological world</p> <p>CO-4: to know the dynamic system of cell and equilibrium, with respect to the import and export of the different molecules across the different boundaries either active or passive mode in this regard along with the issues and problems.</p> <p>CO-5: To know the structural and functional aspect of cell at the ultramicroscopic level</p> <p>CO-6: To have the wide exposure of the Cell, division, growth with respect of the different cell division pattern along with the emergent anomalies derived due to the functional abnormalities of the cell in the eukaryotic world.</p>
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SEMESTER II

COURSE	OUTCOMES
	<p>The course offers the diverse knowledge of the past and present plant diversity along with their evolution pattern and application in human welfare.</p>
BBOTCCHC201 (Mycology & Pathology)	<p>CO-1: To understand the cryptogams in general and fungi in particular,</p> <p>CO-2: Gather information regarding fungal diversity and their wide classification with species exposure,</p> <p>CO-3: Understand the different diseases associated with fungi and their impact in agriculture,</p> <p>CO-4: exposure of the concept of symbiosis along with the role of lichen and mycorrhizae in the environmental sustainability,</p> <p>CO-5: To have the pleasure of the different antibiotics and their mode of action and harmful effects due to their careless uses in human life,</p> <p>CO-6: The application of fungi in industry and agriculture with special reference to organic acid production, alcohol. Vitamins and the application of biofertilizers in the sustainable development</p>
BBOTCCHC202 (Economic Botany & Pharmacognosy)	<p>CO-1: The understanding of the cryptogams likes Bryophytes and Pteridophytes in plant world along with their diversity, classification and the contribution of different naturalists in this regard.</p> <p>CO-2: The evolution of the land plants and the development of the vascular plants are the most thrust areas.</p> <p>CO-3: The content also explores the morphological, anatomical and reproductive beauty of these life forms.</p> <p>CO-4: The content also addresses the different fossil life forms and the</p>

	<p>evolution of the diversity of life in the context of the geological time scale,</p> <p>CO-5: The content also offers the exposure the application of these life forms for the human welfare.</p>
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SEMESTER III

course	<p>After completion of these courses, the student will have the pleasure of the beauty of internal organization of the plant world, the genetics behind the characters expression and rule of the nature, the plants importance in human welfare along with the development skills as a part of their livelihood in future in SEC course.</p>
BBOTCCH301 (Plant anatomy)	<p>CO-1: To introduce the basic anatomy of the plant along with the role of the different anatomists both India and across the globe to enrich the domain.</p> <p>CO-2: To have the application of anatomical knowledge in other sciences like Plant Systematics and Pharmacognosy for solving the issues and challenges,</p> <p>CO-3: to introduce the idea of the developmental biology of the organization of the different level of the organization of the plant life.</p> <p>CO-4: To explore the wide diversity of plant tissues and the systems and their organizational beauty in the light of modification and specialization of the plant metabolites,</p> <p>CO-5: To introduce the Root-Stem transition along with the different theories related to the apex of the root and shoot.</p> <p>CO-6: To introduce the idea of the primary, secondary and the anomalous structure of the root and stem along with their degree of specialization in this regard taking a number of examples.</p> <p>CO-7: To explore the mechanical tissue systems along with their physical and mechanical properties in the durability to overcome stress and the strain</p> <p>CO-8: The wood anatomy along with the different diversity of the wood is the interesting domain for the students to know about the beauty of the wood biology and climopdendrochronology.</p>
BBOTCCHC302 (Economic Botany & Pharmacognosy)	<p>CO-1: The content intends to offer a great deal of the information of the origin of the cultivated plants along with their method of the domestication in the evolution of the human civilization,</p> <p>CO-2: The classification of the economic important plants is one of the thrust area in this regard,</p> <p>CO-3: The course also offers the art and the science of the cultivation of the different type of plants of cereals, pulses, vegetables, fruits, fibers a, beverages and other economic important plants.</p> <p>CO-4: The course offers a value based knowledge of the different</p>

	<p>medicinal plants, their bioactive compounds, parts used along with their uses in the treatment of the different diseases./</p> <p>CO-6: The course also offers a a very deep insight of the importance of the plants in the welfare of human along with the role of agriculture based industries to meet up the needs of the human and to cater the wheels of progress of human cubilizxation.</p>
<p>BBOTCCHC303 (Genetics)</p>	<p>CO-1; To offer detail knowledge of the science of the characters and its inheritance pattern in the human life with special reference to the plants.</p> <p>CO-2: The history of genetics along with the contribution of the different geneticists to enrich this ever expanding knowledge,</p> <p>CO-3: The course offers the basic principles of Mendelian genetics along with the post-Mendelian principles to explore the different aspects of the plant life in the life of the genetics.</p> <p>CO-4: To introduce the idea of the chromosomes, genes and the exterachromosaomal inheritance pattern in the regulation of the different characters.</p> <p>CO-5: To introduce the most interesting idea of the Linkage, crossing over, inference, coincidence and other statistical parameters to account of the gene mapping and the chromosome mapping.</p> <p>CO-6: To introduce the idea of the mutation in general and the chromosomal mutation and the gene mutation in particular .It also explores the idea of the different congenital issues due to the mutation.</p> <p>CO-7: The content also explores the beauty of genetics in the development and design of new and new plants by the modification of the genetic makeup.</p>
<p>BBOTCSEC (Biofertilizers)</p>	<p>CO-1: To introduce the concept of sustainability in the field of agriculture.</p> <p>CO-2: To introduce the application of the organic farming and the green chemistry,</p> <p>CO-3: to introduce the idea of the different kind of microbes and others for the enrichment of the soil fertility,</p> <p>CO-4: The green manures development and the bio-fertilizers production are the important aspect of the curriculum.</p> <p>CO-5: The course offers a practical; knowledge for the choice of the alternate profession after the completion of the curriculum and to promote the organic farming to avid the soil sterility due to ever increasing application of the inorganic fertilizers.</p>

SEMESTER –IV

COURSE	OUTCOMES After completion of these course, the students will have the pleasure of the knowledge of systematic of plant, Ecological attributes in the plant, Phytogeographical insights, Cell & molecular aspects of life. It addition to these, the herbal technology has been covered widely in SEC as a part of the alternative profession of thousands nature lovers.
BBOTCCHC401 (Molecular Biology)	CO-1: To introduce the in-depth concept of helix of life, Nucleic acid and its different attributes in the design and the development of the plant world. CO-2: The historical perspective of DNA along with the some breakthrough experiments has been offered by this course, CO-3: The structural organizations of the chromosome along with the different aspects are the pleasure of this course. CO-4: The replication of DNA and its different models along with the other attributes cal easily draw the attention of the innovation and experimental approach in this regard. CO-5: Another interesting topic is the genetic code and this topic easily can draw the attention for its beauty and the appetite of knowledge must be progressively increased after having the exposure of this curriculum CO-6: Transcription, modification, translation and processing of the non-genetic RNA are some of the most interesting topics and these can easily draw the attention of the biology students for its novelty. CO-7: To introduce the most interesting experiment both in hand and virtual are the outcomes of this course content.
BBOTCCHC402 (Ecology & Phytogeography)	CO-1: It introduces the level of the organizational aspect along with the different structural and functional attributes of the ecosystem. CO-2: The dynamism & the homeostasis are two interesting part have explored widely. CO-3: the soil, water, light, wind, temperature and other abiotic factors have been widely covered along with their structural, functional and role of the designing of the environment are some of the outcomes of this course. CO-4: Ecosystem, Population ecology & community ecology have been widely explained to give a wide knowledge in this domain. CO-5: Biotic interactions and the functional issues of the ecosystem

	<p>have been nicely addressed by the course and this can enough to create an interest among the students to interpret environment in the light of statics and computation.</p> <p>CO-6: Phytogeography, the different phytogeographical zones along with the distribution of the different plants across India has also been highlighted and this symbiosis of knowledge between geography & botany can open an avenue of thought in the interdisciplinary approach and the scientific inquisitiveness.</p>
<p>BBOTCCHC403 (Plant Systematics)</p>	<p>CO1: The plant taxonomy & Systematic offers a reasoning knowledge for the assessment of the plant to explore the angiosperm world.</p> <p>CO-2: It gives the flavor of the synthetic sciences by the taking the evidences of the different branches of plant sciences,</p> <p>CO-3: to offers a wide knowledge in the field of the plant repository both actual and virtual in herbarium and botanical garden along with their significance and importance in plant identification and conservation.</p> <p>CO-4: Botanical nomenclature is an important part of Botany and the course offers the wide light in the concept of ICBN, the different codes, principles and rules have been widely explained.</p> <p>CO-5: To address the different type of plant classification starting from Linnaeus to APG IV system to touch the different milestones in this field.</p> <p>CO-6: Numerical taxonomy, Molecular Taxonomy & Biosystematics is the call of the time and these have widely explored along with the flavor of phylogeny in the context of Cladistics and Phenetics.</p> <p>CO-7: the plant Phylogeny is the most interesting episode in plant Biology and this issue has been widely explored with the help of different theories as far as origin of angiosperms.</p> <p>CO-8: last but not least, both the virtual and practical approach has been assigned sitting in the college premises to know about the global overview of the plant life.</p>
<p>BBOTSEC (Herbal technology)</p>	<p>CO-1: To address the different aspects of the herbal technology</p> <p>CO-2: To address the detail knowledge of the traditional knowledge system in the field of medicine system along with the ethno botanical overview in the context of aboriginal people.</p> <p>CO-3: Pharmacognosy & phytochemistry are the two important domains and these have been addressed by taking a number of plants with bioactive potential for treatment of the different diseases.</p> <p>CO-4; To address the analytical aspects of pharmacognosy along with the bird's eye view of the adulteration of the different plant drugs and its assessment.</p>

SEMESTER V

COURSE	OUTCOMES To give the detail idea of the reproductive biology, Plant physiological aspects in the core course along with the art and science of plant breeding and the industrial application of microbes for the human welfare in DSE are the outcomes of this course.
BBOTCCHC501 (Reproductive Biology)	<p>CO-1: To address the brief idea about the Plant Reproductive biology along with the scientists with their Contribution.</p> <p>CO-2: To address the molecular basis of flowering along with the external factors responsible for flowering mechanisms.</p> <p>CO-3: To explore the different aspects of the reproduction like micro and megasporopogenesis and micro and Megagametogenesis along with some exceptional features in this regard.</p> <p>CO-4: Pollen biology is the most interesting plant & NPC systems have been widely explored.</p> <p>CO-5: the Self incompatibly along with the different measures has been explored.</p> <p>CO-6: embryo development both in monocot & dicot along with some exceptions like apomixes, adventives embryonic have been addressed here.</p> <p>CO-7: the dissemination of seed, its structure, anatomical beauty and other features have been highlighted to make the subject more fascinating among the learners.</p>
BBOTCCHC502 (Plant Physiology)	<p>CO-1: Plant water relations along with the different physiological processes like transpiration, guttation, ascent of sap and their effects on plants have been explored.</p> <p>CO-2: Mineral nutrition, mineral uptake along with the different other aspects like active & passive uptake and other related issues have been done as course outcomes.</p> <p>CO-3: Transport across the phloem of the plant sap and the different models have been widely explored.</p> <p>CO-4: The plant hormones are the most interesting topic. The different plant hormones along with their application in agriculture have been covered as course outcomes in this course.</p> <p>CO-5: Phytochrome, Phtoperiodism & vernalizations are explained in detail; so as to the students develop interest in this course as a part of innovative approach to study the subject.</p>
DSEI (Industrial Microbiology)	<p>CO-1: Scopes of microbes in industry and environment is the most interesting one.</p> <p>CO-2: Bioreactors, different types, working principles and management practices has been addressed properly.</p> <p>CO-3: Microbial production of the different industrial products has been highlighted.</p>

	<p>CO-4: Microbial enzymes along with their role in the production have been explained properly.</p> <p>CO-5: Quality of environment maintenance by microbes along with the application has been taught as the course outcome.</p> <p>CO-6: water and air microbiology along with the different principles, regulation and the role of microbes in the treatment of hazardous chemical has been explained.</p>
DSE II (Plant Breeding)	<p>CO-1: To introduce Plant Breeding and its objectives in the crop improvement.</p> <p>CO-2: Origin and Domestication of the crop plants and the method of the crop improvement to address the need of the people is the another outcomes of this course.</p> <p>CO-3: Quantitative inheritance and Heterosis are the two important outcome of this course.</p> <p>CO-4: Crop improvement and breeding comprising of the different genetic mechanisms can also be learnt by the students and these are most interesting outcomes of this course.</p>

SEMESTER VI

COURSE	OUTCOMES
	<p>This course offers a very interesting outcomes in the context of plant metabolism, Biotechnological beauty of the plant by proper gene transfer technology, the stress related issues and challenges of plants and its solution along with the different techniques associated with the plant life.;</p>
BBOTCCHC601 (Plant Metabolism)	<p>CO-1: To introduce the different metabolic pathways and the integration and the regulation of the pathways along with the mechanisms in detail for the sake and survival of plants.</p> <p>CO-2: to introduce the in depth knowledge of the carbon assimilation, photosynthesis mechanisms with diversity are the key outcomes of this course.</p> <p>CO-3: The carbon oxidation to explore the cellular respiration along with its diversity, pathways and the factors, regulation are some of the interesting episodes of the outcome of this course.</p> <p>CO-4: The biological energy concept and detain idea along with ETC are the outcome of this subject.</p> <p>CO-5; The lipid metabolism and sucrose metabolisms can easily draw the attention of the learners.</p> <p>CO-5: The nitrogen metabolism and the different aspects of biological nitrogen fixation, chemistry and other nitrogen related issues of the plants are outcome of this course.</p> <p>CO-6: The outcome s the regulation of the biochemical pathways in</p>

	<p>general and the signal transduction in particular can easily draw the attention of the students.</p>
<p>BBOTCCHC602 (Plant Biotechnology)</p>	<p>CO-1: To introduce plant tissue culture along with embryogenesis, organogenesis and toti-potency are the major thrust areas.</p> <p>CO-2: To introduce recombinant DNA technology in large scale for the appetites of the learners.</p> <p>CO-3: Gene cloning mechanisms and the methods of gene transfer for the designing and the developing the novel plants like GM crops designing is the another outcome of the subject.</p> <p>CO-4; To introduce the application of biotechnology for herbicide resistant, insect resistant plants along with the other super bug designing and developing for industrial purposes are the major outcomes of this course.</p> <p>CO-5: Industrial enzymes are the key regulators of the biomedical industries and the course offers detail knowledge in this regard.</p>
<p>DSE III (Plant analytical Techniques)</p>	<p>Co-1: To introduce the different instruments for the analysis of the plants chemically, microscopically, genetically and other platforms,</p> <p>CO-2: To introduce FACS, FISH & other Cytometry techniques,</p> <p>CO-3: To introduce the radio isotopes techniques for biological research in autoradiography and other experimental attributes,</p> <p>CO-4: To introduce Spectrophotometer & Chromatography as tools to determine the qualitative and quantitative characters of plants.</p> <p>CO-5: Centrifugation techniques for cell analysis and study.</p> <p>CO-6: To characterize Protein and nucleic acids by crystallography and electrophoresis,</p> <p>CO-7: Basic principles of biostatistics as tool for analysis of the different biological parameters along with the testing goodness of fit by chi-square test.</p>
<p>DSEIV (Stress Biology)</p>	<p>CO-1: To define plant stress along with adaptation and acclimatization.</p> <p>CO-2: To define environmental factors related to stress, stress related proteins and other parameters like mediation insect and disease resistance.</p> <p>CO-3: To explore stress sensing mechanisms of plants including calcium modulation and phospholipids signaling.</p> <p>CO-4; To introduce developmental and adaptive mechanisms to overcome stress by plants to maintain their survival,</p> <p>CO-5: To introduce production and scavenging mechanisms by the reactive oxygen species</p>