Name of the Programme: B.Z.C/Bt.Z.C-(Botany)

Courses offered	Subjects	Type of course	Programme name	Programme outcome	Programme specific outcome	Course outcome
B.Z.C	Botany Zoology Chemistry	Regular	Botany	Prepare students for prominent career in industry, civil exams, group exams and for further academic study.	Create, select, and apply appropriate techniques, resources and modern technology in multidisciplinary environment.	Usage of subject and practical knowledge to design expiriments, anylise and interpret data so as to reach to valid conclusions.
Bt.B.C	Biotechnology Botany Chemistry	Self finance				

Details of Courses

Core Courses –Botany

1. Microbial Diversity (Microbes, Algae, Fungi and Archegoniate)
2. Plant Diversity
3. Plant Anatomy, Embryology, Biodiversity, Pharmacognosy, Phytochemistry
4. Plant Physiology and Metabolism

Discipline Specific course

5. Cell and Molecular Biology

Discipline specific electives

6. A) Economic Botany and Biotechnology
   B) Forensic Palynology and Pollen Biotechnology

Discipline specific Course

7. Genetics and Plant Breeding

Discipline specific electives

8. A) Analytical Techniques in Plant Sciences
   B) Clinical Palynology

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B.Sc. I Year, Botany CBCS Theory Syllabus

Core Course-Semester I –Paper-I, Lectures-60

Course Description: Microbial diversity (Viruses, Bacteria, Algae and Fungi)

This course explores fundamental procedures of Microbial diversity and its economic importance

Executive Summary of Course: students can understand origin and evolution of life with reference to microbes. Students will be expected to read structural features of Virus, Bacteria, Algae and Fungi. The main emphasis of the course is to understand the structures of the microbes and their economic importance for day to day life.

Expected Student Outcome: Students can explain the importance of microbial diversity, Describe the distribution and occurrence of microbes, Discuss about the classification of microbes, Analyze the differences between various microbes, Know the economic importance of the microbes in day to day life.

Employment opportunities:

After completion of this course students can get employment in

- National and International Virology laboratories.
- They can settle as basic botanist or lower plant taxonomist
- Can start consultancy to advice farmers on various plant virus and bacterial diseases.

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B.Sc. I Year, Botany CBCS Theory Syllabus

Core Course-Semester II –Paper-II, Lectures-60

Course description: Plant Diversity (Bryophytes, Pteridophytes, Gymnosperms, and Angiosperm Taxonomy)

This course explores fundamental procedures of Plant diversity and its economic importance

Executive Summary of Course: this course contains general charecters and classification of Bryophytes, Pteridophytes, Gymnosperms and Angiosperms. It also describes structural features of some important lower and higher plants. The main emphasis is also given on Angiosperm taxonomy, plant nomenclature and plant classifications. The last unit also covers the various web resources related to plant taxonomy.

Expected Student Outcome: Students can explain the importance of plant diversity, Describe the distribution and occurrence of Bryophytes, Pteridophytes, Gymnosperms and Angiosperms. Know the economic importance of the Gymnosperms and Angiosperms. Students will understand the various types of classifications and plant nomenclature. They will have knowledge on various web resources related to plant nomenclature. Students can learn scientific names of some important plants.

Employment opportunities:

After completion of this course students can get employment in

- Botanical survey of India.
- They can settle as basic botanist or higher plant taxonomist
- Can start consultancy to identify plants of economic and research interest.

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Osmania University, Hyderabad-500001.

B.Sc. II Year, Botany CBCS Theory Syllabus

Core Course-Semester III –Paper-III, Lectures-60

Course description: Plant Anatomy, Embryology, Biodiversity, Pharmacognosy and phytochemistry

This course explores fundamental procedures of Plant anatomy, embryology and phytochemistry.

Executive Summary of Course: first unit of this course contains basics on Plant anatomy and Embryology. Second unit includes the pollination biology aspects, fertilization, seed dispersal mechanism and apomyxis etc. Third unit covers the Biodiversity aspects like loss, threat and conservation of biodiversity. fourth unit covers the pharmacognosy and phytochemistry aspects viz., scope and importance of phytochemistry and some important medicinal plants used for treatment of various ailments.

Expected Student Outcome: students can explain the importance of Plant Anatomy, Describe the distribution and occurrence of Biodiversity, Discuss about the value addition of Biodiversity, Know about conservation of biodiversity, List out and describe the various pollinators useful for pollination, List out the endangered plant species and their importance, Describe medicinal importance of various drugs used as medicine.

Employment opportunities:

After completion of this course students can get employment in

- Biodiversity conservation centers.
- Artificial pollination centers
- Phytochemical research laboratories and Pharmacognosy centers.

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B.Sc. II Year, Botany CBCS Theory Syllabus

Core Course-Semester IV –Paper-IV, Lectures-60

Discription of the course: Plant Physiology and Metabolism

This course explores fundamental procedures of Plant physiology and metabolism.

Executive Summary of Course: first unit of this course contains plant and water relationships. Also covers the various types of essential elements useful for plant growth and active and passive transport of ions, second unit covers the composition of phloem, photosynthesis, electron transport system, C3 and C4 cycles etc. third unit covers the respiration and glycolysis. It also includes enzymes, their structure and functions. Fourth unit includes nitrogen metabolism and growth regulators.

Expected Student Outcome: students can explain the importance of Plant, physiology, Describe the plant and water relationship, Discuss about the importance of micro and macro eliments, Know about phloem and their contents, students will understand the effect of growth regulators and nitrogen metabolism in plants.

Employment opportunities:

After completion of this course students can get employment in

- Plant growth centres.
- Plant tissue culture and grafting centres
- Horticulture centres
- Can go for higher studies.

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B.Sc. III Year, Botany CBCS Theory Syllabus

Discipline Specific Course-Semester V –Paper-V, Lectures-45

Course description: Cell and Molecular Biology

This course explores fundamental procedures of Cell and Molicular Biology.

Executive Summary of Course: this course is divided into three units. First unit of this course contains techniques in biology viz. x-ray diffractions, light microscopy, phase contrast, fluorescentand electron microscopy. Unit two deals about the cell organells, their functions and molecular structure of DNA etc. third unit consists of cell membrane and genetic material. It also explains the importance of Meosis and Mitosis.

Expected Student Outcome: students can learn different techniques and they are able to use the various microscope techniques for their research analysis. Students will understand the cell organells and their functions, Discuss about the important its structural features, they also will understand the mitosis and meosis and its importance.

Employment opportunities:

After completion of this course students can get employment in

- Biology instrumentation labs.
- Molicular Biology Research centres..

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Discipline Specific Elective-I-Semester-V Paper-VI-A, Lectures-45

Course description: Economic Botany and Biotechnology

This course explores fundamental procedures of Economic Botany and Biotechnology.

Executive Summary of Course: this course is has three units. First unit of this course contains origin and evolution of crop plants. This unit also describes the legumes, cereals, pulses, spices and bevarages. Unit two deals about the oils, fibres and their economic importance. Unit three deals about biotechnological aspects like recombinant DNA technology and its applications etc.

Expected Student Outcome: students can learn economic importance of fibres, oils and cereals. Students will understand the fibre yielding plants and their cultivation techniques. They also can discuss the DNA transmission techniques, RAPD, RELP etc.

Employment opportunities:

After completion of this course students can get employment in

- Agriculture and Horticulture centres.
- Molicular Biology Research centres.
- Biotechnology research centres.

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B.Sc. III Year, Botany CBCS Theory Syllabus

Discipline Specific Elective-II-Semester-V Paper-VI-B, Lectures-45

Forensic Palynology and Pollen Biotechnology

Course Description: This course explores fundamental procedures of forensic Palynology and Pollen biotechnology.

Executive Summary of Course: this discipline specific elective-II is focusing on Palynology and its major applications on Forensic Palynology and Pollen Biotechnology. Students will be expected to read case studies which were solved by using pollen materials. Other side students will learn modern techniques in biotechnology which are specifically related to pollen. The primary emphasis of the course is to strengthen the students knowledge in more advanced applications in the field of Palynology.

Expected Student Outcome: students can understand the critical role of basic Palynological science for a range of forensic palynological methods and pollen biotechnological aspects.; be able to articulate ways in which underlying Palynological variability and similarity can be exploited in a forensic context; be capable of reading and understanding primary literature (case studies) in forensic Palynology; achieve an awareness of the primary literature in basic Palynology that serves as the foundation for forensic literature and pollen biotechnology with field application.

Employment opportunities:

After completion of this course students can get employment in

- National and International Forensic laboratories.
- Crime investigation department
- They can start/Join Forensic Palynology consultancy
- Biotechnology laboratories
- Research and Development Laboratories
- Agriculture based companies
- Can start own Biotechnology labs

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Discipline Specific Course--Semester-VI Paper-VII-, Lectures-45

Discription of the course: Genetics and Plant Breeding

This course explores fundamental procedures of Genetics and Plant Breeding.

Executive Summary of Course: this course is has three units. First unit of this course deals about Heridity. This contains mendals laws, Heriditary laws, Pedigree analysis, Chisquare test etc. second units covers Linkage and crossing over. Mutations ploidy, deletions and duplications are also part of this unit. Third unit covers various plant breeding techniques.

Expected Student Outcome: students can learn heredity and mendal laws. They can assess the pedigree, will learn types of mutations, levels of ploidy, students can discuss the deletiond, duplications etc. students will understand various plant breeding techniques.

Employment opportunities:

After completion of this course students can get employment in

- Agriculture and Horticulture centres.
- Plant breeding centres.
- Biotechnology research centres.

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B.Sc. III Year, Botany CBCS Theory Syllabus

Discipline Specific Electives-I--Semester-VI Paper-VIII-A-, Lectures-45

Course description: Analytical Techniques in Plant Sciences

This course explores fundamental procedures of plant Analytical techniques.

Executive Summary of Course: First unit of this course deals about imaging and related techniques viz., Light microscopy, electron microscopy, FISH and chromosome banding technique etc. second unit covers Chromatography techniques like GLC, HPLC, TLC and Electrophorosis. Third unit covers Biostatistics mean, mode and median etc.

Expected Student Outcome: students can learn microscopy techniques and various plant analytical techniques. They will understand chromotagraphy and other related techniques students are able to analyze characterization of proteins. Able to use biostatistics for their research analysis.

Employment opportunities:

After completion of this course students can get employment in

- Agriculture and Horticulture centres.
- Plant breeding centres.
- Biotechnology research centres.

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B.Sc. III Year, Botany CBCS Theory Syllabus

Discipline Specific Electives-II--Semester-VI Paper-VIII-B-, Lectures-45

Course Description: Clinical Palynology

This course explores fundamental procedures of Clinical palynology.

Executive Summary of Course: this discipline specific elective-II is focusing on Palynology and its major applications in the field of identification pollen allergy and its control mechanisms. Students will be expected to read pollen and spore present in the air, traping of this material from the air, various allergy aspects, clinical aspects, and remedial steps to control pollen allergy. The primary emphasis of the course is to bring awareness on types of pollen allergy, its diagnosis, treatment, and to suggest remedial steps.

Expected Student Outcome: students can understand the types of pollen allergy, its impact on human immune system, basic structure of immune system, using the aeroscopes for capturing pollen and spores from the air, preparation of pollen calendar, diagnosis and treatment of pollen allergy. They also will understand the various remedial steps to avoid pollen allergy.

Employment opportunities:

After completion of this course students can get employment in

- Various hospitals related to human allergy diseases.
- Research laboratories related to pollen allergy
- They can start/Join Allergic diseases consultancy
- Weather monitoring stations
- Pollution control boards
- Diagnostic centers
- Can start own clinics to diagnose pollen allergy patients.

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Interdisciplinary Course-Semester- IV, Lectures-45

Course Description: Interdisciplinary Course-Semester- IV-**(Forensic Palynology)**

This course explores fundamental procedures of forensic Palynology and its applications in crime detection.

Executive Summary of Course: A fast and broad overview of forensic palynology, focusing on Palynology with primary emphasis on Pollen morphology, Production, dispersal, methodology and case studies etc.. Students will be expected to read case studies and other works from the forensic literature, to tolerate exposure to primary research literature that underpins forensic applications, and to explicitly articulate the palynological details subtending the techniques discussed. The primary emphasis of the course is the way in which forensic palynology in particular integrates results of basic science in a societally and scientifically relevant way.

Expected Student Outcome: Understand the critical role of basic Palynological science for a range of forensic palynological methods and the role these can play in society; be able to articulate ways in which underlying Palynological variability and similarity can be exploited in a forensic context; be capable of reading and understanding primary literature (case studies) in forensic Palynology; achieve an awareness of the primary literature in basic Palynology that serves as the foundation for forensic literature and field application.

Employment opportunities:

After completion of this course students can get employment in

- National and International Forensic laboratories.
- Crime investigation department
- They can start/Join Forensic Palynology consultancy