

Department of Botany

Rajeev Gandhi Govt. PG. College, Ambikapur

Vision:

To be distinguished as a renowned academic institution recognized for its innovation, excellence and inventions; producing the best human resource in the field of Plant Sciences and help them to realize their full potential in ways that benefits the society.

Mission:

To develop human resource with competence in frontier areas of Plant Sciences by fostering a culture of scientific and intellectual inquiry supported by critical thinking, reasoning skills and discourse.

To educate students with the fundamental knowledge and the application of scientific methods, skills and attitudes with the help of conventional and modern tools to understand everything related to plants.

To impart a student-centered, profession-oriented, multidisciplinary higher education in a genuine research environment and to establish collaboration with eminent institutes for the benefit of the students.

To advance the fundamental knowledge of Plant Sciences through innovative research, thereby creating a positive impact on society and the country.

Programme Outcomes for B.Sc. Botany (Hons.)

The students will be able to demonstrate ability –

1. To understand concept and theory of their respective subject.
2. To express thoughts and ideas effectively in writing and orally.
3. To identify relationship within and across disciplines in the sciences.
4. Cognitive and technical skills in their field and in multidisciplinary context.
5. To select and use relevant methods and tools for problem solving.
6. To make judgment and take decisions, based on analysis of data and evidences.
7. To critically evaluate principles and theory of sciences.
8. In digital literacy and data analysis.
9. To find a job in their field, exercise responsibilities to job assigned and start- up a business.
10. To develop a sense of respect and duty towards constitutional, human and moral and professional values.
11. to mitigating the effects of environmental degradations, climate change and pollution.

Course Outcomes for B.Sc. Botany (Hons.)

B.Sc-Ist Sem

DSC-Microbial diversity and Thallophta

At the end of this course, the students will be able to:

CO1. Understand the Concept of microbe and Lichen.

CO2. Learn economic importance of microbes which will be beneficial for agriculture industry.

CO3. Understand the General characteristics and affinities of Algae with microbes.

CO4. Understand the life cycle of different genera of Mycology and algology

CO5. Learn economic importance of fungi which will be beneficial for baking industry.

CO6. Understand the techniques and good lab practices for working in a laboratory.

CO7. Develop Skill in Slide Preparation.

CO8. Learn to identify fungal disease on the basis of symptoms.

PO	CO-01	CO-02	CO-03	CO-04	CO-05	CO-06	CO-07	CO-08	CO-09
PO-01	√			√				√	
PO-02			√						
PO-03	√		√						
PO-04						√	√		
PO-05		√			√				
PO-06									
PO-07									
PO-08									
PO-09					√				
PO-10						√			
PO-11		√							

GE- Flowering Plants

At the end of this course, the students will be able to:

- CO1. Understand the concept evolution in flowering plants.
- CO2. Understand the General characteristics of flowering plants and their life cycle.
- CO3. Understand the difference between Hydrophytes, Xerophytes, Halophytes.
- CO4. Learn Mechanism of Photosynthesis and Respiration.
- CO5. Know about Saprophytic and Insectivores plants.
- CO6. Understand the techniques and good lab practices for working in a laboratory.
- CO7. Develop Skill in Herbarium Preparation.
- CO8. Develop skills for identifying Hydrophytes, Xerophytes plants.
- CO9. Learn the technicality of flower dissection.

PO	CO-01	CO-02	CO-03	CO-04	CO-05	CO-06	CO-07	CO-08	CO-09
PO-01	√	√			√			√	
PO-02		√							
PO-03	√		√						
PO-04				√		√	√		√
PO-05									
PO-06									
PO-07			√						
PO-08						√			
PO-09									
PO-10						√			
PO-11							√		

B.Sc-IInd Sem

DSC- Embryophyta

At the end of this course, the students will be able to:

CO1. Understand characteristics & affinities of Bryophytes, Pteridophytes & Gymnosperms.

CO2. Learn morphology, and anatomy of Embryophytes.

CO3. Learn life cycles of selected genera of different groups.

CO4. Understand Phylogenetic relationships with the help of Palaeobotanical studies.

CO5. Understand the Economic Importance of Plants from different group of Embryophyta.

CO6. Understand the techniques and good lab practices for working in a laboratory.

CO7. Develop skills for preparation of slides.

CO8. Can initiate his laboratory of slide preparation and can sell the slide to the market.

CO9. Can prepare herbaria of bryophytes and pteridophytes for business purpose.

CO10. Can prepare a Gymnosperm Garden in own house.

PO	CO-01	CO-02	CO-03	CO-04	CO-05	CO-06	CO-07	CO-08	CO-09	CO-10
PO-01	√	√			√					
PO-02		√								
PO-03	√									
PO-04			√	√		√	√			
PO-05										
PO-06										
PO-07										
PO-08						√				
PO-09								√	√	
PO-10						√	√	√		√
PO-11				√					√	√

GE- Economic Botany

At the end of this course, the students will be able to

CO1. Understand the concept of Ethnobotany and its role in the society.

CO2. Differentiate in the concept of Ethnobotany and medicinal botany.

CO3. Evaluate the management strategies of different natural resources.

CO4. Reflect upon the different national tribal groups and their role in ethnobotany.

CO5. Learn economic importance of different plants of the concerned families.

CO6. Understand the traditional knowledge about the plants and possible use of this knowledge

CO7. Recognise different medicinal plants and can use that plants in needs.

CO8. Understand different mode of studies for ethnobotanical study.

CO9. Learn different Medicinal plants and their role.

PO	CO-01	CO-02	CO-03	CO-04	CO-05	CO-06	CO-07	CO-08	CO-09
PO-01	√			√					√
PO-02									
PO-03		√		√				√	
PO-04									
PO-05	√		√				√		√
PO-06									
PO-07		√				√			
PO-08									
PO-09					√		√		
PO-10									
PO-11			√		√				

B.Sc. IIIrd Sem

DSC- Plant taxonomy and Embryology

At the end of this course, the students will be able to

CO1. Understand the concept evolution in flowering plants and Plant Taxonomy.

CO2. Understand the General characteristics of flowering plants and their life cycle.

CO3. Understand the traditional knowledge about the plants and possible application of this knowledge.

CO4. Understand the life cycle of angiospermic plants with details of microsporogenesis, megasporogenesis, fertilization and other developmental details up to embryogenesis

CO5. Learn the technicality of flower dissection.

CO6. Understand the techniques and good lab practices for working in a laboratory.

CO7. Develop Skill in Herbarium and slide Preparation.

PO	CO-01	CO-02	CO-03	CO-04	CO-05	CO-06	CO-07	CO-08	CO-09
PO-01	√	√		√					
PO-02		√							
PO-03	√								
PO-04					√	√			
PO-05			√						
PO-06									
PO-07				√					
PO-08									
PO-09			√			√			
PO-10					√	√	√		
PO-11							√		

GE- Forestry

At the end of this course, the students will be able to:

CO1. To provide knowledge about Forest ecosystem concept, stand dynamics, forest succession, productivity and vegetation forms and natural regeneration of tree species.

CO2. Develop understanding of tree measurements, forest inventory and yield concepts.

CO3. The course will equip the students regarding wood based industries.

CO4. The course will equip the students regarding different product of wood like wood extracts resins and gums, katha, tannis and various type of non-timber products

CO5. To develop understanding of students about forest policy and laws and international conventions

CO6. Clear the concept of IPR.

CO7. Start the small entrepreneurship on forest products and its marketing

PO	CO-01	CO-02	CO-03	CO-04	CO-05	CO-06	CO-07	CO-08	CO-09
PO-01	√			√	√				
PO-02									
PO-03	√								
PO-04		√							
PO-05			√				√		
PO-06									
PO-07	√					√			
PO-08		√	√	√					
PO-09							√		
PO-10					√	√			
PO-11					√				

B.Sc VIth Sem.

DSC- Ecology

At the end of this course, the students will be able to

CO1. Understand the complex interrelationship between organisms and environment.

CO2. Understand and make other aware with sustainable natural resource management and biodiversity conservation.

CO3. Understand method for studying vegetation, community pattern and process, ecosystem functions, and principles of phyto-geography.

CO4. Determine Frequency, density and abundance of components

CO5. Differentiate the Hydrophytes, Xerophytes and Halophytes on the basis of Anatomical characters.

CO6. Understand the difference in pH in different soil and can calculate pH of soil.

CO7. Start soil testing laboratory to for livelihood

PO	CO-01	CO-02	CO-03	CO-04	CO-05	CO-06	CO-07	CO-08	CO-09
PO-01	√				√				
PO-02									
PO-03	√			√	√				
PO-04			√			√			
PO-05		√				√			
PO-06									
PO-07					√				
PO-08			√	√					
PO-09							√		
PO-10		√					√		
PO-11		√							

DSEC- Aquatic and Marine Botany

At the end of this course, the students will be able to

CO1. Develop their understanding on commonly occurring marine and limnetic algae of Indian coast along with the current understanding of its biology.

CO2. Analyse the properties of mangroves, other aquatic angiosperms and micro algae.

CO3. Reflect upon the values and uses of aquatic plants

CO4. Understand the techniques of microscopy and good lab practices.

CO5. Develop skills for sampling.

CO6. Can initiate his laboratory of microscopic sample collection and can sell the sample to the research institution.

CO7. Understand the hydrophytic diversity of that area.

PO	CO-01	CO-02	CO-03	CO-04	CO-05	CO-06	CO-07	CO-08	CO-09
PO-01	√						√		
PO-02							√		
PO-03	√	√							
PO-04				√	√				
PO-05			√						
PO-06									
PO-07			√						
PO-08					√				
PO-09				√		√			
PO-10						√			
PO-11		√							

GE- Nursery and Gardening

At the end of this course, the students will be able to:

CO1. Understand the concept of Nursery its types and component.

CO2. Understand and make other aware with sustainable natural resource management and biodiversity conservation with the help of Nursery and gardening.

CO3. Understand the importance of a plant nursery and basic infrastructure to establish it.

CO4. Explain the basic material, tools and techniques required for nursery.

CO 5. Demonstrate expertise related to various practices in a nursery.

CO 6. Comprehend knowledge and skills to get an employment or to become an entrepreneur in plant nursery sector

PO	CO-01	CO-02	CO-03	CO-04	CO-05	CO-06	CO-07	CO-08	CO-09
PO-01	√			√					
PO-02									
PO-03	√								
PO-04			√			√			
PO-05				√	√				
PO-06			√						
PO-07									
PO-08									
PO-09					√	√			
PO-10		√				√			
PO-11		√							

Programme Outcomes for M.Sc. Botany

Students would be benefited with knowledge of core subjects like plant diversity, physiology and biochemistry, molecular cytogenetics and application of statistics etc. which are offered in these subjects. Modules on analytical techniques, plant tissue culture and phytochemistry would make them obtain skills in doing research. All the courses in the programme are carefully designed to equip the students for competitive exams like CSIR NET, SET etc. and to write research proposals for grants.

PO1: Application of knowledge

Maintain a high level of scientific excellence in botanical research with specific emphasis on the role of plants. Create, select and apply appropriate techniques, resources and modern technology in multidisciplinary way. Practice of subject with knowledge to design experiments, analyse and interpret data to reach to an effective conclusion.

PO2: Ability to convey the concept clearly

They would identify, formulate and analyse the complex problems with reaching a substantiated conclusion. Logical thinking with application of biological, physical and chemical sciences. Learning that develops analytical and integrative problem-solving approaches.

PO3: Honesty and Integrity with Global Thinking

Student should be aware of ethical issues and regulatory considerations while addressing society needs for growth with honesty. Knowledgeable students with good values, ethics, kind heart will help in nation building globally.

PO4: Environmental and Sustainability

Best problem-solving skills in students would encourage them to carry out innovative research projects thereby making them to use knowledge creation in depth. Understand the impact of the plant diversity in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO5: Scope and importance of Botany

Student will understand scope and importance of Botany in every field especially in dealing with societal and environmental issues, agriculture, ethics and healthcare.

PO6: Life Long learning and Problem solving

They would lend the support to other students to grow with them with equal opportunities. Student will also understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired.

PO7: Practical skills and Modern tool usage

Students learn to carry out practical work, in the field and in the laboratory, with minimal risk. They gain introductory experience in different field of botany. This will also help to Create, select, and apply appropriate techniques, resources, and modern instruments and equipments for Biochemical estimation, Molecular Biology, Biotechnology, Plant Tissue culture experiments, cellular and physiological activities of plants with an understanding of the application and limitations.

PO8: Transferable and Technical skills

1. Use of IT (word-processing, use of internet, statistical packages and databases).
2. Communication of scientific ideas in writing and orally.
3. Ability to work as part of a team.
4. Ability to use library resources.
5. Time management.
6. Career planning.

Course Outcomes for M.Sc. Botany

M.Sc Ist Sem.

Paper I- Cell and Molecular Biology

After successful completion of this course, students will be able to understand: -

1. Co1 – the cell structure in relation to function of cells the fundamental unit of life, are concerned in this course along with molecules present in cells.
2. Co2 - Understanding of the structure and function of cell wall plasma membrane and how the packaging of DNA. Students will also know the gene regulation process in prokaryotes.
3. Co3 – Students will understand about cell division and apoptosis and also understand the rorted various cell organelles.
4. Co4 – students will understand about fine structured Gene DNA replication and transcription in protein synthesis understanding the different structural and numerical changes why? And how?
5. Co5-Understand the instruments, techniques and good lab practices for working in a Molecular laboratory.
6. Co6-Develop skill to operate the instrument in laboratory.
7. Co7-Can be employed in the genetic laboratory & start his own venture.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1							√
PO2	√		√	√			
PO3							
PO4							
PO5						√	√
PO6							
PO7		√			√	√	
PO8							

Paper II- Algae

After completion of this course the students will be able to –

Co1 –Understand and explain the thallus organization cell structure and reproduction in various group of algae.

Co2 – Understand the general characters, habitats range of thallus, structure, organization, reproduction economic importance of algae

Co3 – Understand the process of algal culturing techniques in the laboratory.

Co4 – Understand the technique of cryopreservation aquaculture of micro and macro algae cultivation.

Co5 – Understand the use and application of seaweeds and agar and the role of algae in bioengineering.

Co6-- Understand the techniques and good lab practices for working in a laboratory.

Co7- Develop skills for preparation of slides.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1		√	√		√		
PO2	√	√		√			
PO3							
PO4				√			
PO5							
PO6							
PO7			√		√		√
PO8	√		√		√	√	√

Paper III- Physiology and biochemistry

After completion of this course the students will be able to –

Co1 –Understand how enzymes serve important function in body, indigestion and metabolism. They have developed knowledge about pathway of water through xylem and phloem.

Co2 – Student will understand the importance of photosynthesis in plants. They will also understand photosynthesis is one of the most important processes that allow plants to live.

Co3 – Student will come to know that energy produced by respiration is essential for normal functioning of body. They will also understand functional lipid and role of nitrogen cycle in environment.

Co4 – Student will be able to know the concept of different plant growth hormones and their role in plant growth and stress physiology.

Co5 – Student will be able to know the mechanism of flowering. They also understand the circadian rhythm and plant movements.

Co6 -Learn the symptoms of Mineral Deficiency in crops and their management.

Co7- Assimilate Knowledge about Biochemical constitution of plant diversity

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1		√	√			√	
PO2	√	√	√		√		√
PO3							
PO4							
PO5							
PO6		√		√			
PO7							√
PO8						√	

Paper IV- Social Outreach and Entrepreneurship

Paper IV- Medicinal plants and their cultivation

On Completion of this course the students will be able to-

Co1 – Understand the method of establishment of nursery of medicinal plants and gain the know led knowledge how the medicinal plants cultivate.

Co2 – Understand the method of preparing the various herbal product kike candy, toffee, murabba and herbal gulal.

Co3 – Understand the process of the production of various beauty product from aloe-vera leaves and bio-diesel from jetropha seeds.

Co4 – Understand the method to prepare the insecticide from neem seed, karanj seed and mustard seeds. They students will also know the production of essential oil.

Co5 – Students will get knowledge about the prime ministers employment generation programme and also know the function of national medicinal plant Board.

PO	CO1	CO2	CO3	CO4	CO5
PO1	√	√	√		
PO2					
PO3					√
PO4					√
PO5		√	√	√	
PO6					
PO7	√			√	
PO8	√			√	

Paper V- Environmental Science

Co1 – After completion of this course student will be able to know the environmental stresses and their management like global climatic change and global warming. They also will understand the effect of air, water and soil pollution in environment.

Co2 – Student will understand the uses of fertilizer, pesticides and other chemical in agriculture and their impact on biodiversity of microbe, animals and plants. They will also get knowledge about environmental issues, policies and regulation.

Co3 – Student will understand the regulative organization in community. Student will get to know about how changes take place during ecological succession.

Co4 – Student will develop knowledge about structure and function of ecosystem. They also will understand how to conservation takes place of agriculture forest and soil.

Co5 – Student will develop knowledge about human health and environmental change. They also will understand the importance of natural resources and their management and application of GIS.

Co6- They will also understand the role of environment on human health henceforth develop emotional attachment for sustainable development

PO	CO1	CO2	CO3	CO4	CO5	CO6
PO1	√		√			
PO2		√				√
PO3						
PO4	√		√	√	√	
PO5						√
PO6					√	
PO7						
PO8				√		

M.Sc IInd Sem.

Paper I- Genetics

Co1 – Student will understand about fine structure of gene and viral and bacterial genomes students will also understand the Mendel law of inheritance and organelle inheritance.

Co2 – Student will understand the mechanism of linkage and crossing over and they also know the interaction of gene, genetic recombination producing the characters differently.

Co3 – Understand the role and process of mutation and different mutagenic agent which brings about mutation in the organism. Student will also know about onco genes and cancer.

Co4 – Student will understand the different aspect of genetics. They also understand how to DNA damage and repair themselves.

Co5- Understand the techniques and lab practices for working in field of Anatomy.

Co6- Can be employed in environment in the genetical laboratory & start his own venture.

Co7- Develop understanding of gene interaction and pedigree analysis.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	√		√				√
PO2	√	√		√			√
PO3							
PO4							
PO5						√	
PO6		√					
PO7					√		
PO8					√		

Paper II- Advance in Archegoniate (Bryophyta and pteridophyta)

After completion of this course students will gain knowledge of -

Co1 – The characters, distribution, classification and regeneration in Bryophytes and pteridophytes.

Co2 – General characters, classification and reproduction of different ovule mosses, sphagnales and polytrichales.

Co3 – The classification of pteridophytic classes and the morphological and anatomical characters of genus included in the different pteridophytic order.

Co4 - Economic Importance of Bryophyte and gain knowledge about fossil pteridophytes.

Co5- Students will also know how the stele evolution occurs in pteridophytes and also familiar with the work done by Indian pteridologist.

Co6- They will understand the techniques and good lab practices for working in a laboratory and develop skills for preparation of slides.

Co7- Can prepare herbaria of bryophytes and pteridophytes for business purpose.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1				√	√		
PO2	√	√	√				
PO3							
PO4							√
PO5				√			√
PO6					√		
PO7						√	
PO8						√	

Paper III- Gymnosperm

After completion of this course: -

Co1 – Student can gain the knowledge of evolution of gymnosperms and know about used less and fruit less seed plants.

Co2 – Student can gain the knowledge of the characters, distribution and classification of gymnosperms.

Co3 –Will understand the meaning of fossil and its use in the determination of age of plant material, understanding the applied knowledge and different aspect of paleo botany.

Co4 – Students can critically differentiate fossil and living fossil. Students will also understand the evolutionary tendencies and comparative morphology of cycadeoidales and cordaitales. Students can critically differentiate the character of different order of Gymnosperms.

Co5 – Student can gain knowledge of seed technology of conifers, somatic embryogenesis and litter decomposition.

Co6- Student can understand the techniques and lab practices for working in field and can initiate his laboratory of slide preparation and can sell the slide to the market

Co7- Develop skill for preparation of Plant Gymnosperm Herbarium.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	√			√			
PO2	√	√			√		
PO3							√
PO4			√				
PO5							√
PO6							
PO7			√			√	
PO8						√	

Paper IV- Research methodology and computer Application Basics

This course is an optional but compulsory for completion of the degree. The student can co-relate the knowledge gained in this subject with his principled subject.

Co1 – After completion of this course students will be able to gain the basic knowledge of research and also know how to prepare a research proposal and selection of problem.

Co2 – Student will be able to know about the different tools of research and also gain the knowledge of different sampling technique.

Co3 – student will be able to gain the knowledge of different method of research which is important for completion of research.

Co4 – Student will be able to understand the measurements of data and interpretation of results and they also know how to research report writing.

Co5 – Student will be able to understand the fundamental of computer system they know about the different parts of computer system like hardware and software they also gain the knowledge of ms windows and control panel of operating system of computer.

Co6- Student will be able to understand the team attitude and will learn time management.

Co7- Student will be able to start a venture of computer system

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1			√				
PO2	√			√	√		
PO3						√	
PO4							
PO5							√
PO6	√						
PO7		√		√	√		
PO8		√				√	

Paper V- Fungi

After completion of this course-

Co1 – Students will be able to understand the structure nutrition and reproduction of Bacteria, virus, cyanobacteria and phytoplasma and identify them.

Co2 – Student will gain understanding of classification. Structure and reproduction of fungal species from different classes of fungi.

Co3 – Student will gain understanding of classification nutrition, structure and reproduction of different sub classes of class ascomycetes.

Co4 – Student will gain knowledge of imperfect fungi and the member of Basidiomycetes.

Co5- Student will understand the techniques and good lab practices for working in a laboratory and can develop Skill in Slide Preparation.

Co6- Student will develop skills for identifying fungal genera and using them for industrial purposes along with learns to identify fungal disease on the basis of symptoms.

Co7- Can initiate his own fungal culture laboratory and can start own enterprise on fungal products.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1							
PO2	√	√		√			
PO3							
PO4			√				
PO5						√	√
PO6							
PO7					√	√	
PO8					√		

M.Sc. IIIrd Sem.

Paper I- Developmental Biology

After completion of this course-

Co1 – Student will be able to know about plant anatomical structure, their development. They will also understand how growth of root and shoot apical meristem takes place.

Co2 – Structure will get knowledge about the various arrangement of leaf in plants. They will have developed knowledge about vascular tissues and its constituents by section and maceration, wood anatomy T.S., TLS, RLS. They also know about secretory tissues, laticifers, stomata and trichomes.

Co3 – Student will understand the floral architecture and how flowering takes place. They will also know about seed and fruit anatomy and evolution of seed.

Co4 – Student will able to know about mechanical tissue (collenchymas, sclerenchyma) and also understand the normal and anomalous secondary growth.

Co5 – Student will able to know about the mechanism of dormancy and overcoming the dormancy and also understand the mechanism of program cell death.

Co6-Student will able to understand the techniques and lab practices for field of Anatomy.

Co7- Student will able to Develop skills for preparation of Slides and can initiate his laboratory of slide preparation

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1		√	√				
PO2	√		√	√	√		
PO3							
PO4							
PO5							√
PO6	√						
PO7		√				√	
PO8						√	

Paper II- Systematics Evolution and Taxonomy

After completion of this course-

Co1 – Students will be able to know the probable ancestors of angiosperms, extinct species and also they will also understand adaptive features and technicality of international code of Botanical nomenclature.

Co2 – Student will be able to understand the various characters of plants are used as taxonomic evidence for the classification.

Co3 – Student will be able to understand how to prepare herbarium sheet and how to read floras. They will also get knowledge about monocotyledous family members.

Co4 – Student will be able to understand the differences between unisexuals and bisexuals members of dicotyledons.

Co5 – Student will be able to understand the major system of classification with their merits and demerits.

Co6- Student will be able to Understand the techniques and lab practices for working in field along with develop skills for preparation of Herbarium and can make own herbaria of that region.

Co7- They can initiate his laboratory of slide preparation and can sell the slide to the market.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	√					√	
PO2	√	√	√	√			
PO3							
PO4						√	
PO5							√
PO6					√		
PO7						√	
PO8			√				

Paper III- Principles of Ecology

After completion of this course-

Co1 – Student will be able to understand the growth and characteristics of population and limiting factors which are affect the population.

Co2 – Student will have developed knowledge about structure and function of ecosystem. They also will understand about bio geo chemical cycle in environment and its role.

Co3 – Student will be able to understand the vegetative organization in community. Student will get to know analytical and synthetic characters of community.

Co4 – Student will have developed knowledge about Biological conservation and its management by in situ and ex-situ conservation.

Co5 – Student will get knowledge about local plant diversity and its socio-economic importance.

Co6- Student will differentiate the Hydrophytes, Xerophytes and Halophytes on the basis of Anatomical characters.

Co7- Student will understand the difference in pH in different soil and can determine Frequency, density and abundance of plant community.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1				√			
PO2	√		√			√	
PO3							
PO4		√					
PO5					√		√
PO6			√				
PO7							
PO8				√			√

Paper IV- Intellectual property rights

This course is an optional but compulsory for completion of the degree student can correlate the knowledge gained in this subject with his principle subject. This gives an opportunity to learn other subjects of his interest which is not offered in his principle subject.

After the completion of the course, students will be able to understand:-

Co-01:- The concept and development of all forms of I.P.R.

Co-02:- Distinguish and explain various forms of I.P.R.

Co-03:- Identify criteria's to fit one's own intellectual work in particular forms of I.P.R.

Co-04:- Apply statutory provisions to protect particular forms of I.P.R.

Co-05:- Apply the concept and forms of I.P.R. in research field.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	√	√	√				
PO2	√						
PO3			√	√			
PO4					√		
PO5				√			
PO6		√		√			
PO7							
PO8					√		

Paper V- Pathogen and pests of crop plants

After completion of this course -

Co1 – Student will understand the characteristics of micro-organism like fungi, Bacteria and viruses. They will also develop knowledge their parasitic ability and damage caused by them.

Co2 – Student will get knowledge about symptom of plant diseases and they will also know about pathogenesis.

Co3 - Student will get knowledge about the source of infection and they will also get know about the recurrence of diseases.

Co4- Student will be able to know the importance of environment and nutrition on disease development. They will also get knowledge about how to pathogen disseminate.

Co5-Student will be able Understand the techniques and good lab practices for working in a laboratory and develop skill in slide Preparation of plant disease.

Co6- Student will be able Develop skills for identifying fungal genera and fungal disease on the basis of symptoms, using them for industrial and laboratory purposes.

C06-Student can initiate his own fungal culture laboratory and enterprise on fungal products.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1		√	√	√		√	
PO2	√	√					
PO3							
PO4							
PO5					√		√
PO6			√				√
PO7					√		
PO8				√		√	

M.Sc. IVth Sem.

Paper I- Plant tissue culture and Industrial Applications

After successful completion of this course –

Co1 – Student will understand the concept of tissue culture. They will have developed knowledge of micro propagation of different types of plants through tissue culture.

Co2 – Student will get knowledge about the protoplast research about the regeneration of plants. They will understand the importance and method of in vitro and in vivo conservation.

Co3 – Student will have knowledge about the different Application of plant tissue culture. They will also develop understanding the role of minerals and hormone in organs development in laboratory.

Co4 – Student will be able to know the fundamental of organ culture. They will also get knowledge about the techniques and utility of organogenesis.

Co5 – Student will be able to practice and learn the method of different type of culture media preparation. They will also get knowledge of application of tissue culture.

Co6- Student will be able to understand the instruments and techniques of biotechnology and Tissue culture laboratory.

Co7-Student will be able to start own enterprises of improved Plant Varieties and can produce Transgenic Crop.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1		√	√				
PO2	√	√					
PO3							
PO4							
PO5			√		√		√
PO6							√
PO7					√	√	
PO8				√			

Paper II- Biotechnology, Genetic Engineering and Resource Utilization

After successful completion of this course-

Co1 – Student will get knowledge about Importance of recombinant DNA technology. Student will get idea about gene cloning and DNA libraries.

Co2 – Student will have knowledge about the technique and importance of DNA fingerprinting and PCR.

Co3 – Student will know how they can grow disease free plant by tissue culture technique. They will develop understanding about how gene technology has helped in improving various qualities in crops.

Co4 – Students will know the characters of Agro bacterium and they will get knowledge about how agro bacterium used for developing a transgenic plant by genetic engineering.

Co5 – Students will have developed the knowledge of genetic improvements of microbes for Industrial important. They will get idea about fermentation technology.

C06- Students will understand the instruments and techniques of biotechnology and enhance learning skill for the operation of tools and techniques of genetic engineering.

Co7-Students can start own enterprises of improved Plant Varieties and can produce Transgenic Crop.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1		√					
PO2	√	√		√			
PO3							√
PO4							
PO5			√				
PO6			√				√
PO7						√	
PO8					√	√	

Paper III- Plant pathology and diseases of plants

After completion of this course –

Co1 – Students will get knowledge about the production of new races of fungi which are more harmful for host plants. They will get to know different control measure of plant diseases and quarantine procedure.

Co2- Student will understand the characteristics of micro-organism like fungi, Bacteria and viruses. They will also develop knowledge their parasitic ability and damage caused by them.

Co3 – Students will have developed the knowledge of different disease of vegetable caused by viruses, nematodes and mycoplasma. They will also understand how these diseases control.

Co4 – Student will get knowledge about symptom of plant diseases and they will also know about pathogenesis.

Co5- Student will be able to know the importance of environment and nutrition on disease development. They will also get knowledge about how to pathogen disseminate.

Co6-Student will be able Understand the techniques and good lab practices for working in a laboratory and develop skill in slide Preparation of plant disease.

Co7- Student will be able Develop skills for identifying fungal genera and fungal disease on the basis of symptoms, using them for industrial and laboratory purposes.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	√						
PO2	√	√	√		√		
PO3							√
PO4					√		
PO5							√
PO6			√	√			
PO7						√	
PO8							

Paper IV-Dissertation

Paper V- Embryology and Reproductive Biology of Flowering Plants

After completion of this course –

Co1 – Student will understand the floral architecture and the process of flower development.

Co2 – Students will understand the structure of Anther and development of pollen and biochemical aspects of pollen. They will also know about the development of male and female gametophyte.

Co3 – students will understand pollination mechanism. They get to know about fertilization and how pollen stigma interaction takes place. They will also understand the concept of Incompatibility.

Co4 – Student can understand the relation between embryo and endosperm. Student will get idea about practical importance of polyembryony. Student will develop understanding of formation of embryo from somatic cell.

Co5 – Students will get knowledge about the types of fruits and their biochemistry during maturation students will also understand how endosperm provide nutrition to embryo development. They also understand how germination of seed takes place in plants.

Co6- Students will understand the techniques and lab practices for working in field of taxonomy and preparation of Herbarium.

Co7- Students can make own herbaria of that region and can start own food resource utilization centre.

PO	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1					√		
PO2	√	√	√	√			
PO3							
PO4						√	√
PO5			√				
PO6							√
PO7						√	
PO8							

**RAJEEV GANDHI GOVT. P.G. COLEGE AMBIKAPUR (C.G.)
DEPARTMENT OF BOTANY**

B.Sc. Botany (NEP)

SEMESTER	COURSE CODE	COURSE TITLE	DESCRIPTION	RELEVANCE			
				LOCAL	REGIONAL	NATIONAL	GLOBAL
B.Sc. I Semester	DSCBOT - 01 (DSC)	Microbial diversity and Thallophyta	Microbiology: Detail study of virus and bacteria	√	√	√	√
			Mycology and Phycology: General characters, structure, reproduction of algae & fungi	√	√	√	√
			Lichenology: Detail account of lichen		√	√	√
	GECBOT - 01 (GE)	Flowering Plants	Morphology: Root, stem and leaf	√	√	√	√
			Embryology: Flower and its parts	√	√	√	√
			Physiology: Photosynthesis and Respiration			√	√
			Types of Flowering plants: Hydrophytes, Xerophytes and Halophytes	√	√	√	√

B.Sc. II Semester	DSCBOT - 02 (DSC)	Embryophyta	Bryology: Structure & reproduction of important bryophytes				
			Pteridology: Structure & reproduction of important Pteridophytes			√	√
			Gymnosperm: Classification, distribution, anatomy and Life cycle of Cycas and Pinus			√	√
	GECBOT - 02 (GE)	Economic Botany	Domestic of crop plants: Cereals, pulses, oil, timber, rubber, dyes and fibers	√	√	√	√
			Ethenobotany: Application of old traditional knowledge of local plants (medicinal plants)	√	√	√	√
B.Sc. III Semester	DSCBOT - 03 (DSC)	Plant Taxonomy and Embryology	Taxonomic resources and nomenclature		√	√	√
			Classification: According to Bentham & Hooker, Engler & Prantle, and Hutchinson		√	√	√
			A study of important families with economic importance	√	√	√	√
			Plant-embryology: Sporogenesis; Micro and mega-sporogenesis	√	√	√	√

B.Sc. IV Semester	DSEBOT - 01 (DSEC)	Fundamental of Plants Pathology	Plant diseases: Introduction and concepts	√	√	√	√
			Classification of plant diseases caused by: fungi, bacteria & viruses	√	√	√	√
			Methods of control : Mechanical, Physiological & chemical control	√	√	√	√
			Symptoms and management of plant diseases : Field crop, horticultural crop, crucifers	√	√	√	√
	DSCBOT - 04 (DSC)	Plant Physiology	Plant water relation & Transpiration			√	√
			Photosynthesis: Light and Dark reaction			√	√
			Respiration : Aerobic & Anaerobic, glycolysis, Krebs & ETS cycle			√	√
			Plant development & plant hormones	√	√	√	√
	DSEBOT - 02 (DSEC)	Plant Anatomy and Biochemistry	Plant tissue and tissue system: Theories of optical organization			√	√
			Anatomy and secondary growth: Dicot and Monocot			√	√
Anomalous secondary growth and anatomical adaptation					√	√	

			Structure, types and function of protein, carbohydrate, lipid & enzymes	√	√	√	√
B.Sc. V Semester	DSCBOT - 05 (DSC)	Cell and Molecular Biology	Cytology: Cell components and cell organelles			√	√
			Cell cycle & cell division			√	√
			Chromosome : types and detail description about chromosome			√	√
			Structure & organization of DNA & RNA; Transcription & translation			√	√
	DSEBOT - 03 (DSEC)	Biotechnology and Plant Tissue Culture	Plant tissue culture: techniques and application			√	√
			Concepts & steps involved in biotechnology with it's			√	√
			Requirements & application of PTC		√	√	√
	GECBOT - 03 (GE)	Forestry	Introduction and types of forest		√	√	√
			Description of forest based industries in Chhattisgarh		√	√	√
			Conservation of forest & natural resources	√	√	√	√
			National forest policy		√	√	√

B.Sc. VI Semester	DSCBOT - 06 (DSC)	Ecology	Ecology, ecosystem and its factor; Soil and biogeochemical cycle			√	√
			Ecological adaptation and Population ecology			√	√
			Food chain & Food webs, ecological succession			√	√
			Biodiversity and it's conservation			√	√
	DSEBOT - 04 (DSEC)	Aquatic and Marine Botany	Marine and Limnetic macro algae: Seaweeds of India and common terrestrial algae	√	√	√	√
			Mangroves : Detail description	√	√	√	√
			Phytoplankton, cyanobacteria, diatoms and macro algae	√	√	√	√
			Aquatic vascular plants	√	√	√	√
	GECBOT - 04 (GE)	Nursery and Gardening	Introduction to Plant Nursery and Gardening	√	√	√	√
			Necessities for nursery and detail about seed dormancy	√	√	√	√
			Vegetative propagation	√	√	√	√
			Management of nursery and garden & economics of nursery & garden	√	√	√	√

**RAJEEV GANDHI GOVT. P.G. COLEGE AMBIKAPUR (C.G.)
DEPARTMENT OF BOTANY**

M.Sc. Botany

SEMESTER	COURSE CODE	COURSE TITLE	DESCRIPTION	RELEVANCE			
				LOCAL	REGIONAL	NATIONAL	GLOBAL
M.Sc. I Semester	PD3 - 701 (Paper - I)	Cell and Molecular Biology	Study of modern tools and techniques of cell biology			√	√
			Detailed study of cell components and chromosomes			√	√
			Cell multiplication and cell organelles			√	√
			Gene regulation in Eukaryotes and Prokaryotes			√	√
			Organelles, genomes, cytoskeletal gene and protein sorting				√
	PD3 - 702 (Paper -II)	Algae	Diversity and distribution of the algae	√	√	√	√
			Classification, thallus structure and detailed study of various type of algae	√	√	√	√

		Algal biotechnology and algal biofuels			√	√
		Industrial phycology			√	√
PD3 - 703 (Paper-III)	Plant Physiology and Biochemistry	Biomolecule and catalyst, types of Enzyme			√	√
		Plant water relation, translocation in plants, transpiration			√	√
		Photosynthesis and photochemistry			√	√
		Respiration, lipid and nitrogen metabolism			√	√
		plant hormones, growth regulators, sensory photobiology		√	√	√
VAC PD3 - 704 (Paper-IV)	Social Outreach					
PD3 - 706 (Paper- V)	Environment Science	Environmental stresses and their management, Environmental pollutants		√	√	√
		Environmental issues, policies and regulation			√	√

			Vegetation development	√	√	√	√
			Ecosystem, conservation and their management		√	√	√
			Human health and environmental changes, application of GIS	√	√	√	√
M.Sc. II Semester	PD3 - 801 (Paper - I)	Genetics	Microbial genetics, Mendelian and non-Mendelian inheritance			√	√
			Recombination in eukaryotes and eukaryotic genome			√	√
			Detailed study of mutation, transposons, cancer			√	√
			Study of various type of genetics, DNA damage and repair			√	√
			Detailed study of cytogenetic			√	√
	PD3 - 802 (Paper-II)	Advances in Archegoniate	General characters, structure, distribution, classification and reproduction in various types of Bryophytes		√	√	√

		General characters, structure, distribution classification and reproduction in various types of Pteridophytes	√	√	√	√
		Stelar system, origin of seed, fossil Pteridophytes			√	√
PD3 - 803 (Paper-III)	Gymnosperm	Detailed description of Gymnosperm with morphology and reproductive organs.	√	√	√	√
		Classification of Gymnosperm and brief account of the families of Gymnosperm			√	√
		Propagation of conifers using plant tissue culture and other advance technique			√	√
PD3 - 804 (Paper-IV)	Research methodology & Computer Application	Concept of research and selection of topic for research		√	√	√
		Tools for research and sampling methodology		√	√	√
		Fundamentals of computer and treatment of data	√	√	√	√

M. Sc. III Semester	PD3 - 806 (Paper -V)	Fungi	Microbiology : detailed study of various type of micro-organism		√	√	√
			Mycology : detailed study of fungi and their class	√	√	√	√
			Detailed account of Lichen		√	√	√
	PD3 - 901 (Paper - I)	Developmental Biology	Vascular plant development, tissue system and secretory ducts			√	√
			Leaf growth and differentiation			√	√
			Development of flower, anatomical adaptation for special habitats			√	√
			Anatomy in relation to taxonomy, anomalous secondary thickenings			√	√
			Detailed account on dormancy, senescence and PCD			√	√
	PD3 - 902 (Paper- II)	Systematics, Evolution and Taxonomy	Systematics and study various type of classification system		√	√	√
Detailed study of species concepts and taxonomic evidence.					√	√	

			Detail study of monocot and dicot		√	√	√
			Description system of angiosperm classification		√	√	√
			Concept of ecology and population ecology			√	√
			Detailed account on ecosystem ecology	√	√	√	√
			Detailed description of vegetational organization	√	√	√	√
			Biological conservation and management	√	√	√	√
			Detailed description of concepts of phytogeography			√	√
	PD3 - 903 (Paper-III)	Principles of Ecology					
	PD3 - 904 (Paper-IV)	Intellectual Property rights		√	√	√	√
	PD3 - 905 (Paper- V)	Pathogens and Pests of crop Plants	General characteristics of fungi, bacteria and viruses and important plant disease caused by them	√	√	√	√

			Symptomatology, pathogenicity, host-parasite relationship			√	√
			Effect of environment and disease development			√	√
M. Sc. IV Semester	PD3- 1001 (Paper - I)	Plants tissue culture and Industrial applications	General introduction, requirement, sterilization and media of plant tissue culture		√	√	√
			Different type of culture techniques and culture systems		√	√	√
			Steps of somatic hybridization germplasm conservation		√	√	√
			Different aspects of organogenesis and embryogenesis		√	√	√
			Application of plant tissue culture		√	√	√
	PD3- 1002 (Paper- II)	Biotechnology genetic Engineering & resource Utilization	Detailed study of biotechnology and plant breeding			√	√
			Detailed description of recombinant DNA technology			√	√
			Detailed study of genetic engineering			√	√

