SIR C R REDDY COLLEGE, ELURU

Affiliated to Adikavi Nannaya University, Rajamahendravaram

Thrice accredited at 'A' Level by NAAC Bengaluru

An ISO-9001:2015Certified Institution

BOARD OF STUDIES MEETING

FOR UG PROGRAMME – 2019-20

DEPARTMENT OF BOTANY

SIR C R REDDY COLLGE

ELURU-534007

Sir C R REDDY COLLEGE

Eluru- 534007

Dear sir/ madam,

Greetings to all of you.

We are going to conduct the BOS meeting for different subjects, for the year 2019-2020, I want to put some thoughts before you while making the resolutions. Considering the objectives of Autonomous Colleges and NAAC guidelines, to fulfill them effectively, it is imperative to meet the challenges at National and Global levels in a highly dynamic contemporary context requiring integration of social, cultural and scientific dimensions into the **Teaching , Learning** and **Research** programmes. Moreover the HRD ministries of both central and State Govts., are giving thrust for Skill based and employment oriented courses with internship, this is the time for the Autonomous Colleges to think over and should make necessary resolutions in your concerned subject BOS.

The autonomous system facilitates insightful thinking on all issues connected with focus on knowledge generation with an interdisciplinary perspective. In order to enrich the academic resources of the autonomous system, for a deeper reflection on critical issues of autonomous colleges, the following thorough discussions on various academic issues of the subject is to be carried out for effective implementation of the system for the benefit of learners and moulding them with all skills and academic excellence in the field of specialization.

- Chairman is directed to prepare action plan to be designed to improve quality by strengthening academic activities/ infrastructure in order to promote excellence in the Departments and to develop curricular instruction to inculcate right values among the students.
- Reforms in content of evaluation and encouraging creation of new knowledge through innovative ideas / projection / practical orientation /exposure to labs / institution / organizations etc.
- Redesigning the curricula taking into account their scientific requirement for projects, etc.
- Creation of alliances with research institution and industry should be facilitated to create a self governing system.
- A renewed focus must be laid on research by integrating teaching and extension activities.
- A compulsory component as subject oriented extension activity for all Departments at least once in a semester
- Suggestions to A/c, GB meetings to include in the agenda for necessary decision.

Dt. 16-11-2019 PRINCIPAL

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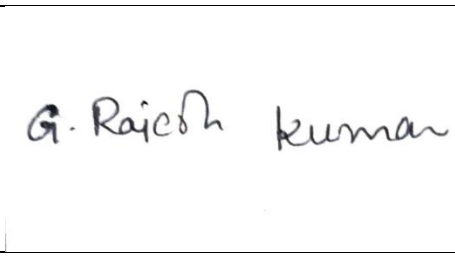
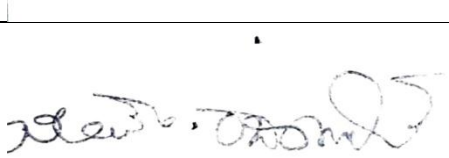
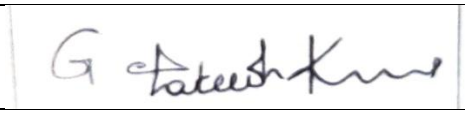
DEPARTMENT OF BOTANY
BOARD OF STUDIES MEETING: 16th NOV 2019

The Board of studies meeting of DEPARTMENT OF BOTANY was convened at 10.00A.M on 16-11-2019 under the Chairmanship of Sri V.S.S Vara Prasad, Head of the Department. The members present have discussed various aspects such as changes to be made in the Syllabi, Scheme of Evaluation and Blue print both for theory and practical papers, Departmental activities for 2019-20

The following members were present.

S. No	Members Present	Designation	Signature
01	**Sri V S SVara Prasad** Head, Dept. of Botany Sir C R R Autonomous College Eluru. vsp@sircrreddycollege.ac.in	**Chairman**	
02	**Dr.J. Suneetha** Head, Dept. of Botany Government college(Autonomus) Rajamahendravaram E.G Dist	University Subject expert	
03	**Dr. Srinivas reddy** HOD of Botany PB Siddartha college Vijayawada Krishna district	Subject expert I	
04	**Smt. Ch. Beulah Rajani** Lecturer in Botany AG&SG Siddartha college Vijayawad Krishna district	Subject expert II	

05	**Sri G Rajesh Kumar** Lecturer in Botany Sir C R R Autonomous College Eluru.	Member	
06	**Sri M. Raja Gopal** Lecturer in Botany Sir C R R Autonomous College Eluru.	Member	
07	**Mr. K. pavan kumar** Eluru W.G.Dt.	Alumni	

AGENDA

1. To prepare syllabus and model question papers.
2. To have additional curriculum for all the Papers.
3. To suggest methodologies for innovative methods of teaching.
4. To suggest panel of names to the Academic Council for appointment of examiners and paper setters.
5. To discuss about coordinating research, teaching, extension and other academic activities in the department.
6. To prepare syllabi for Certificate Courses / Value-added courses.
7. To discuss the topics for the students' study projects and to introduce the study projects for final year advanced learners.
8. To discuss about the introduction of New Courses/Re-structured courses.
9. Any other matter with the permission of the Chair.

BOS Minutes of the Meeting

Agenda No. 1:

To prepare syllabus and model question papers.

Discussion :

Discussed to continue the same syllabi in both theory and practical's for I and II B.Sc i.e., I to IV semesters as followed in the previous academic year also for academic year 2019-2020. Discussed to follow the three tier question paper (section A, B and C) for all the semesters.

Resolution:

Resolved to follow the same syllabi in both theory and practical's for I and II B.Sc., i.e., I to IV semesters as followed in the previous academic year and also for the academic year 2019-2020.

Resolved to follow the three tier question paper (section A, B and C) for all the semesters. Section A consists of Part-A and Part- B. Each part has four questions and student has to answer any four questions choosing atleast one question from each part. Each question carries 10 marks. Section B consists of eight short answer type questions and student has to answer any five questions. Each question carries 5 marks. Similarly Section C consists of eight very short answer type questions and the student has to answer any five questions. Each question carries 2 marks.

Agenda No. 2:

To have additional curriculum for all the Papers.

Discussion :

Discussed for additional curriculum for all papers for students to identifies the learning outcomes, standards and core competencies that they must demonstrate before advancing to the next level

Resolution:

Resolved to approve the CBCS syllabi for theory and practical of V semester botany for III B.Sc., degree for adaptation and implementation from the academic year 20 certain modifications along with 20% additional curriculum

Semester	Unit	Topic
II Diversity of Archaegoniatesa& Plant Anatomy	4. Systematic Taxonomy	Anamolous Secondary growth in Achyranthes stem
1V Plant Physiology and Metabolisnm	5. Growth and Development	Growth and Development: Definition phases and Kinetics of growth
VI Cluster VIII A-2	4. Indigenous medicinal science	Unani

AgendaNo.3:

To suggest methodologies for innovative methods of teaching.

Discussion:

Preparation of the lecture wise curricular plan with mentioning of curricular and co- curricular activities to tentative days in the academic year 2019-2020. This will help both faculty and stakeholders to maintain the proper plan of action to conduct Class room seminars, quiz programme,value added course group discussion, guest lectures and workshops etc

Resolution:

Resolved to follow the innovative methods of teaching i.e., guest lectures, workshops, class room seminars, group discussions, quiz, value added courses on herbal medicinal plants, student study projects, field trips and etc..

Agenda No. 4:

To suggest panel of names to the Academic Council for appointment of examiners and paper setter.

Discussion:

Maintaining list of examiners and paper setters with their qualifications should be known and helpful to conduct examinations.

Resolution:

Resolved to approve the existing list of examiners, paper setters prepared by the concerned faculty of the department.

Agenda No. 5 :

To discuss about coordinating research, teaching, extension and other academic activities in the department.

Discussion:

Conduction of different department activities for the sake of stakeholders benefit.

Resolution:

Resolved to follow the teaching, extension and other academic activities i.e.,

a. Teaching- using Charts, microscopes, museum specimens, live specimens, e-class rooms and etc.
b. Extension activities- Guest lectures, field trips assignments, classroom seminar quiz, group discussion, celebrating important days and etc.,

Agenda No. 6 :

To prepare syllabi for Certificate Courses / Value-added courses.

Discussion:

The necessity of Value Added Course on **"Herbal medicinal plants"**

will helps the stakeholders for their employability.

Resolution:

Resolved and approved the syllabi of value added course on "Herbal medicinal plants".

Agenda No. 7 :

Review of curriculum in terms of employability, Skill enabled for Value added and Certificate courses.

Discussion:

The curriculum of the value added course deeply discussed by the members of the BOS as it must be in terms of employability and skills. It creates many opportunities to students to get employment and skill in cultivation practices and marketing.

Resolution:

It is resolved to review the curriculum in terms of employability and skilled enabled thrust areas.

Agenda No. 8:

To discuss the topics for the students' study projects and to introduce the study projects for final year advanced learners.

Discussion:

Student study project will help the III B.Sc,. students is mandatory as per the curriculum. Because it will benefit for the stake holders in the aspect of their higher education and research work. We must create student interest in research work in aspect of making knowledge on research methodology and complete idea on how to write research literature from their under graduation.

Resolution:

Resolved to conduct student's study projects.

Agenda No 9:

To discuss about the introduction of New Courses/Re-structured courses.

Discussion:

Discussed to implement to adopt CBCS syllabi of theory and practical for elective subjects in Botany for IV semester and (cluster A and B)

Resolution:

Resolved to adopt CBCS syllabi of theory and practical for the elective subjects in botany (A or B or C) for III B.Sc., degree course for VI semester for adaptation and implementation from the academic year 2019-2020.

Resolved to approve the CBCS syllabi of theory and practical's in botany clusters (Cluster A andB) for VI semester of III B.Sc., degree course for adaptation and implementation from the academic year 2019-2020 **The offered elective papers are**

PAPER VII-(A): ORGANIC FARMING & SUSTAINABLE AGRICULTURE

PAPER VII-(B) NURSERY, GARDENING AND FLORICULTURE.

PAPER VII-(C): PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICAL APPLICATIONS

Agenda No. 10 :

Any other matter with the permission of the Chair.

Discussion:

For academically week students department decided to conduct remedial classes

Resolution:

Resolved to conduct remedial classes for the academically weak students.

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DEPARTMENT ACTIVITIES 2019-20

S.No.	Dates	Name of the Program	Topic	Number of students Participated	Name of the Resource person/Chief Guest with Designation
1	05-06-2019	World Environment Day	Conducted Plantation Programme	30	VSP,GRK.MRG
2	21-06-2019	Celebration of International Yoga Day	Prayanam and Yoga Practice	43	Principal, Vice-Principal, VSP, GRK, MRG, GTB, VSVS, KVSS
3	1-7-2019	Value Added Course for 3rd BZC Students	Fundamentals of Floriculture	65	VSP,GRK,MRG
4	06-07-2019	Swacch Bharath	Plantation Programme in the College Campus	28	VSP,GRK.MRG
6	11-07-2019	Career Guidance Programme to 3rd B.Sc. BZC Sudents	Higher Education	28	Dr. Md. MuZahiddin, Asst. Professor, Pondichery Central University
9	19-07-2019	Plantation Programme By 3rd B.Sc., BZC Students	Plantation in college campus	50	VSP,GRK, MRG
10	22-7-2018	Mendel's birthday celebration	Conducted Quiz Programme to All B.Sc. BZC Students	55	VSP, GRK, MRG
18	27-8-2019	Filedtrip to Guntupalli caves, Jeelakarragudem for 2nd B.Sc.,	Herbarium collection and plant diversity	56	VSP,GRK, MRG
	5-10-2019	Group Discussion for 2nd BZC	Englar and Prantl System Of Classification	7	VSP, GRk
25	18-10-2019	Student Study Project Submission	1. Geo-Tagging and Social Assessment of Sir. C R Reddy College Campus Flora. 2. Medicinal Plant Survey in Sir. C R Reddy College Campus	32	VSP, GRK, MRG
36	20-1-2020	Value Added Course	Horticulture and Landscaping	65	VSP, MRG
39	27-1-2020	Students of Srividyalaya Jr. College Students Visited Botany	Mechanism of enzyme action		VSP, MRG

		Museum and Medicinal plants Garden			
47	10-2-2020	Guest Lecture	Biotechnological Applications: Plant Tissue Culture	115	B. Srinivasa Rao, Retd. SG Lecturer, Sir, C R Reddy College, Eluru
51	17-2-2020	Guest Lecture	The Basic Concepts of Ayurvedha	124	Dr. PRP Santha Kumari, Medical Officer, AYUSH, Eluru

ALLOCATION OF CREDITS 2019-20

Year	*Semester*	*Paper*	*Title*	*Hours*	*Marks*	*Credits*
I	**I**	***I***	**Microbial diversity, Algae and Fungi**	***3***	***100***	***03***
			Practical	***2***	***50***	***02***
	II	***II***	**Diversity Of Archaegoniatae & Plant Anatomy**	***3***	***100***	***03***
			Practical	***2***	***50***	***02***
II	***III***	***III***	***Plant Taxonomy and Embryology***	***3***	***100***	***03***
			Practical	***2***	***50***	***02***
	IV	***IV***	***Plant Physiology and Metabolism***	***3***	***100***	***03***
			Practical	***2***	***50***	***02***
III	**V**	**V**	Cell Biology, Genetics &Plant breeding	**3**	**100**	**03**
			Practical V	**2**	**50**	**02**
		VI	Plant Ecology & Phytogeography	**3**	**100**	**03**
			Practical VI	**2**	**50**	**02**
	*Any one paper from (A), (B) and (C) can be selected	**VII (A)***	ORGANIC FARMING & SUSTAINABLE AGRICULTURE	**3**	**100**	**03**
			Lab	**2**	**50**	**02**
		VII (B)*	Nursery, Gardening and Floriculture			
			Lab			

	VI	**VII (C)***	Plant tissue culture and its biotechnological applications			
			Lab			
	Any one cluster (Set of Three Papers) from VIII-A or VIII-B can be selected	**** VIII-A**	**Cluster Elective-A**			
			VIII-A-1 : PLANT DIVERSITY AND HUMAN WELFARE	**3**	**100**	**03**
			VIII-A-2 : ETHNOBOTANY AND MEDICINAL BOTANY	**3**	**100**	**03**
			VIII-A-3: Pharmacognosy and Phytochemistry	**3**	**100**	**03**
			VIII-A-1 : Practical	**2**	**50**	**02**
			VIII-A-2 : Practical	**2**	**50**	**02**
			VIII-A-3: Practical	**2**	**50**	**02**
			Or			
		**** VIII-B**	**Cluster Elective-B**			
			VIII-B-1 : Biological Instrumentation and	**3**	**100**	**03**

PROGRAMME OUTCOMES

Programme Code	Programme	Programme Outcome (POs)	Programme Specific Outcomes (PSOs)
		I, III and V Semester	
	B.Sc. (BZC) Botany, Zoology, Chemistry	**PO1: Knowledge Empowerment** Empowered with Knowledge of basic concepts,Principles, the scientific theories and their relevance in the day-to-day life . **PO2: Skill Enhancement** To emerge as skillful, critical and creative graduates through hands on experience in the laboratories. **PO3: Values Enrichment** To develop value based services through outreach activities. **PO4: Social Responsibility and Extension** Transform them to become nurturers of Environment and Society. **PO5: Analyse Capacity** Analyse complex interactions among the various animals of different phyla, their distribution and their relationship with the environment	**Botany:** Enables students to understand Plant Morphology, Physiology, Anatomy, Embryology, Genetics of plants, Plant identification, Plant Ecology and Human welfare, Medicinal values of plants, Pharmacognosy and phytochemistry and development of Organic farming for Sustainable Agriculture. **PSO2**: Gain knowledge of Agro based Small Scale industries like sericulture, fish farming, butterfly farming and vermicompost preparation.

II, IV and VI Semester

	B.Sc. (CBZ) Chemistry, Botany & Zoology	**PO1: Knowledge Empowerment** Empowered with Knowledge of basic concepts, principles, the scientific theories related to various scientific phenomena and their relevance in the day-to-day life with an interdisciplinary approach. **PO2: Skill Enhancement** Equipped with Skills of observations and logical inferences from the scientific experiments. **PO3: Values Enrichment** Enriched with Values to respect the diversity of life and practice limited use of Natural resources. **PO4: Social Responsibility and Extension** To be transformed to become Nurturers of Environment and Society. **PO5:Analyse Capacity** Apply ethical principles and commit to professional ethics and responsibilities in delivering his duties **PO6:Self-directed and lifelong learning:**Recognize the need for and have the ability to engage in independent, lifelong learning and adapt to technological changes to be globally competent.	**PSO1:** **Botany:** Enables students to understand Plant Morphology, Physiology, Anatomy, Embryology, Genetics of plants, Plant identification, Plant Ecology and Human welfare, Medicinal values of plants, Pharmacognosy and phytochemistry and development of Organic farming for Sustainable Agriculture. **PSO2:** Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, tools and techniques of Zoology, Fish biology, Animal biotechnology, Immunology and research methodology through field visits. **PSO3**: Gains knowledge of small scale industries like sericulture, fish farming, butterfly farming and medical diagnostics. Understand the complex evolutionary processes and behavioral patterns of various animals.

w.e.f. 2020-21 Admitted batch(CBCS)Pattern

SIR C R REDDY COLLEGE, ELURU

I Year B.Sc. (I Semester)

Subject :BOTANY

COURSE TITLE	Fundamentals of Microbes and Non-vascular Plants
TOTAL HOURS	60 Hrs
HOURS/WEEK	4 T+2P
CODE	
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	60

CO.NO	Course Outcomes
CO-1	To gain knowledge about origin and evolution of life and microbial diversity; to understand about the geological time scale and to understand the phylogeny of plants
CO-2	To know about the various plant diseases and their control measures.
CO-3	To understand the life cycles of different algal , fungal species and lichens.
CO-4	To explore the economic importance of Algae, Fungi and Lichens
CO-5	To understand Cyanobacteria and their uses as Biofertilizers

SIR C R REDDY COLLEGE ELURU
I B.Sc - SEMESTER- I: BOTANY SYLLABUS
w.e.f. 2015-16 (Revised in April, 2016)
Paper- I : Microbial Diversity, Algae and Fungi
Total hours of Teaching 60 hrs@ 4 hours per a week

Learning objectives

The specific objectives of this course are to expose students to the following topics:

1. Origin, evolution, and genetic diversity of microbial life
2. Physiological diversity of metabolic and bioenergetics pathways
3. Microbial species and speciation;
4. Phylogenetic and functional analysis of (meta) genomic data
5. Characterization of uncultivated microbial lineages; and
6. Linkage between microbial diversity, function, and ecology

PART –A : (Microbial World, Viruses, Bacteria)

UNIT – I : MICROBIAL WORLD (Origin and Evolution of Life, Microbial diversity **(12 hrs)**

1. Discovery of microorganisms, origin of life, biogenesis, Pasteur experiments.
2. Classification of microorganisms – R.H. Whittaker's five kingdom concept
3. Brief account of special groups of bacteria- Archaebacteria, Mycoplasma, Chlamydia.
4. Detailed account of Actinomycetes and Cyanobacteria.

UNIT – II: VIRUSES **(12 hrs)**

4. Viruses- Discovery, general account, structure& replication of –T4 Phage (Lytic, Lysogenic) and TMV, Viroids.
5. Plant diseasescaused by viruses– Symptoms, transmission and control measures (Brief account only).
6. Brief account of Vaccines.

UNIT – III : BACTERIA **(12 hrs)**

7. Bacteria: Discovery, General characteristics, cell structure and nutrition.
8. Bacterial staining- Gram +ve and Gram -ve
9. Reproduction- Asexual and bacterial recombination (Conjugation, Transformation, Transduction).
10. Economic importance of Bacteria.

PART – B (Algae & Fungi)

UNIT – IV : ALGAE **(12 hrs)**

11. General account - thallus organization and reproduction in Algae.
12. Fritsch classification of Algae (up to classes only) and economic importance.
13. Structure, reproduction and life history of *Oedogonium*, *Ectocarpus* and *Polysiphonia*.

UNIT – V : FUNGI **(12 hrs)**

14. General characteristics and outline classification (Ainsworth).
15. Structure, reproduction and life history of *Rhizopus* (Zygomycota), *Penicillium* (Ascomycota)

16. Mushroom cultivation (Paddy straw mushroom only)
17. Lichens-Structure and reproduction; ecological and economic importance.

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Moduling	Employability	Employability	Skill development
Unit-I			
Origin of life, concept of primary Abiogenesis; Miller and Urey experiment. Five kingdom classification of R.H. Whittaker			✓
Discovery of microorganisms, Pasteur experiments, germ theory of diseases.			✓
A general account on symptoms of plant diseases caused by Viruses. Transmission of plant viruses and their control.	✓		✓
Significance of viruses in vaccine production, bio-pesticides and as cloning vectors.	✓		✓
Unit-2			
Brief account of Archaebacteria, Actinomycetes and Cyanobacteria. Cell structure and nutrition of Eubacteria			✓
Reproduction- Asexual (Binary fission and end oospores) and bacterial recombination (Conjugation, Transformation, Transduction).			✓
Economic importance of Bacteria with reference to their role in Agriculture and industry (fermentation and medicine).	✓		✓

Unit-3			
General characteristics of fungi and Ainsworth classification (upto classes)			✓
Structure, reproductionand life history of(a)Rhizopus (b)Puccinia			✓
Economic uses of fungi in food industry, pharmacy and agriculture.	✓		✓
A general account on symptoms of plant diseases caused by Fungi; Blast of Rice.	✓		✓
Lichens- structure and reproduction; ecological and economic importance.	✓		✓
Unit-4			
General characteristics of Algae (pigments, flagella and reserve food material)			✓
Thallus organization and life cycles in Algae			✓
Occurrence, structure, reproduction and life cycle of (a) Spirogyra (b) Polysiphonia			✓
Economic importance of Algae.	✓		✓
Unit-5			
General characteristics of Bryophytes; classification upto classes.			✓
Occurrence, morphology, anatomy, reproduction and life			✓

cycle of Marchantia			
Occurrence, morphology, anatomy, reproduction and life of Funaria			✓
General account on evolution of sporophytes in Bryophyta.			✓

Textbooks:

- Botany–I(Vrukshasastram-I):Telugu Akademi, Hyderabad
- Botany–II (Vrukshasastram-II):Telugu Akademi, Hyderabad
- Acharya,B.C.,(2019)*Archchegoniates* , KalyaniPublishers,NewDelhi
- Bhattacharya,K.,G.Hait&Ghosh,A.K.,(2011)*ATextBookofBotany,Volume-II,*New CentralBookAgencyPvt.Ltd., Kolkata
- Hait,G.,K.Bhattacharya&A.K.Ghosh(2011)*ATextBookofBotany,Volume-I,*NewCentralBookAgencyPvt.Ltd.,Kolkata
- Pandey, B.P.(2013)*CollegeBotany,Volume-I,*S. ChandPublishing,NewDelhi
- Pandey, B.P.(2013)*CollegeBotany,Volume-II,*S.ChandPublishing,NewDelhi

BooksforReference:

- Smith,G.M.(1971)*CryptogamicBotanyVol.II.*,TataMcGrawHill, New Delhi
- Sharma,O.P.(2012)Pteridophyta.TataMcGraw-Hill,NewDelhi
- Kramer, K.U.&P. S. Green (1990) *The Families and Genera of Vascular Plants,Volume–I:PteridophytesandGymnosperms*(Ed.K.Kubitzki)Springe-Verlag,NewYork
- Bhatnagar, S.P. &AlokMoitra (1996)*Gymnosperms*. New Age International, NewDelhi
- Coulter,J.M.&C.J.Chamberlain(1910)*MorphologyofGymnosperms,*TheUniversityofChicago Press, Chicago,Illinois
- Govil,C.M.(2007)*Gymnosperms:ExtinctandExtant.*KRISHNAPrakashanMedia(P)Ltd.Meerut& Delhi
- Sporne,K.R.(1971)*TheMorphologyofGymnosperms.*HutchinsonsCo.Ltd.,London
- Arnold,C.A.,(1947)*AnintroductiontoPaleobotany*McGraw–HillBookCompany,INC,New York
- Stewart,W.N.,andG.W.Rothwell(2005)*Paleobotanyandtheevolutionofplants*Cambridge UniversityPress,New York
- Lawrence,George H.M.(1951)*TaxonomyofVascularPlants.*The McMillan Co.,NewYork

- Heywood,V.H.andD.M.Moore(1984)*CurrentConceptsinPlantTaxonomy*.AcademicPress, London

Video Links:-

https://youtu.be/0H6XMWMYqK8

https://youtu.be/hkJAOXSDLOY

https://youtu.be/cL717drDW0s

https://www.youtube.com/watch?v=kqceWL9Jskg

SIR C R REDDY COLLEGE ELURU
I B.Sc – SEMESTER –I: BOTANY PRACTICAL SYLLABUS

Paper-I: Microbial Diversity, Algae and Fungi

Total hours of laboratory Exercises 30 hrs @ 2 per week

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1. Knowledge of Equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, laminar air flow chamber and Incubator.
2. Preparation of liquid and solid media for culturing of microbes (Demonstration).
3. Study of viruses and bacteria using electron photo micrographs (TMV, Bacteriophage, HIV, Cocci, Bacillus, Spirillum bacteria).
4. Gram staining technique.
5. Study of Plant disease symptoms caused by Bacteria (Citrus canker, leaf blight of rice, Angular leaf spot of Cotton) and viruses (TMV, Bhendi vein clearing and Leaf curl of Papaya),Fungi (Late blight of potato, Red rot of Sugarcane and Paddy blast).
6. Study of vegetative and reproductive structures of the following :

   a) **Cyanobacteria:** *Nostoc and Scytonema.*

   b) Algae: *Oedogonium, Ectocarpus, Polysiphonia,*

   c) Fungi: *Rhizopus, Penicillium and Puccinia* .
7. Study of plant materialinfected by Fungi (Rot of tomatoes,blue and greenmoulds of Ciitrus fruits and wheat rust(Section cutting of diseased parts of Wheat and Barberry -identification of different spores).
8. Lichens: Morphology and of anatomy of different thalli.
9. Field Visit.

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SIR C R REDDY COLLEGE ELURU
I B.Sc - SEMESTER- I: BOTANY SYLLABUS
w.e.f. 2015-16 (Revised in April, 2016)
(CBCS pattern) Model paper
Paper- I : Microbial Diversity, Algae and Fungi

Time : 3hours **Max Marks: 75**

Section - A

Answer any four questions choosing at least one question from each unit

4×10=40M

Part-A (MICROBIAL WORLD, VIRUSES, BACTERIA)

1. Describe the transmission methods of plant viral Diseases
2. Write the name of the pathogens sympotoms and control measures of TMV and papaya leaf curl disease
3. Describe the bacterial cell astructure and its nutrition
4. Write an essay on economic importance of Bacteria

Part-B(ALGAE AND FUNGI)

5. Describe the thallus organization
6. Describe the structure and reproduction of Ectocarpus
7. Describe the life history of puccinia graminis tritici
8. Describe the structure and reproduction of Lichenes

Section-B

Answer any FIVE of the following

9. Mycoplasma
10. R.H.Whittaker's classification
11. Structure of Bacteriophage
12. Conjugation
13. Fritsch classification
14. Polyshiponia Tetra sporophyte
15. Asexual reproduction of Rhizopus
16. Economic importance of Lichenes

Section-C

Answer any FIVE of the following

17. Chlamydia
18. Viriods
19. Transformation
20. Capsomeres
21. Zoospores
22. Cystocarp
23. Cleisthothium
24. Aeciospores

w.e.f. 2020-21 Admitted batch(CBCS)Pattern

SIR C R REDDY COLLEGE, ELURU

I Year B.Sc. (II Semester)

Subject :BOTANY

COURSE TITLE	**Basics of Vascular plants and Phytogeography**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

Course outcomes :

At the end of the Course, the student will be able to
CO-1: To understand the phylogeny from Bryophytes to Gymnosperms.
CO 2 : To know about the evolution of sporophytes in Bryophytes.
CO 3 : To understand the stellar evolution and seed formation habit in pteridophytes.
CO 4 : To gain knowledge about the life cycles of Gymnosperm plants.
CO 5 : To explain about the plant cell, tissues and tissue systems. To understand the secondary growth

Sir. C R REDDY COLLEGE
I B.Sc.- Semester-II : BotanyCore Course – 2 Theory Syllabus
(w.e.f. 2015-16 admitted batch)
Basics of Vascularplants and Phytogeography
(Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)
Total teaching hours 60@ 4 hours per week

Learning objectives

The specific objectives of this course are to expose students to the following topics:

1. To study general characteristics of bryophytes.
2. To classify and evaluate sporophytes and economic importance of bryophytes.
3. To study alternation of generations in bryophytes.
4. To study heterospory, apospory, apogamy and economic importance of pteridophytes.
5. To give General account of stellar evolution.

PART- A (Bryophyta andPteridophyta)

UNIT - 1: Bryophytes (12hrs)

1. ' General characters, Classification (Proskaauer 1957 up to classes)
2. Structure, reproduction and Life history of Marchantia, and Funaria. (developmental stages not included)
3. Evolution of Sporophyte in Bryophytes.

UNIT - 11: Pteridophytes (12hrs)

1. General characters, classification (Sporne 1975 up to Classes)
2. Structure, reproduction and life history of Lycopodium, and Marsilea (developmental stages not included).
3. Heterospory and seed habit.
4. Stelar evaluation in Pteridophytes.

PART- B (Gymnosperms and Plant Anatomy)

UNIT — Ill: Gymnosperms (12hrs)

1. . General characters, classification (Sporne 1975 up to classes)
2. Morphology, anatomy, reproduction and life history of Pinus and Gnetum (developmental stages are not included)
3. Economic importance.

UNIT —I V: Tissues and Tissue systems (12hrs)

1. . Meristems - Root and Shoot apical meristems and their histological organization,
2. Tissues — Meristematic and permanent tissues (simple, complex, secretory)
3. Tissue systems—Epidermal, ground and vascular.

UNIT — V. Secondary growth (12hrs)

l . Normal secondary growth in Dicot stem.

2. Anomalous secondary growth in Bignonia, Boerhaavia and Dracaena Achyranthes

3. Study of local timbers of economic importance-Teak, Rosewood.

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Modules	Employability	Enterpreneurship	Skill development
UNIT-I			
General characteristics of Pteridophyta; classification of Smith			✓
Occurrence, morphology, anatomy, reproduction Lycopodium, Marsilea			✓
Stelar evolution in Pteridophytes			✓
Heterospory and seed habit.			✓
UNIT-II			
General characteristics of Gymnosperms; Sporne classification up to classes.			✓
Occurrence, morphology, anatomy, reproduction and life history of Cycas and Gnetum			✓
Outlines of geological time scale	✓		✓
A brief account on Cycadeoidea.			✓
UNIT-III			
Aim and scope of taxonomy; Species concept: Taxonomic hierarchy, species, genus and family			✓
Plant nomenclature : Binomial system, ICBN- rules for nomenclature.			✓
Herbarium and its techniques, BSI herbarium and Kew herbarium; concept of digital herbaria.			✓
Bentham and Hooker system of classification			✓
Systematic description and economic importance of the Annonaceae, Curcurbitaceae			✓
UNIT-IV			
Systematic description and economic importance of Asteraceae,			✓

Asclepiadaceae, Amaranthaceae, Euphorbiaceae, Arecaceae, Poaceae			
UNIT-V			
Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)			✓
Endemism – types and causes.			✓
Phytogeographic regions of World.	✓		✓
Phytogeographic regions of India. ✓ Vegetation types in Andhra Pradesh.	✓		✓

BooksforReference:

- Smith,G.M.(1971)*CryptogamicBotanyVol.II*.,TataMcGrawHill, New Delhi
- Sharma,O.P.(2012)Pteridophyta.TataMcGraw-Hill,NewDelhi
- Kramer, K.U.&P. S. Green (1990) *The Families and Genera of Vascular Plants,Volume–I:PteridophytesandGymnosperms*(Ed.K.Kubitzki)Springe-Verlag,NewYork
- Bhatnagar, S.P. &AlokMoitra (1996)*Gymnosperms*. New Age International, NewDelhi
- Coulter,J.M.&C.J.Chamberlain(1910)*MorphologyofGymnosperms*,TheUniversityof Chicago Press, Chicago,Illinois
- Govil,C.M.(2007)*Gymnosperms:ExtinctandExtant*.KRISHNAPrakashanMedia(P)Ltd.Meerut& Delhi
- Sporne,K.R.(1971)*TheMorphologyofGymnosperms*.HutchinsonsCo.Ltd.,London
- Arnold,C.A.,(1947)*AnintroductiontoPaleobotany*McGraw–HillBookCompany,INC,New York

Video links:-

https://youtu.be/8yLvMfEWEmU
https://youtu.be/VA2LNWkZNWo

SIR C R REDDY COLLEGE, ELURU

1 B.Sc SEMESTER -11

BOTANY PRACTICAL SYLLABUS

Paper-Il: Diversity of Archaegoniates& Plant Anatomy

Total teaching hours 30@2 per week

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1. Morphology (vegetative and reproductive structures) , anatomy of the following : Marchantia, Funaria, Lycopodium and Pinus.

2. Anatomy:

   a) Demonstration of double staining technique.

   b) Tissue organization in root and shoot apices using permanent slides

   c) Preparation of double staining slides

   d) Anomalous secondary structure ofAchyranthes, Boerhavia and Dracaena.

   e) Anatomical study of wood in T.S., T.L.S. and R.L.S.

3. Field visits to local timber depots.

SIR C R REDDY COLLEGE ELURU
II B.Sc - SEMESTER- I: BOTANY SYLLABUS
w.e.f. 2015-16 (Revised in April, 2016)
(CBCS pattern) Model paper
Paper- II : Diversity of Archegoniates and Plant Anatomy

Time : 3hours **Max Marks: 75**

Section - A

Answer any four questions choosing at least one question from each unit

4×10=40M

Part-A (Bryophyta and Pteridophyta)

1. Write an essay on evolution of sporophyte in Bryophyta
2. Describe the External and internal structure of leafy gametophyte of funaria
3. Write an essay on Heterospory and Seed habita
4. Describe the internal structure of Lycopodium stem

Part-B(Gymnosperms and anatomy)

5. Describe the general characters of gymnosperms
6. Describe the structure of male and female cones of Gnetum
7. Describe the various theories regarding the organization root tips
8. Describe the anamolous secondary growth in stem of Achyranthes

Section-B

Answer any FIVE of the following

9. Marchantia gemma cup
10. Male shoot of Funaria
11. Male gametophyte of Marsilea
12. Strobilus of Lycopodium
13. R.L.S wood of Pinus
14. T.S of Gnetum leaf
15. Sclereiods
16. Tellamaddi

Section-C

Answer any FIVE of the following

17. Protonema
18. Liver worts
19. Plectostele
20. Sporocarp of Marsilea

21. Haplocheilic stomata
22. Systematic position of Gnetum
23. Bordered pits
24. Botanical name and family of Teak wood

w.e.f. 2020-21 Admitted batch(CBCS)Pattern

SIR C R REDDY COLLEGE, ELURU

II Year B.Sc. (III Semester)

Subject :**BOTANY**

COURSE TITLE	PLANT TAXONOMY AND EMBRYOLOGY
TOTAL HOURS	60 Hrs
HOURS/WEEK	4 T+2P
CODE	
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	60

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PAPER – III : PLANT TAXONOMY AND EMBRYOLOGY

Course outcomes :

On completion of the course the students will be able :

CO 1 : To recognize the major groups of vascular plants and their phylogenetic relationships.
CO 2 : To gain proficiency in the use of keys and identification manuals for identifying any unknown
plants to species level. To understand the herbarium techniques.
CO 3 : To Learn about the characters of biologically important families of Angiosperms. To Learn the
types of classifications – natural, artificial and phylogenetic.
CO 4 : To Understand the structure and development in microsporangium and megasporangium.
CO 5 : To know about the pollination, fertilization, endosperm and embryogeny, palynology

SIR C R REDDY COLLEGE ELURU

II B. Sc - SEMESTER –III: BOTANY THEORY PAPER –III
Paper-III : Plant Taxonomy and Embryology)
Total Teaching hours 60 @ 4 hours per a Week

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Learning objectives :

The specific objectives of this course are to expose students to the following topics:

1. Students should understand complete details about the structures, development of embryo at different stages including gametogenesis, fertilization, and implantation.
2. Ability to correlate between the embryological structure and its significance.
3. Demonstrate activities on the gametogenesis, fertilization.

PART – A : (Plant Taxonomy)

UNIT – I : INTRODUCTION TO PLANT TAXONOMY, CLASSIFICATION (12hrs)

1. Fundamental components of taxonomy (identification, nomenclature, classification)
2. Types of classification- Artificial, Natural and Phylogenetic.
3. Bentham & Hooker's system of classification- merits and demerits.
4. Engler & Prantle's system of classification- merits and demerits
5. Botanical Nomenclature- Principles and rules of ICBN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).

UNIT – II : SYSTEMATIC TAXONOMY-I (12hrs)

6. Taxonomic resources: Herbarium- functions& important herbaria, Botanical Gardens.
7. Systematic study and economic importance of the following families: Annonaceae, Fabaceae, Rutaceae, Curcurbitaceae, and Apiaceae.

UNIT – III : SYSTEMATIC TAXONOMY-II (12hrs)

8. Systematic study and economic importance of plants belonging to the following families: Asteraceae, Asclepiadaceae, Lamiaceae, Ephorbiaceae, Orchidaceae and Poaceae.

PART – B (EMBRYOLOGY)

UNIT – IV : EMBRYOLOGY – I (12hrs)

9. Anther structure, .microsporogenesis and development of male gametophyte.
10. Ovule structure and types; Megasporogenesis, development of Monosporic, Bisporic and Tetrasporic types (*Peperomia ,Drusa, Adoxa*) of embryo sacs.
11. Pollination (Self Pollination, Cross Pollination, Controversies of Cross Pollination), Process of Fertilization in Angiosperms

UNIT – V : EMBRYOLOGY – II (12hrs)

12. Endosperm development and types.
13. Development of Dicot embryo (Ex. Crucifer type)
14. Development of Monocot embryo (Ex. Luzule fosteri)
15. Polyembryony.

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Suggested activity: Collection of locally available plants of medicinal importance, observing pollen grains in honey, Aero palynology-collection of pollen from air using glycerin strips in different seasons

Modules	Employability	Entrepreneurship	Skill Development
UNIT -I			
Fundamental components of taxonomy (identification, nomenclature, classification)			✓
Bentham & Hooker's system of classification-			✓
Principles and rules of ICBN			✓
UNIT -II			
Herbarium- functions& important herbaria, Botanical gardens			✓
Annonaceae,Malvaceae, Fabaceae, Rutaceae, Curcurbitaceae, and Apiaceae.	✓	✓	✓
UNIT-III			
Asteraceae, Asclepiadaceae, Lamiaceae, Ephorbiaceae,orchidaceae and Poaceae.	✓	✓	✓
UNIT-IV			
Anther structure, microsporogenesis and development of male gametophyte.			✓
Ovule structure and types; Megasporogenesis, development of Monosporic, Bisporic and Tetrasporic types (Peperomia ,Drusa, Adoxa) of embryo sacs			✓
Pollination and Fertilization			✓
UNIT-V			
Types of endosperms			✓

. Books for Reference:

1. Porter, C.L. ( ) : Taxonomy of flowering Plants, Eurasia Publishing House, New Delhi.

2. Lawrence, G.H.M. (1953): Taxonomy of Vascular Plants, Oxford & IBH Publishers, New Delhi, Calcutta.

3. Jefferey, C. (1968) : An Introduction to Plant Taxonomy J.A. Churchill, London.

4. Mathur, R.C. (1970): Systematic Botany (Angiosperms) Agra Book Stores – Lucknow, Ajmer, Allahabad, Delhi.

5. Maheswari, P (1963): Recent Advances in the Embryology of Angiosperms (Ed.,) International Society of Plant Morphologists – University of Delhi

. 6. Swamy. B.G.L. & Krishnamoorthy. K.V. (1980) : From flower to fruit Tata McGraw Hill Publishing Co., Ltd., New Delhi.

7. Maheswari, P. (1985) : An Introduction to the Embryology of Angiosperms Tata McGraw Hill Publishing Co., Ltd., New Delhi.

8. Bhojwani, S.S. & Bhatnagar, S.P. (2000) : The Embryology of Angiosperms (4th Edition) Vikas Publishing House (P) Ltd., UBS Publisher's Distributors, New Delhi**SIR C R**

Video links:-

https://www.youtube.com/watch?v=QhC5SWkpwrs

https://www.youtube.com/watch?v=zzPfKRVYrOQ

SIR C R REDDY COLLEGE ,ELURU

II B.Sc BOTANY - SEMESTER-III
Paper-III: PRACTICAL
Plant Taxonomy and Embryology

Total hours of laboratory Exercises 30 hrs @ 2 per week

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Suggested Laboratory Exercises:

1. Systematic study of locally available plants belonging to the families prescribed in theory syllabus.
2. Demonstration of herbarium techniques.
3. Structure of pollen grains using whole mounts (*Catharanthus, Hibiscus, Acacia*, Grass).
4. Demonstration of Pollen viability test using *in- vitro* germination (*Catharanthus*).
5. Study of ovule types and developmental stages of embryo sac using permanent slides Photographs.
6. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot Embryos using permanent slides / Photographs
7. Isolation and mounting of embryo (using *Symopsis / Senna* / *Crotalaria*)
8. Field visits .
9. Study of local flora and submission of Field Note Book.

SIR C R REDDY COLLEGE ,ELURU
II B.Sc - SEMESTER- I: BOTANY SYLLABUS
w.e.f. 2015-16 (Revised in April, 2016)
(CBCS pattern) Model paper
Paper- III : Plant Taxonomy and Embryology

Time : 3hours **Max Marks: 75**

Section - A

Answer any four questions choosing at least one question from each unit

4×10=40M

Part-A (Taxonomy)

1. Describe the Engler and prantl's system of classification and mention its merits and demerits
2. Describe the vegetative and floral characters of Rutaceae
3. Explain the vegetative and floral characters of Asclepidiaceae and mention its economic imortance
4. Describe vegetative and floral characters of orchidiaceae and mention its economic imortance

Part-B(**Embryology)**

5. Explain the development of gametophyte in Angiosperms
6. Write an essay on polyembryony
7. Describe the process of fertilization Angiosperms
8. Describe the development of embryo in Monocots

Section-B

Answer any FIVE of the following

9. Herbarium
10. Bionomial nomenclature
11. Head inflorescence
12. Vegetative characters of Cucurbitaceae
13. Structure of ovule
14. Structure of Anther
15. Pollination
16. Nuclera endosperm

Section-C

Answer any FIVE of the following

17. ICBN
18. Phylogenetic system of classification

19. Cypsela
20. Rachilla
21. Tepatum
22. Microsporangium
23. Nucellus
24. Ruminate endosperm

SIR C R REDDY COLLEGE ,ELURU

II B.Sc., BOTANY- SEMESTER -III
PRACTICAL MODEL PAPER III
Plant Taxonomy and Embryology

Time: 3 hrs **Max. Marks: 50**

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1. Describe the given Plant specimens (A & B) in technical terms. Draw neat labeled diagrams of twig with inflorescence, L.S. of Flower, T.s. of Ovary and floral Diagram. Give floral formula. Identify the family. 2x 10 = 20 Marks

   (Description- vegetative - 2 marks, floral – 4 marks; diagrams-3 marks, Identification-1 marks)

2. Derive the plant specimens C & D to their respective families- 2x4 = 08 marks

3. Identification of spotters - D, E ,and F (Embryology) 3x4 =12 marks

4. Record & Herbarium (submission compulsory) 10 marks

Total : 50 Marks

w.e.f. 2020-21 Admitted batch(CBCS)Pattern

SIR C R REDDY, ELURU

II Year B.Sc. (IV Semester)

Subject :**BOTANY**

COURSE TITLE	**Plant Physiology and Metabolism**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

PAPER – IV : PLANT PHYSIOLOGY AND METABOLISM

Course outcomes :

At the end of the Course, the student will be able to ;

CO 1 : To know the importance and scope of plant physiology.
CO 2 : To understand the plants and plant cells in relation to water. To Understand the process ofphotosynthesis in higher plants with particular emphasis on light and dark reactions, C3 and C4 pathways.
CO 3 : To understand the respiration in the higher plants with particular emphasis on Aerobic andAnaerobic respiration.
CO 4 : To learn about the movement of sap and absorption of water in plant body. To understand thelipid metabolism in plants. To know about the nitrogen metabolism and its importance.
CO 5 : To learn about growth and development of plants and its regulations.

Sir C R REDDY COLLEGE
II B. Sc. - SEMESTER- IV: BOTANY SYLLABUS
THEORY PAPER –VI: PLANT PHYSIOLGY AND METABOLISM
Total Teaching hours 60 @4 hours per a week

Learning objectives :

The specific objectives of this course are to expose students to the following topics:
1. Identify location and function of apical meristems, and describe their general structure
2. Identify the essential elements, rank their relative abundance in plant tissues, and describe their general roles in plant function.
3. Identify the ionic forms in which essential macro-elements are typically available in the soil.
4. Explain the mechanisms by which inorganic ions are absorbed by the root and transported throughout the plant.
5. Describe the two major symbioses occurring between plant roots and other organisms, and the benefit of each for plant nutrition.
6. Define hormone and explain its general role as a signal transducer. • List the welldocumented roles of each of the major hormone groups in plant development and responses to environment.

PART-A (Plant Physiology)

Unit-I: Plant Water Relations: (12hrs)

1. Physical properties of water, importance of water to Plant life.
2. Diffussion, Imbibition and Osmosis; concept and components of water potential.
3. Absorption and transport of water and ascent of sap- cohesion tension theory.
4. Transpiration-definition, types of transpiration, structure, opening and closing mechanism of stomata- starch- sugar hypothesis, proton transport mechanism.

Unit-II: Mineral Nutrition and Enzymes: (12hrs)

5. Mineral nutrition: essential elements (Macro and Micro nutrients) and their role in plant metabolism, deficiency symptoms.
6. Enzymes: general characteristics, mechanism of enzyme action and factors regulating enzyme action.

Unit-III: Photosynthesis: (12hrs)

7. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo phosphorylation, carbon assimilation pathways; C3, C4 and CAM (brief account).
8. Photorespiration and its significance.
9. Translocation of organic solutes; Mechanism of phloem transport, source sink relationships.

PART-B (Plant Metabolism)

Unit-IV: Plant Metabolism: (12hrs)

10. Nitrogen metabolism- Biological Nitrogen fixation in Rhizobium, outlines of protein synthesis (Transcription and translation)
11. Respiration: Glycolysis, Anaerobic respiration, TCA cycle, Electron transport system. Mechanism of oxidative phosphorylation, Respiratory Quotient (RQ).
12. Lipid Metabolism: Types of lipids, β- oxidation.

Unit-V: Growth and Development: **(12hrs)**

13. Phytohormones: Introduction

14. Physiological Effects of Phytohormones- Auxins, Gibberellins, Cytokinens, ABA, Ethylene and Brassino steroids.

15. Physiology of flowering- Photo-periodism, role of phytochrome in flowering, Vernalization.

16. Seed dormancy- Definition, causes and breaking methods of seed dormancy.

17. Definition, phases and Kinetics of Growth

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Suggested activity: Seminars, Quiz, Debate, Question and Answer sessions, observing animations of protein biosynthesis in you tube.

Modules	Employability	Entrepreneurship	Skill Development
UNIT I			
Importance of water to plant life, physical properties of water	✓		✓
diffusion, imbibition, osmosis. water potential, osmotic potential, pressure potential.	✓		✓
Absorption and lateral transport of water; Ascent of sap			✓
Transpiration: stomata structure and mechanism of stomatal movements			✓
UNIT-II			✓
mineral nutrients and their role in plants; symptoms of mineral deficiency	✓	✓	✓
Characteristics, nomenclature and classification of Enzymes. Mechanism of enzyme action,	✓	✓	✓
UNIT-III			✓
Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect.		✓	✓

Carbon assimilation pathways (C3,C4 and CAM);	✓	✓	✓
UNIT-IV			✓
Nitrogen metabolism: Biological nitrogen fixation	✓	✓	✓
Aerobic and Anaerobic; Glycolysis			✓
Lipid metabolism- Types of lipids, β-oxidation			✓
UNIT-V			✓
Phytoharmones			✓
Physiological effects of Plant Growth Regulators (PGRs) - auxins, gibberellins, cytokinins, ABA, ethylene and brassinosteroids.	✓	✓	✓
Seed darmancy	✓	✓	✓

Books for Reference:

1. Steward. F.C (1964): Plants at Work (A summary of Plant Physiology) AddisonWesley Publishing Co., Inc. Reading, Massachusetts, Palo alto, London.
2. Devlin, R.M. (1969) : Plant Physiology, Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi .
3. Noggle, R.& Fritz (1989):Introductory Plant Physiology Prentice Hall of India.
4. Lawlor.D.W. (1989): Photosynthesis, metabolism, Control & Physiology ELBS/Longmans-London.
5. Mayer, Anderson & Bonning(1965): Introduction to Plant Physiology D.Van Nostrand . Publishing Co., N.Y.
6. Mukherjee, S. A.K. Ghosh(1998) Plant Physiology ,Tata McGraw Hill Publishers(P) Ltd., New Delhi.
7. Salisbury, F.B & C.W. Ross (1999): Plant Physiology CBS Publishers and Printers, New Delhi.
8. Plummer, D.(1989) Biochemistry–the Chemistry of life ,McGraw Hill Book Co., London, N.Y. New Delhi, Paris, Singapore, Tokyo.
9. Day, P.M.& Harborne, J.B. (Eds.,) (2000): Plant Biochemistry. . Harcourt Asia (P) Ltd., India & Academic Press, Singapore.

Video links:-

https://www.youtube.com/watch?v=vC67tvST9I0
https://www.youtube.com/watch?v=mecpBvcBUUA
https://www.youtube.com/watch?v=pMawzHGEH-U

(w. e. f. 2015-16 admitted batch)

Sir C R REDDY COLLEGE

II B. Sc. - SEMESTER- IV: BOTANY PRACTICAL SYLLABUS

PRACTICAL PAPER –VI: PLANT PHYSIOLGY AND METABOLISM

Total hours of laboratory Exercise 30 hours @ 2 per week

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1. Osmosis- by Potato osmoscope experiment.
2. Determination of osmotic potential of plant cell sap by plasmolytic method using leaves of Rhoeo/ Tradescantia.
3. Structure of stomata (Dicot and Monocot)
4. Determination of rate of transpiration using Cobalt chloride method.
5. Demonstration of transpiration by Ganong's Photo meter.
6. Demonstration of Ascent of sap/ transpiration pull.
7. Effect of temperature on membrane permeability by colorimetric method.
8. Study of Mineral deficiency symptoms using plant material/ photographs.
9. Separation of chloroplast to pigments using paper chromatography technique.
10. Rate of photosynthesis under varying CO_2 Concentration.
11. Effect of Light intensity on Oxygen evolution in photosynthesis using Wilmott bubbler.

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SIR C R REDDY COLLEGE ,ELURU
II B.Sc - SEMESTER- I: BOTANY SYLLABUS
w.e.f. 2015-16 (Revised in April, 2016)
(CBCS pattern) Model paper
Paper- IV : Plant Physiology and Metabolism

Time : 3hours **Max Marks: 75**

Section - A

Answer any four questions choosing at least one question from each unit

4×10=40M

Part-A (Plant Physiology**)**

1. What is Ascent of sap? Describe the cohesion And Tension thery
2. What are macronutrient? Describe their role in plant growth
3. What is photophosphorylatio? Describe the non- cyclic photophosphorylation
4. Write an essay on photo Respiration

Part-B**(PlantMetabolism)**

5. Describe the process of Biological nitrogen fixation in plants
6. Describe the mechanism of electron transport system in Aerobic respiration
7. What are phytoharmones? Describe the physiological effects of Gibberellins and Cytokinins
8. What are Beta oxidation? Describe the biochemical- pathway of beta oxidation

Section-B

Answer any FIVE of the following

9. Imbibition
10. Structure of stomata
11. CAM pathway
12. Active transport
13. Fermentation
14. Ethylene
15. Vernalization
16. Transcription

Section-C

Answer any FIVE of the following

17. Diffusion
18. Water potential
19. Red dop

20. Apoenzymes

21. Rhizobium

22. Respiratory quotient

23. ABA

24. Scenescence

SIR C R REDDY COLLEGE, ELURU

II B.Sc., BOTANY- SEMESTER -IV
PRACTICAL MODEL PAPER IV
Plant Physiology and Metabolism

Time: 3 hrs **Max. Marks: 50**

Perform the experiments A and B Give the aim principle procedure and observation .

2 ×15=30marks

Tabulate the results if any . Draw the labeled diagram

Give the protocol of the experiments C&D

2× 5=10marks

Record 10marks

SIR C R REDDY COLLEGE, ELURU
III Year B.Sc. (V Semester)
PAPER-V Cell Biology, Genetics and Plant Breeding
Subject :**BOTANY**

COURSE TITLE	**Cell Biology, Genetics and Plant Breeding**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

Paper-V: Cell Biology, Genetics and Plant Breeding

Course outcomes :

At the end of the Course, the student will be able to ;

CO 1 : To understand the structure of cell components and their functions. To describe cell division inplants.
CO 2 : To understand structural organization and variation in chromosome as well as karyotype analysis.
CO 3 : To undestand the structure and replication of DNA. To explain DNA as genetic material and studyof RNA- their types, structure and function.
CO 4 : To have knowledge of the nature and function of genes, process of inheritance and chromosometheory of inheritance. To describe the linkage, crossing over and mutations.
CO 5 : To introduce the student with branch of plant breeding for the survival of human being fromstarvation. To study the techniques of production of new superior crop varieties. To study the role ofmutations, somaclonal variations in crop improvement and also the use of DNA markers in plantbreeding.

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SIR C R REDDY COLLEGE ,ELURU
III B. Sc - SEMESTER- V: BOTANY SYLLABUS (W. e. f 2017-2018)
THEORY PAPER – V Paper-V: Cell Biology, Genetics and Plant Breeding
Total hours of teaching 60 hrs @ 4 hrs per week

Learning objectives:

The specific objectives of this course are to expose students to the following topics:

1. To explain the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles..
2. Students will understand the cellular components underlying mitotic cell division.
3. The basic principles of inheritance at the molecular, cellular and organism levels.
4. Causal relationships between molecule/cell level phenomena and organism-level patternsof heredity..
5. Describe the mechanisms governing Mendelian inheritance, gene interactions, and gene.

PART-A (Cell Biology and Genetic material)

UNIT – I Cell Biology: (12hrs)

1. Cell, the unit of life- Cell theory, Prokaryotic and eukaryotic cells; Eukaryotic cell components.
2. Ultra structure and functions of cell wall and cell membranes
3.Chromosomes: morphology, organization of DNA in a chromosome (nucleosome model), Euchromatin and heterochromatin.

UNIT –II Genetic Material: **(12hrs)**

1. DNA structure (Watson & Crick model) and replication of DNA in prokaryotes (semi-conservative)
2. Types of RNA (mRNA, tRNA, rRNA), their structure and function.
3. Mendel's laws of Inheritance (Mono- and Di- hybrid crosses); backcross and test cross.
4. Chromosomal mapping – 2-point & 3-point test cross.

PART- B- (Linkage & Crossing Over, Plant breeding, breeding, crop improvement & biotechnology)

UNIT – III Linkage and crossing over (12hrs)

1. Linkage: concept, complete and incomplete linkage, coupling and repulsion

2. Crossing Over: concept (Definition, mechanism of Crossing over, duplication theory, copy choice theory)& significance.

UNIT – IV Plant Breeding: (12hrs)

1.Introduction and Objectives of plant breeding.

2. Methods of crop improvement: Procedure, advantages and limitations of

Introduction, Selection, and Hybridization (outlines only).

UNIT – V Breeding, Crop Improvement and Biotechnology: **(12hrs)**

1. Role of mutations in crop improvement.

2. Role of somaclonal variations in crop improvement.

3. Molecular breeding – use of DNA markers in plant breeding and crop improvement (RAPD, RFLP).

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Suggested activity: Seminar, Debate, Quiz, observation of live cells and nucleus in Onion peels, observation of Meiotic nuclei in Maize pollen. Solving Genetics problems.

Modules	Employability	Entrepreneurship	Skill Development
UNIT I			
Cell, the unit of life	✓	✓	✓
Eukaryotic cell components.	✓	✓	✓
Ultra structure and functions of cell wall and cell membranes	✓	✓	✓
Chromosomes			✓
UNIT-II			✓
DNA structure	✓	✓	✓
Chromosomal mapping –	✓	✓	✓
UNIT-III			✓
Linkage		✓	✓
Crossing Over	✓	✓	✓
UNIT-IV			✓
Methods of crop improvement	✓	✓	✓
Methods of crop improvement	✓	✓	✓
Hybridization	✓	✓	✓
UNIT-V			✓
Role of mutations in crop			✓

improvement.			
Somaclonal variations	✓	✓	✓
Molecular breeding	✓	✓	✓

Books for Reference:

1. Old, R.W. and Primrose S.B. 1994, Principles of Gene Manipulation Blackwell Science, London
2. Grierson, D. and Convey S.N. 1989, Plant Molecular Biology, Blackie Publishers, New York. 2 2. Lea, P.J. and Leegood R.C. 1999, Plant Biochemistry and Molecular Biology, John Wiley and Sons, London
. 3. Power C.B., 1984, Cell Biology, Himalaya Publishing Co. Mumbai
4. De. Robertis and De Robertis, 1998, Cell and Moleceular Biology, K.M. Verghese and Company .
5. Sinnott, E.W., L.C. Dunn & J. Dobshansky (1958) : Principles of Genetics (5th Edition) McGraw Hill Publishing Co., N.Y. Toronto, London.
6. Winchester, A.M. (1958) : Genetics(3rd Edition) Oxford & IBH Publishing House, Calcutta, Bombay, New Delhi.
7. Singleton, R.(1963) : Elementary Genetics, D. Van Nostrand Co., Ltd., Inc., N.Y. & Affiliated East West Press (P) Ltd., New Delhi.
8. Strickberger, M.W. (1976): Genetics(2nd Edition) MacMillan Publishing Co., Inc., N.Y., London
9. Watson, J.D. (1977): Molecular Biology of the Gene, W.A. Benjamin, Inc., Menlo Park- California, Reading-Massachusetts, London, Amsterdam, Don Mills, Ontario, Sydney.
10. Gardner,E.J & Snusted, D.P.(1984): Principles of Genetics (7thedition) John Wiley & Sons, N.Y. Chichester, Brisbane, Toronto, Singapore.
11. Lewin, B. (1985) Genes VII Wiley Eastern Ltd., New Delhi, Bombay, Calcutta, Madras, Hydrabad.
12. Allard R.W(1999): The Principles of Plant Breeding, John & Wiley and Sons.
13. Poelman J.M: Breeding Field Crops, Springer.
14. George Acquaah(2012):Principles of Plant Genetics & Breeding: Wiley-Blackwell

Video links:-

https://www.youtube.com/watch?v=fzE1Nu38J04
https://www.youtube.com/watch?v=OGfuWsb9nFw

SIR C R REDDY COLLEGE ,ELURU

III B. Sc– BOTANY PRACTICAL SYLLABUS SEMESTER- V

Practical Paper-V: CELL BIOLOGY, GENETICS AND PLANT BREEDING

Total hours of laboratory Exercises 30 hrs @ 2 per week

Suggested Laboratory Exercises:

1. Study of the structure of cell organelles through photomicrographs.
2. Study of structure of plant cell through temporary mounts.
3. Study of various stages of mitosis using cytological preparation of Onion root tips.
4. Study of effect of organic solvent on permeability of cell membrane.
5. Numerical problems solving Mendel' Laws of inheritance
6. Chromosome mapping using 3 point test cross data.
7. Hybridization techniques – emasculation, bagging (for demonstration only).
8. Field visit to a plant breeding research station.

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SIR C R REDDY COLLEGE, ELURU
III Year B.Sc. (V Semester) PAPER-VI
Subject :**BOTANY**

COURSE TITLE	**PLANT ECOLOGY& PHYTOGEOGRAPHY**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

PAPER-VI: PLANT ECOLOGY& PHYTOGEOGRAPHY

Course outcomes

CO1: To study about the different elements of Ecology. To understand the ecological relationshipsbetween organisms and their environment
CO2: To understand the plant communities and ecological adaptations in the plants.
CO3: To identify diversity of life forms in an ecosystem.
CO4: To understand the role that biodiversity plays in conservation science.
CO5: :To discover phytogeographic regions of India and phytogeographic regions of the world. Toexplain about the endemism, types and causes. To study about the principles of phytogeography.

III B. Sc - SEMESTER- V: BOTANY THEORY SYLLABUS

PAPER-VI: PLANT ECOLOGY& PHYTOGEOGRAPHY

Total hours of teaching 60 hrs @ 4 hrs per week

Learning objectives

The specific objectives of this course are to expose students to the following topics:

1. Describe the structure and function of ecological systems and explain how ecological systems work at different spatial and temporal scales

2. List abiotic and biotic factors that affect, the distribution, dispersal, and behavior of organisms

3. Identify factors that affect biological diversity and the functioning of ecological systems

4. Use an ecological vocabulary in arguments and explanations of ecological phenomena

5. Apply concepts and theories from biology to ecological examples

UNIT – I. Elements of Ecology **(12 hrs)**

1. Ecology: definition, branches and significance of ecology.

2. Climatic Factors: Light, Temperature.

3. Edaphic Factor: Origin, formation, composition and soil profile.

4. Biotic Factor: Interactions between plants and animals.

UNIT– II. Ecosystem Ecology **(12 hrs)**

1. Ecosystem: Concept and components, energy flow, Food chain, Food web, Ecological pyramids
2. . 2. Productivity of ecosystem-Primary, Secondary and Net productivity.

3. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.

UNIT – III Population &Community Ecology **(12 hrs)**

1. Population -definition, characteristics and importance, outlines –ecotypes.

2. Plant communities- characters of a community, outlines – Frequency, density, cover, life forms, competition.

3. Interaction between plants growing in a community.

UNIT – IV Phytogeography **(12 hrs)**

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)

2. Phytogeographic regions of India.

3. Phytogeographic regions of World.

4. Endemism – types and causes

UNIT- V: Plant Biodiversity and its importance (12 hrs)

1. Definition, levels of biodiversity-genetic, species and ecosystem.

2. Biodiversity hotspots- Criteria, Biodiversity hotspots of India.

3. Loss of biodiversity – causes and conservation (In-situ and ex-situ methods).

4. Seed banks - conservation of genetic resources and their importance

****

Suggested activity :Collection of different soils, studying their texture, observing polluted water bodies, student study projects, debates on man's activity on ecosystem and biodiversity conservation methods, visiting a nearest natural vegetation area. Visit to NGO, working in the field of biodiversity and report writing; to study Honey Bees and plants yielding honey

Modules	Employability	Entrepreneurship	Skill Development
UNIT I			
Ecology	✓	✓	✓
Climatic factors	✓	✓	
Edaphic factors	✓	✓	✓
Biotic factors	✓		
UNIT-II			
Ecosystem	✓	✓	✓
Population ecology	✓	✓	✓
UNIT-III			
Plant communities	✓	✓	✓
Interactions between plants growing in community	✓		✓

UNIT-IV			
Phytogeographic regions of INDIA	✓	✓	✓
Phytogeographic regions of world	✓	✓	✓
Endemisim	✓	✓	✓
UNIT-V			✓
Biodiversity hotspots			✓
Insitue and exsitue conservation	✓	✓	✓
Seed banks	✓	✓	✓

Books for Reference:

1. Daubenmire, R.F. ( ): Plants & Environment (2nd Edn.,) John Wiley & Sons., New York

2. Puri, .G.S. (1960): Indian Forest Ecology (Vol.I & II) Oxford Book Co., New Delhi & Calcutta. 5

3. Billings, W.B. (1965): Plants and the Ecosystem Wadsworth Publishing Co., Inc., Belmont.

4. Misra, R. (1968): The Ecology work Book Oxford & INH Publishing Co., Calcutta

5. Odum E.P. (1971): Fundamentals of Ecology (2nd Edn.,) Saunders & Co., Philadelphia & Natraj Publishers, Dehradun.

6. Odum E.P. (1975): Ecology By Holt, Rinert & Winston.

7. Oosting, H.G. (1978): Plants and Ecosystem Wadworth Belmont

. 8. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.

, 9. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi.

10. Kumar H.D. (2000): Biodiversity & Sustainable Conservation Oxford & IBH Publishing 1. Co Ltd. New Delhi.

11. Newman, E.I. (2000): Applied Ecology Blackwell Scientific Publisher, U.K

. 12. Chapman, J.L&M.J. Reiss (1992): ecology (Principles & Applications). Cambridge University Press, U.K.

13. Cain, S.A . (1944): Foundations of Plant Geography Harper & Brothers, N.Y.

14. Mani, M.S (1974): Ecology & Biogeography of India Dr. W. Junk Publishers, The Haque 15. Good, R. (1997): The Geography of flowering Plants (2nd Edn.) Longmans, Green & Co., Inc., London & Allied Science Publishers, New

Video links:-

https://www.youtube.com/watch?v=QhC5SWkpwrs

https://www.youtube.com/watch?v=zzPfKRVYrOQ

III B. Sc - SEMESTER- V: BOTANY PRACTICAL PRACTICAL
PAPER-VI: PLANT ECOLOGY& PHYTOGEOGRAPHY
Total hours of teaching 30 hrs @ 2 hrs per week

1. .Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, rain gauze, and lux meter.
2. Permeability (percolation; total capacity as well as rate of movement) of different soil samples.
3. Determination of soil Ph
4. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (4 each)
5. .Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method
6. Study of Phytoplankton and macrophytes from water bodies.
7. To study field vegetation with respect to stratification, canopy cover and composition.
8. Study of plants included in agro forestry and social forestry
9. To locate the hotspots, phyto geographical regions and distribution of endemic plants in the map of India. 6
10. The following practical should be conducted in the Field/lab with the help of photographs, herbarium, Floras, Red data book- Study of endangered plants species, critically endangered plants species, vulnerable plant species and monotypic endemic genera of India.

SIR C R REDDY COLLEGE, ELURU
III B.Sc - SEMESTER- I: BOTANY SYLLABUS
w.e.f. 2015-16 (Revised in April, 2016)
(CBCS pattern) Model paper
Paper- VI: PLANT ECOLOGY & PHYTOGEOGRAPHY

Time : 3hours **Max Marks: 75**

Section - A

Answer any four questions choosing at least one question from each unit

4×10=40M

Part-A (Elemental Ecology, ecosystem ecology)

1. Describe the various branches of ecology
2. Describe the role of light as an ecological factor
3. What are biogeochemical cycles Explain the nitrogen cycle
4. What is ecosystem? Describe the components of ecosystem

Part-B(Community ecology, Phytogeography)

5. Describe the phytogeographic region in a INDIA
6. Write an essay on endemisim
7. Write an essay on types of biodiversity
8. Write an essay on conservation of biodiversity

Section-B

Answer any FIVE of the following

9. Soil profile
10. Ecological pyramids
11. Phosphorous cycle
12. Mortality
13. Density
14. Vientam
15. Hotspots
16. Cryopreservation

Section-C

Answer any FIVE of the following

17. Food web
18. Ammonification
19. Phytoplankton
20. Heliophytes

21. Age pyramids

22. Arctic zone

23. Species diversity

24. Decidious forests

III B. Sc - SEMESTER- V: BOTANY PRACTICAL
MODEL PAPER
PAPER–VI: PLANT ECOLOGY & PHYTOGEOGRAPHY

Time: 3 hrs **Max. Marks: 50**

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1. Study Project under supervision	= 15 Marks
2. Record & Viva-Voce	= 10 Marks
3. Experiment A	= 10 Marks
4. Anatomical adaptations of B (Section cutting)	= 10 Marks
5. Spotters C&D (2x2 1/2)	= 5 Marks
	Total = 50 Marks

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1. Study Project of a surrounding Ecosystem (terrestrial or aquatic)(plant diversity, animal diversity, human activity, pollution levels, restoration efforts under supervision.
2. Presentation of the project work in Q & A session.
3. A -determination of soil porosity/PH/percolation/retaining capacity.
4. B- Xerophyte/Hydrophyte anatomical adaptations.
5. C & D-anemometer/rain gauze/lux meter.

SIR C R REDDY COLLEGE, ELURU
III Year B.Sc. (VI Semester) PAPER-VII(A)
Subject :**BOTANY**

COURSE TITLE	**ORGANIC FARMING & SUSTAINABLE AGRICULTURE**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

Paper-VII (A) ORGANIC FARMING & SUSTAINABLE AGRICULTURE

Course outcomes :

At the end of the Course, the student will be able to ;

CO-1: To understand the organic farming and its benefits. Scope of organic farming
CO-2: To Acquire knowledge about green manuring and application of Biofertilizers
CO-3: To know aqbout Botanical pesticides, weed management
CO-4: To gain practical knowledge about sustainable agriculture
CO-5: To gain Practical knowledge about organic certificatio

Sir C R REDDY COLLEGE

IIII B. Sc. - SEMESTER- VI: BOTANY THOERY SYLLABUS PAPER –VII: Elective

Paper-VII (A) ORGANIC FARMING & SUSTAINABLE AGRICULTURE

Total hours of teaching 60 hours @4 per week

PART-A

Learning Objectives:

1. Explain organic farming and its benefits. Scope of organic farming
2. Explain about green manuring and application of Biofertilizers
3. Evalute about Botanical pesticides, weed management
4. Explain about sustainable agriculture
5. Explain about organic certification

Unit - I: Concept of organic farming (12hrs)

1. Introduction: Farming, organic farming, concept and development of organic farming.
2. Principles of organic farming, types of organic farming, biodynamic farming.
3. Benefits of organic farming, need for organic farming, conventional farming v/s organic farming
4. Scope of organic farming; Andhra Pradesh, National and International status.
5. Agencies and institutions related to organic agriculture.
6. Requirements for organic farming, farm components for an organic farm.

Unit - II: Organic plant nutrient management (12hrs)

1. Organic farming systems, soil tillage, land preparation and mulching.
2. Choice of varieties.
3. Propagation-seed, planting materials and seed treatments, water management
4. Green manuring, composting- principles, stages, types and factors, composting methods, Vermi composting .
5. Bulky organic manures, concentrated organic manures, organic preparations, organic amendments and sludges.
6. Bio-fertilizers- types, methods of application, advantages and disadvantages, standards for organic inputs- fertilizers

PART-B

Unit-III: Organic plant protection (12hrs)

1. Plant protection- cultural, mechanical, botanical pesticides, control agents
2. Weed management
3. Standards for organic inputs- plant protection.

Unit- IV: Organic crop production practices (12hrs)

1. Organic crop production methods- rice, coconut.
2. Organic crop production methods- vegetables- okra, amaranthus, cucurbits.
3. Livestock component in organic farming.
4. Sustainable Agriculture-Apiculture, Mushroom cultivation.

Unit- V: Organic Certification (12hrs)

1. Farm economy: Basic concept of economics- demand &supply, economic viability of a farm.
2. Basic production principles, reducing expenses, ways to increase returns, costproduction system. Benefit/ cost ratio, marketing, imports and exports.
3. Policies and incentives of organic production.
4. Farm inspection and certification.

5. Terrace farming.

*****

Suggested Activities: Preparation of Vermicompost in small scale, observing sewage sludge disposal mechanisms in urban/semi urban areas, studying the usage, of green manures, neem oil, neem cake, pongamia oil in organic farming, livestock component in various farming methods, visiting an Apiculture center, drawing various terrace farming models

Modules	Employability	Entrepreneurship	Skill Development
UNIT I			
Organic farming	✓	✓	✓
Agencies and institutions	✓	✓	✓
UNIT-II			
Green manuring	✓	✓	✓
Biofertilizers	✓	✓	✓
UNIT-III			
Botanical pesticides	✓	✓	✓
Weed management	✓	✓	✓
UNIT-IV			
Organic crop methods – rice, coconut	✓	✓	✓
Apiculture	✓	✓	✓
Mushroom cultivation	✓	✓	✓
UNIT-V			
Farm economy	✓	✓	✓
Terrace farming	✓	✓	✓

Reference Books:

1. Organic Soil-Fertility and Weed Management
   Book by Steve Gilman
2. Humane and Healthy Poultry Production: A Manual for Organic Growers
   Book by Karma Glos
3. Fertile Soil: A Grower's Guide to Organic & Inorganic Fertilizers
   Book by Robert Parnes
4. Organic Seed Production and Saving: The Wisdom of Plant Heritage
   Book by Bryan Connolly
5. Organic Food and Farming: A Reference Handbook
   Book by Shauna M. McIntyre

Video links:-

https://www.youtube.com/watch?v=iPeBBw5WxZo

https://www.youtube.com/watch?v=UmNUErtv4KE

Sir C R REDDY COLLEGE
III B. Sc. - SEMESTER- VI: BOTANYPRACTICAL SYLLABUS PAPER –VII: Elective
Paper-VII (A) ORGANIC FARMING & SUSTAINABLE AGRICULTURE
Total hours of laboratory Exercise 30 hours @ 2 per week

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1. Study of different bio pesticides, weedicides, inorganic and organic fertilizers
2. Deficiency symptoms of nutrient deficiency symptoms (photographs)
3. Soil testing, liming, and fertilizing
4. Preparation of enriched Farm Yard Manure.
5. Study of composting methods.
6. Preparation of vermicompost.
7. Study of recycling of farm waste.
8. Study of methods of green manuring.
9. Study of steps in mushroom cultivation
10. Visit to urban waste recycling unit.
11. Study project report under supervision of lecturer – farm manure preparation/vermi-compost// /waste management// green manures/ mushroom cultivation / nutrient requirements of vegetables.

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Sir C R REDDY COLLEGE
III B. Sc. - SEMESTER- VI: BOTANY PRACTICAL
MODEL PAPER -Elective
Paper-VII (A) ORGANIC FARMING & SUSTAINABLE AGRICULTURE

Time : 3 hrs **MaxMarks: 50**

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1. Project report (A) **- 15 M**
   Viva-voce on study project **-05 M**
2. Identify and write notes on B, C, D, and E **(4x5) -20 M**

   B- inorganic manures/bio-weedicides/bio-pesticides (photograph/ specimen)

   C- Compost preparation method (photograph/instrument)

   D- Green manure type (plant specimen/photograph)

   E- Waste recycling method (photograph/live specimen/institute/organization)
3. Field report **- 05 M**
4. Record **- 05 M**

50 M

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Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: MODEL PAPER

SUBJECT: BOTANY PAPER- VII (A) ELECTIVE

ORGANIC FARMING & SUSTAINABLE AGRICULTURE

Time : 3hrs Max **Marks: 75**

Note: 1. Draw labeled diagrams wherever necessary for questions in section A and B.

2. Section A consists of long answer type questions.

3. Section B consists of short answer type questions.

SECTION-A

I. Answer any five of the following questions **5X10 =50 M**

1.

2.

3.

4.

5.

6.

7.

8.

SECTION- B

II. Answer any five of the following **5X5 = 25 M**

9.

10.

11.

12.

13.

14.

15.

SIR C R REDDY COLLEGE, ELURU

III Year B.Sc. (VI Semester)

PAPER-VII(B) Nursery, Gardening and Floriculture

Subject :**BOTANY**

COURSE TITLE	**Nursery, Gardening and Floriculture**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

Paper-VII (B) Nursery, Gardening and Floriculture

Course outcomes :

At the end of the Course, the student will be able to ;

CO-1: To gain practical knowledge about Nursery management
CO-2: To Acquire knowledge Land scape And home gardening
CO-3: To understand propogation methods
CO-4: To gain practical knowledge growing of ornamental plants
CO-5: To gain Practical knowledge commercial floriculture

Sir C R REDDY COLLEGE
III B. Sc.s - SEMESTER- VI: BOTANY SYLLABUS
THEORY PAPER –VII: Elective
Paper-VII (B) Nursery, Gardening and Floriculture
Total teaching hours 60 @ 4 per week

PART-A

Learning Objectives:

The specific objectives of this course are to expose students to the following topics:

1. Explain about the skills of Nursery management
2. Identify the Land scape And home gardening
3. Explain different propogation methods
4. To gain practical knowledge growing of ornamental plants
5. Practical knowledge commercial floriculture

Unit I: Nursery: (12hrs)

1. Definition, objectives, scope and building up of infrastructure for nursery.
2. Planning and seasonal activities - Planting - direct seeding and transplants.
3. Nursery Management and Routine Garden Operations.

Unit II: Gardening (12hrs)

1. Definition, objectives and scope - different types of gardening.
2. Landscape and home gardening - parks and its components, plant materials and design .
3. Computer applications in landscaping.
4. Gardening operations: soil laying, manuring, watering.
5. Landscaping Places of Public Importance: Landscaping highways and Educational Institutions
6. Some Famous gardens of India.

PART-B

Unit III: Propagation methods (12hrs)

1. Sowing/raising of seeds and seedlings, transplanting of seedlings.
2. Air-layering, cutting, selection of cutting, propagule collecting season, treatment of cutting, rooting medium and planting of cuttings - Hardening of plants.
3. Propagation of ornamental plants by rhizomes, corms tubers, bulbs and bulbils.
4. .Green house - mist chamber, shed root, shade house and glass house for propagation.

Unit IV: Floriculture (12hrs)

1. Ornamental Plants: Flowering annuals; herbaceous, perennials; Shade and ornamental trees.
2. Ornamental bulbous and foliage plants; Cacti and succulents.
3. Ornamentals-palms.
4. Cultivation of plants in pots; Indoor gardening; Bonsai.

Unit V: Commercial Floriculture (12hrs)

1. Factors affecting flower production; Production and packaging of cut flowers; Flower arrangements; Methods to prolong vase life of flowers
2. Cultivation of Important cut flowers (Aster, Dahlia, Gerbera, Anthuriams, Marigold, Rose, Lilium)
3. Management of pests, diseases and harvesting.
4. Methods of harvesting.

*****

Suggested Activities: Raising a nursery, managing it, studying and drawing various land scaping designs, practicing layering methods, using shade nets to protect horticultural crops, practicing

indoor gardening techniques, visiting florists and recording their methods of prolonging vase life of commercial cut flowers.

Modules	Employability	Entrepreneurship	Skill Development
UNIT I			
seeding and transplants	✓	✓	✓
Nursery Management	✓	✓	✓
UNIT-II			✓
Landscape and home gardening	✓	✓	✓
Computer applications in landscaping	✓	✓	✓
UNIT-III			✓
Propagation methods		✓	✓
Green house	✓	✓	✓
UNIT-IV			✓
Ornamental Plants	✓	✓	✓
Indoor gardening; Bonsai.	✓	✓	✓
UNIT-V			✓
Cultivation of Important cut flowers			✓
Management of pests, diseases and harvesting.	✓	✓	✓
Methods of harvesting.	✓	✓	✓

Reference Books:

1. Nihzesa Floriculture Paperback – 18 June 2020
   by V. Bhargav (Author), K. Raja Babu (Author), A. Sumalatha (Author)
2. The Complete Gardener
   Book by Monty Don
3. How Not to Kill Your Houseplant: Survival Tips for the Horticulturally Challenged
   Book by Veronica Peerless
4. All New Square Foot Gardening
   Book by Mel Bartholomew

Video links

https://www.youtube.com/watch?v=gMSbZYUiwmA

https://www.youtube.com/watch?v=VIINZ1Q_CsY

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: BOTANY PRACTICAL SYLLABUS PAPER –VII: Elective

Paper-VII (B) Nursery, Gardening and Floriculture

Total hours of laboratory Exercise 30 hours @ 2 per week

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1. Tools, implements and containers used for propagation and nursery techniques.
2. Propagation by cutting, layering, budding and grafting
3. Seed propagation- preparation of portable trays, seed treatments, sowing and seedling production.
4. Identification and description of annuals, herbaceous perennials, climbers, creepers, foliage and flowering shrubs, trees, palms, ferns, ornamental grasses; cacti and succulents..
5. Planning and designing of gardens, functional uses of plants in the landscape
6. Preparation of land for lawn and planting.
7. Identification of commercially important flower crops and their varieties.
8. Propagation practices in flower crops, sowing of seeds and raising of seedlings of annuals.
9. Use of chemicals and other compounds for prolonging the vase life of cut flowers.
10. Grading, packing and marketing of cut flowers.
11. Visit to commercial nurseries and commercial tissue culture laboratory
12. Study project under supervision of lecturer – nursery/ornamental flowers/ plants/lawn designing/ landscape designing

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: MODEL PAPER

SUBJECT: BOTANY PAPER- VII (B) ELECTIVE

NURSERY, GARDENING AND FLORICULTURE

Time : 3hrs Max **Marks: 75**

Note: 1. Draw labeled diagrams wherever necessary for questions in section A and B.

2. Section A consists of long answer type questions.

3. Section B consists of short answer type questions.

SECTION-A

III. Answer any five of the following questions **5X10 =50 M**

1.

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SECTION- B

IV. Answer any five of the following **5X5 = 25 M**

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Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: BOTANY PRACTICAL MODEL PAPER –VII: Elective Paper-VII (B) Nursery, Gardening and Floriculture

Time : 3 hrs **Max. Marks: 50**

1. Project report (A) **- 15 M**
   Viva-voce on study project **-05 M**
2. Identify and write notes on B, C, D, and E **(4x5) -20 M** B- Tool/instrument/container used in nursery

C-Seed propagation technique

D- Plant used in lawn (plant specimen/photograph)

E-ornamental flower (photograph/live specimen)

3. Field report **- 05 M**
4. Record **- 05 M**

50 M

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SIR C R REDDY COLLEGE, ELURU
III Year B.Sc. (VI Semester) PAPER-VII(C)
Subject :**BOTANY**

COURSE TITLE	**Plant Tissue Culture and Biotechnological Applications**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

Course outcomes:

CO1:	To Understand the Plant Tissue Culture Research, Principles, Totipotency, Thallus Culture, Meristem Culture, Organ Culture, Differentiation and Dedifferentiations.
CO2:	To know about Cryo preservation, embryo culture, production of secondary metabolites, applications of Tissue Culture.
CO3:	Understand the restriction endonuclease, cloning vectors, genecloning.
CO4:	To understand the gene transfer and selection of transgenics
CO5:	Yo understand the applications of plant genetic engineering

Sir C R REDDY COLLEGE
III B. Sc. – SEMESTER- VI: BOTANY SYLLABUS
THEORY PAPER –VII: Elective
Paper-VII I Plant Tissue Culture and Biotechnological Applications
Total teaching hours 60 @ 4 per week

PART-A (Plant Tissue Culture)

Learning Objectives:

The specific objectives of this course are to expose students to the following topics:

1. Learn basic principle of plant tissue culture
2. Explain Cryopreservation technique
3. Identify various methods of gene transfer
4. Explain about applications of plant genetic engineering

Unit I: PLANT TISSUE CULTURE – 1 **(12hrs)**

History of plant tissue culture research – basic principles of plant tissue callus culture, meristem culture, organ culture, Totipotency of cells, differentiation and dedifferentiation.

. Methodology – sterilization (physical and chemical methods), culture media, Murashige and Skoog's (MS medium), phytohormones, medium for micro-propagation/clonal propagation of ornamental and horticulturally important plants.

Callus subculture maintenance, growth measurements, morphogenesis in callus culture –organogenesis, somatic embryogenesis.

UNIT-II: Plant Tissue culture -2 **(12hrs)**

Endosperm culture – Embryo culture –culture requirements – applications, embryo rescue technique.

2. Production of secondary metabolites.
3. Cryopreservation; Germplasm conservation.
4. Apllications of Tissueculture

PART-B (Biotechnology) **(12hrs)**

Unit III: Recombinant DNA technology

. Restriction Endonucleases (history, types I-IV, biological role and application); concepts of restriction mapping.

Cloning Vectors: Prokaryotic (pUC 18, pBR322,Ti plasmid and Lambda phage, Eukaryotic Vectors (YAC and briefly PAC)

. Gene cloning (Bacterial Transformation and selection of recombinant clones, PCR mediated gene cloning)

Construction of genomic and cDNA libraries, screening DNA libraries to obtain gene of interest by complementation technique, colony hybridization.

Unit IV: Methods of gene transfer **(12hrs)**

. Methods of gene transfer- Agrobacterium-mediated, direct gene transfer by Electroporation, Microinjection, Micro projectile bombardment.

2. Selection of transgenics– selectable marker and reporter genes (Luciferase, GUS, GFP).

Unit V: Applications of Biotechnology **(12hrs)**

1. Applications of Plant Genetic Engineering – crop improvement, herbicide resistance, insect resistance, virus resistance.
2. Genetic modification – transgenic plants for pest resistant (Bt-cotton); herbicide resistance (Round Up Ready soybean); improved agronomic traits – flavrSavr tomato, Golden rice); Improved horticultural varieties Moon dust carnations)

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Modules	Employability	Entrepreneurship	Skill Development
UNIT I			
History of plant tissue culture research	✓	✓	✓
Totipotency of cells	✓	✓	✓
Methodology - sterilization	✓	✓	✓
			✓
UNIT-II			✓
Endosperm culture	✓	✓	✓
Cryopreservatio	✓	✓	✓
UNIT-III			✓
Restriction Endonucleases		✓	✓
Cloning Vectors	✓	✓	✓
UNIT-IV			✓
Methods of gene transfer	✓	✓	✓
Selection of transgenics	✓	✓	✓
UNIT-V			✓
insect resistance, virus resistance			✓
Genetic modification	✓	✓	✓

Reference Books:

1. Plant Tissue Culture: Techniques and Experiments
   Book by Roberta H. Smith
2. Introduction to plant tissue culture
   Book by M. K. Razdan
3. Dictionary of plant tissue culture
   Book by A. C. Cassells
4. Experiments in plant tissue culture
   Book by John Dodds
5. INTRODUCTION TO PLANT CELL TISSUE AND ORGAN CULTURE
   Book by SUNIL D. PUROHIT
6. Plant Tissue Culture: A Classified Bibliography, 1985-1989
   Book by S. S. Bhojwani and Vibha Dhawan
7. The Reference Manual of Woody Plant Propagation: From ...
   Book by Charles W. Heuser and Michael A. Burstein

Video links:

https://www.youtube.com/watch?v=K_7-L072eSA

https://www.youtube.com/watch?v=3Z5j0xl8knY

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: MODEL PAPER

SUBJECT: BOTANY PAPER- VII (C) ELECTIVE

PLANT TISSUE CULTURE AND BIOTECHNOLOGICAL APPLICATIONS

Time : 3hrs **MaxMarks: 75**

Note: 1. Draw labeled diagrams wherever necessary for questions in section A and B.

2. Section A consists of long answer type questions.

3. Section B consists of short answer type questions.

SECTION-A

I. Answer any five of the following questions. **5X10 =50 M**

1.

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SECTION- B

Answer any five of the following **5X5 = 25 M**

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Sir C R REDDY COLLEGE
III B. Sc. - SEMESTER- VI: BOTANY
PRACTICAL SYLLABUS PAPER –VII:
ElectivePaper-VII (C) Plant Tissue Culture and Biotechnological Applications
Total teaching hours of laboratory 30 hours @ 2 per week

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a. Preparation of MS medium.
b. Demonstration of in vitro sterilization methods and inoculation methods using leaf and nodal explants of Tobacco/ Datura/ Brassica etc.

2. Study of embryo and culture, micro propagation of Banana, somatic embryogenesis, artificial seeds through photographs.
3. Construction of restriction map of circular and linear DNA from the data provided.
4. Study of methods of gene transfer through photographs: Agrobacterium-mediated, direct gene transfer by electroporation, microinjection, and micro projectile bombardment.
5. Different steps involved in genetic engineering for production of Bt. cotton, Golden rice, FlavrSavr tomato through photographs.
6. Isolation of plasmid DNA.
7. Restriction digestion and gel electrophoresis of plasmid DNA (optional)
8. Field visit to a lab involved in tissue culture
9. Study project under supervision of lecturer – tissue culture/ genetic engineering

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Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: BOTANY PRACTICAL MODEL PAPER

PAPER –VII: Elective

Paper-VII (C) Plant Tissue Culture and Biotechnological Applications

Time : 3 hrs **Max Marks: 50**

1. Project report (A) **- 15 M**

Viva-voce on study project **-05 M**

2. Identify and write notes on B, C and D **- (3x4) -12 M**

B- Tool/instrument/container used in sterilization

C- Tool/instrument/container used in gene transfer

D- GM crops (Photographs)

3. Construct restriction map of circular and/ or linear DNA from the data provided– **08 M**

4. Field report **- 05 M**

5. Record **- 05 M**

50 M

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SIR C R REDDY COLLEGE, ELURU
III Year B.Sc. (VI Semester) PAPER-VIII(A1)
Subject :**BOTANY**

COURSE TITLE	**PLANT DIVERSITY AND HUMAN WELFARE**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

COURSE OUTCOMES

CO1:	To Understand plant diversity (flowering plants) and Maceration, wood (Tracheary elements, fibres).
CO2:	To identify exotic species- Identification and morphological characteristics.
CO3:	To Identify forest trees through bark, wood, flowers leaves and fruits.
CO4:	To understand various methods of preservation and canning of fruits using additional OE resources available in the internet using modern ICT tools.
CO4:	To gain Knowledgeable through visits to the local ecosystem.
CO5:	To understand and practice effective solid and liquid waste management systems in rural/urban areas.
CO6:	Realize ecological importance of plants and describe the role of plants in relation to Human Welfare.

Sir C R REDDY COLLEGE
III B. Sc. - SEMESTER- VI: CLUSTER (A) BOTANY SYLLABUS
THEORY PAPER –VIII- A1: PLANT DIVERSITY AND HUMAN WELFARE
Total teachinh hours 60 @ 4 Per Week

PART-A

Learning Objectives:

The specific objectives of this course are to expose students to the following topics:

1. Explain about genetic diversity
2. Describe the loss of bio diversity
3. Explain contemporary practices in resource management
4. Explain biodiversity conservation

Unit- I: Plant diversity and its scope (12hrs)

i. Genetic diversity, Species diversity, Plant diversity at the ecosystem level, Agro biodiversity and cultivated plant taxa, wild taxa.

ii. Values and uses of biodiversity: Ethical and aesthetic values,

iii. Methodologies for valuation, Uses of plants.

Unit -II: Loss of biodiversity (12hrs)

i. Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agro biodiversity, projected scenario for biodiversity loss.

ii. Management of plant biodiversity: Organizations associated with biodiversity management-Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR; Biodiversity legislation and conservations, Biodiversity information management and communication.

PART-B

Unit-III: Contemporary practices in resource management (12hrs)

i. Environmental Impact Assessment (EIA), Geographical Information System (GIS), Participatory resource appraisal, Ecological footprint with emphasis on carbon footprint, Resource accounting;

ii. Solid and liquid waste management

Unit -IV: Conservation of biodiversity (12hrs)

i. Conservation of genetic diversity, species diversity and ecosystem diversity, In situ and ex situ conservation,

ii. Social approaches to conservation, Biodiversity awareness programs, Sustainable development.

Unit- V: Role of plants in relation to Human Welfare (12hrs)

i. Importance of forestry, their utilization and commercial aspects-
a) Avenue trees, b) ornamental plants of India. c) Alcoholic beverages through ages.

ii. Fruits and nuts: Important fruit crops their commercial importance,Wood, fiber and their uses.

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Suggested activities: Study of flora and its diversity in the college campus or local area,enumerating wild and exotic species(Parthenium,Water hyacinth etc.) Project work on any one of the International organizations striving for preservation of biodiversity, study of conservation efforts of local people, and civic bodies, study of locally available fruits in different seasons, enumerating the avenue plantations and their diversity in your town/city

Modules	Employability	Entrepreneurship	Skill Development
UNIT I			
Genetic and species diversity	✓	✓	✓
Values and uses of biodiversity	✓	✓	✓
UNIT-II			✓
Loss of biodiversity	✓	✓	✓
Management of plant biodiversity	✓	✓	✓
UNIT-III			✓
EIA, GIS		✓	✓
CARBON FOOTPRINT	✓	✓	✓
UNIT-IV			✓
Insitue and Exsitue conservation	✓	✓	✓
Biodiversity awareness programme	✓	✓	✓
UNIT-V			✓
Forestry and its utilization			✓
Ornamental plants of india	✓	✓	✓
Fruits and nuts	✓	✓	✓

Reference Books:

1. Human Biological Diversity 2Nd Edition by Daniel E. Brown, Taylor & Francis
2. Plant Diversity and Conservation (English, Hardcover, V S Ramachandran)
3. BIOLOGY IN HUMAN WELFARE
   Author Amit Kumar Dixit,
4. INTEGRATED PLANT DIVERSITY AND HUMAN WELFARE
   Author- T.S.DHAKA

Video links:

https://www.youtube.com/watch?v=BmOJAVHxOYQ

https://www.youtube.com/watch?v=_P9lL-ZNZRA

Sir C R REDDY COLLEGE

III B. Sc. – SEMESTER- VI: CLUSTER (A) BOTANY PRACTICAL SYLLABUS

PRACTICAL PAPER –VIII- A1: PLANT DIVERSITY AND HUMAN WELFARE

Total hours of laboratory Exercise 30 hours @ 2 per week

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1) Study of plant diversity (flowering plants).

2) Study of exotic species- Identification and morphological characteristics.

3) Identification of forest trees through bark, wood, flowers, leaves and fruits.

4) Maceration, Study of wood (Tracheary elements, fibres).

5) Methods of preservation and canning of fruits.

6) Visit to the local ecosystem to study the plants.

7) Write up on the conservation efforts of International organizations.

8) Study of Solid and Liquid waste management systems in rural/urban areas.

(w. e. f. 2015-16 admitted batch)

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: MODEL PAPER

SUBJECT: BOTANY PAPER- VIII-A1-CLUSTER

PLANT DIVERSITY AND HUMAN WELFARE

Time : 3h **Max.Marks: 75**

Note: 1. Draw labeled diagrams wherever necessary for questions in section A and B.

2. Section A consists of long answer type questions.

3. Section B consists of short answer type questions.

SECTION-A

I. Answer any five of the following questions. **5X10 =50 M**

1.

2.

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SECTION- B

II. Answer any five of the following **5X5 = 25 M**

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15.

16.

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: CLUSTER (A) BOTANY PRACTICAL MODEL PAPER

PAPER –VIII- A1: PLANT DIVERSITY AND HUMAN WELFARE

Time: 3hrs **Max. Marks: 50**

I. Assign the plants A, B and C to their respective families families, giving reasons, family name and classification-2 marks, important diagrams- respective 3 marks. **-15 M**

II. Give the protocol of D **-10 M**

III. Comment on specimens E, F and G **3x3 = 09 M**

IV. Report on Field visit **-06 M**

V. Viva-Voce **-05 M**

VI. Practical Record **-05 M**

50 M

KEY

A-Cultivated Plant

B- Wild Plant

C –Exotic plant

D- Preservation and canning of fruits, solid and liquid waste management systems in rural/urban areas

E. Bark/wood/fruit yielding plant

F. Nuts/ Alcoholic beverage plant

G. wood /Fibre yielding plant

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SIR C R REDDY AUTONOMOUS COLLEGE, ELURU
III Year B.Sc. (VI Semester) PAPER-VII(A2)
Subject :**BOTANY**

COURSE TITLE	**ETHNOBOTANY AND MEDICINAL BOTANY**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

Course Outcomes:

CO1:	Comprehensive Knowledge of various common plants, their use and medicinal values through primitive culture.
CO2:	To gain knowledge about concept, scope and objectives of Ethnobotany as an Inter-disciplinary science using additional OE resources available in the internet.
CO3:	To Understand history, Scope and Importance of Medicinal Plants & indigenous Medicinal Sciences
CO4:	To know about common medicinal plants in the neighbourhood for therepeutical use.
CO5:	To gain knowledge about how to Conserve endangered and endemic medicinal plants.
CO6:	To gain Efficient knowledge in modern tool use to get additional knowledge from the internet.

Sir C R REDDY COLLEGE
III B. Sc. - SEMESTER- VI: CLUSTER (A) BOTANY SYLLABUS
THEORY PAPER –VIII- A2: ETHNOBOTANY AND MEDICINAL BOTANY
Total teaching 60 Hours @ 4 per week

PART-A

Learning objectives:

The specific objectives of this course are to expose students to the following topics:

1. Explain the concept and scope of Ethobotany
2. Explain the role of ethobotany in modern medicine
3. Describe the plants used by tribal population
4. Explain history scope and importance of medicinal plants

Unit –I: Ethnobotany (12hrs)

1. Introduction, concept, scope and objectives; Ethnobotany as an interdisciplinary science. The relevance of ethno botany in the present context.
2. Major and minor ethnic groups or Tribals of India, and their life styles.
3. Plants used by the tribal populations:
   a) Food plants, b) intoxicants and beverages, c) Resins and oils and miscellaneous uses.

Unit -II: Role of ethnobotany in modern Medicine (12hrs)

4. Role of ethnobotany in modern medicine with special example *Rauvolfia sepentina, Trichopus zeylanicus, Artemisia annua, Withania somnifera.*
5. Medico-ethnobotanical sources in India.
6. Significance of the following plants in ethno botanical practices (along with their habitat and morphology)
   a)Azadirachta indica, b) Ocimum sanctum, c) Vitex negundo, d) Gloriosasuperba, e) Tribulus terrestris, f) Phyllanthus niruri , g) Cassia auriculata, h) Indigofera tinctoria , i) Senna auriculata j) Curcuma longa.
7. Role of ethnic groups in the conservation of plant genetic resources.

PART-B

Unit-III: Ethnobotany as a tool to protect interests of ethnic groups (12hrs)

8. Sharing of wealth concept with few examples from India.
9. Biopiracy, Intellectual Property Rights and Traditional Knowledge.

Unit -IV: History, Scope and Importance of Medicinal Plants, Indigenous Medicinal Sciences (12hrs)

10. Definition and Scope-Ayurveda:History, origin, panchamahabhutas, saptadhatuandtridosha concepts, Rasayana, plants used in ayurvedic treatments.
11. Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine. :
12. Homoeopathy: Basic concepts of homoeopathy.
13. Unani

Unit -V: Conservation of endangered and endemic medicinal plants (12hrs)

14. Definition: endemic and endangered medicinal plants.

15. Red list criteria
16. In situconservation Biosphere reserves, sacred groves, National Parks conservation: Botanical Gardens.
17. Ex situ conservation : Botanical gardens.

Suggested Activities: Studying plant utilization methods by tribal/rural/migrant populations for their beverages, food, medicinal and uses, seminars on role of ethnic groups in conservation of plant genetic resources, project work on traditional knowledge about plant medicines, study of indigenous medicinal sciences and their efficacy.

Modules	Employability	Entrepreneurship	Skill Development
UNIT I			
Ethnobotany as an interdisciplinary science	✓	✓	✓
Plants used by the tribal populations	✓	✓	✓
UNIT-II			✓
Role of ethnobotany in modern medicine	✓	✓	✓
Medico-ethnobotanical sources in India	✓	✓	✓
UNIT-III			✓
8. Sharing of wealth concept with few examples from India.		✓	✓
Biopiracy, Intellectual Property Rights and Traditional Knowledge	✓	✓	✓
UNIT-IV			✓
Ayurveda	✓	✓	✓
Siddha	✓	✓	✓
Homoeopathy	✓	✓	✓

UNIT-V			✓
8. endemic and endangered medicinal plants.			✓
18. National Parks conservation: Botanical Gardens.	✓	✓	✓
Ex situ conservation : Botanical gardens	✓	✓	✓

Reference books:

1. Native American ethnobotany
   Book by Daniel Moerman
2. A Field Guide to Medicinal Plants and Herbs
   Book by James A. Duke
3. The Encyclopedia of Psychoactive Plants: Ethnopharmacology and Its Applications
   Book by Christian Rätsch
4. Medicinal and Other Uses of North American Plants: A Historical Survey with Special Reference to the Eastern Indian Tribes
   Book by Charlotte Erichsen-Brown
5. Phytomedicines, Herbal Drugs, and Poisons
   Book by B. E. Van Wyk and Michael Wink

Video links:

https://www.youtube.com/watch?v=WosV4xC0VAw
https://www.youtube.com/watch?v=pdIVVA7BHjo

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: CLUSTER (A) BOTANY PRACTICAL SYLLABUS

PAPER –VIII- A2: ETHNOBOTANY AND MEDICINAL BOTANY

Total hours of laboratory Exercise 30 hours @ 2 per week

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1. Ethnobotanical specimens as prescribed in theory syllabus.
2. Detailed morphological and anatomical study of medicinally important part(s) of locally available plants (Minimum 8 plants) used in traditional medicine.
3. Field visits to identify and collect ethno medicinal plants used by local tribes/folklore.

*****

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: MODEL PAPER

SUBJECT: BOTANY PAPER- VIII-A2-CLUSTER

ETHNOBOTANY AND MEDICINAL BOTANY

Time : 3hrs **Max Marks: 75**

Note: 1. Draw labeled diagrams wherever necessary for questions in section A and B.

2. Section A consists of long answer type questions.

3. Section B consists of short answer type questions.

SECTION-A

I. Answer any five of the following questions. 5X10 =50 M

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SECTION- B

II. Answer any five of the following 5X5 = 25 M

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15.

16.

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: CLUSTER (A) BOTANY PRACTICAL SYLLABUS

PAPER –VIII- A2: ETHNOBOTANY AND MEDICINAL BOTANY

Total hours of laboratory Exercise 30 hours @ 2 per week

I.	Identify the specimen A- Give reasons (morphological and anatomical) and draw labeled sketches	**-15 M**
II.	Identify and write about the medicinal uses of B-and C-	**-2x 5= 10 M**
III.	Comment on D and E.	**- 2x 4= 08 M**
IV.	Report on Field visit:	**-07 M**

List to be prepared mentioning special features of plants used by tribal populations as Medicinal Plants & Species. Write their botanical and common names,parts used and diseases/disorders for which they are prescribed.

V. Viva-voce 0**5 M**

VI. Record 0**5 M**

50 M

KEY

A-Plants given in unit -II

B-Plants used in Ayurvedicprearations (Amla in Chyavanprash, Senna in Laxatives)

C - - do –

D. Photographs of National parks, Biosphere reserves and Botanical gardens.

E. Photograph of famous personalities in Ayurveda/Siddha medicine

SIR C R REDDY COLLEGE, ELURU
III Year B.Sc. (VI Semester) PAPER-VIII(A3)
Subject :**BOTANY**

COURSE TITLE	**Pharmacognosy and Phytochemistry**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

COURSE OUTCOMES

CO1:	To Know various common plants, plant products,drugs and their chemical compounds and medicinal uses.
CO2:	Classify drugs and drug evaluation methods using additional OE resources available in the internet using modern ICT tools.
CO3:	To understand the primary and secondary metabolites and their differences, major types - terpenes, phenolics, alkaloids, terpenoids, steroids.
CO4:	Togain knowledge on sources of drugs and biosynthesis : (Phenols ,Steroids, Alcohols), enzymes, proteins and amino acids etc.
CO5:	To know about the common crude drugs and their therepeutical values.

Sir C R REDDY COLLEGE
III B. Sc. - SEMESTER- VI: CLUSTER (A) BOTANYSYLLABUS
PAPER –VIII- A3:Pharmacognosy and Phytochemistry
Total teaching 60 hours @ 4 per week

PART-A

Learning objectives:

The specific objectives of this course are to expose students to the following topics:

1. Explain about drug evaluation methods
2. Describe about organoleptic and microscopic studies
3. Describe about secondary metabolites
4. Explain about biosynthesisi of drugs

Unit-I: Pharmacognosy

Definition, Importance, Classification of drugs - Chemical and Pharmacological, Drug evaluation methods

Unit –II: Organoleptic and microscopic studies

Organoleptic and microscopic studies with reference to nature of active principles and common adulterants of Alstoniascholaris (bark), Adhatodavasica (leaf), Strychnosnuxvomica (seed), Rauwolfia serpentine (root) and Zinziberofficinalis (stem), Catharanthusroseus (leaves).

Unit-III: Secondary Metabolites

i. Definition of primary and secondary metabolites and their differences, major types - terpenes, phenolics, alkaloids, terpenoids, steroids.

ii. A brief idea about extraction of alkaloids.Origin of secondary metabolites – detailed account of acetate pathway, mevalonate pathway, shikimate pathway.

PART-B

UNIT-IV: Phytochemistry

Biosynthesis and sources of drugs: (i) Phenols and phenolic glycosides : structural types, biosynthesis, importance of simple phenolic compounds, tannins, anthraquinones, coumarins and furanocoumarins, flavones and related flavonoid glycosides, anthocyanins, betacyanins,stilbenes, lignins and lignans.

(ii) Steroids, sterols, saponins, withanolides, ecdysones, cucurbitacins: Biosynthesis, commercial importance.

(iii) Alkaloids: Different groups, biosynthesis, bioactivity.

(iv) Volatile oils, aromatherapy.

UNIT-V: Enzymes, proteins and amino acids as drugs

i. Vaccines, toxins and toxoids, antitoxins, immune globulins, antiserums,

ii. Vitamins, Antibiotics – chemical nature, mode of action.

iii. Pharmacological action of plant drugs – tumor inhibitors, PAF antagonists, antioxidants, phytoestrogens and others.

iv. Role of different enzyme inhibitors.

Suggested Activities: Isolation techniques of active principles from various parts of popular medicinal plants, debates on the efficacy of plant medicines and palliative cure, volatile oils from plants-extraction methods, project work on crude drugs

Modules	Employability	Entrepreneurship	Skill Development
UNIT I			
Classification of drugs	✓	✓	✓
Drug evaluation methods	✓	✓	✓
			✓
UNIT-II			✓
common adulterants of Alstoniascholaris (bark), Adhatodavasica	✓	✓	✓
common adulterants Zinziberofficinalis (stem), Catharanthusroseus	✓	✓	✓
UNIT-III			✓
primary and secondary metabolites		✓	✓
extraction of alkaloids	✓	✓	✓
UNIT-IV			✓
Biosynthesis and sources of drugs	✓	✓	✓
Steroids	✓	✓	✓
Alkaloids	✓	✓	✓
UNIT-V			✓
Vaccines			✓
Vitamins, Antibiotics	✓	✓	✓
Role of different enzyme inhibitors	✓	✓	✓

BOOKS FOR REFERENCE:

1. Wallis, T. E. 1946. Text book of Pharmacognosy, J & A Churchill Ltd.2. Roseline, A. 2011. Pharmacognosy. MJP Publishers, Chennai.

2. Gurdeep Chatwal, 1980. Organic chemistry of natural productis. Vol.I.Himalaya Publishing house.

3. Kalsi, P. S. and Jagtap, S., 2012. Pharmaceutical medicinal and natural product chemistry N.K. Mehra . Narosa Publishing House Pvt. Ltd. New Delhi

4. Agarwal, O. P. 2002. Organic chemistry–Chemistry of organic natural products. Vol. II. Goel publishing house , Meerut.

5. Harborne, J. B. 1998. Phytochemical methods –a guide to modern techniques of plant analysis 3 rd edition, Chapman and Hall

6. Datta & Mukerji, 1952. Pharmacognosy of Indian roots of Rhizome drug

Video links:

https://www.youtube.com/watch?v=hOHyIuO20-4

https://www.youtube.com/watch?v=AYIE039NAH0

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: CLUSTER (A) BOTANY PRACTICAL SYLLABUS

PAPER –VIII- A3:Pharmacognosy and Phytochemistry

Total hours of laboratory Exercise 30 hours @ 2 per week

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1. Physical and chemical tests for evaluation of unorganized drugs- Asaphoetida, Honey, Castor oil,Acacia

2. Identification of bark drugs – Cinchona, Cinnamom

3. Identification of fruit drugs – Cardamom, Coriander

4. Identification of root and rhizome drugs- Ginger, Garlic, Turmeric

5. Identification of whole plant – Aloes,Vinca, Punarnava

6. Herbarium of medicinal plants (minimum of 20 platns)

7. Collection of locally available crude drugs from local venders (minimum of 20)

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Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: MODEL PAPER

SUBJECT: BOTANY PAPER- VIII-A3-CLUSTER

PHARMACOGNOSY AND PHYTOCHEMISTRY

TIME:3Hr **Max.Marks: 75**

Note: 1. Draw labeled diagrams wherever necessary for questions in section A and B.

2. Section A consists of long answer type questions.

3. Section B consists of short answer type questions.

SECTION-A

I. Answer any five of the following questions. **5X10 =50 M**

1.

2.

3.

4.

5.

6.

7.

8.

SECTION- B

II. Answer any five of the following **5X5 = 25 M**

9.

10.

11.

12.

13

15.

16.

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI:

CLUSTER (A) BOTANY PRACTICAL MODEL PAPER

PAPER –VIII- A3: Pharmacognosy and Phytochemistry

Time :3hrs **MaxMarks: 50**

I.	Identify the given crude drugs A& B by morphological study and chemical tests-	**10 M**
II.	Perform suitable chemical test and identify the given phytochemical C	**-10 M**
III.	Comment on D and E	**- 2x5=10 M**
IV.	Herbarium and submission of drugs	**-10 M**
V.	Viva-Voce	**-05 M**
VI.	Practical Record	**-05 M**
		50 M

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: CLUSTER (A)

BOTANY PRACTICAL MODEL PAPER

PAPER –VIII- A3:Pharmacognosy and Phytochemistry

Time :3hrs **Max. Marks: 50**

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i.	Identify the given crude drugs A& B by morphological study and chemical tests-	**10 M**
ii.	Perform suitable chemical test and identify the given phytochemical C	**-10 M**
iii.	Comment on D and E	**- 2x5=10 M**
iv.	Herbarium and submission of drugs	**-10 M**
v.	IV. Viva-Voce	**-05 M**
vi.	V. Practical Record	**- 05 M**
		50 M

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KEY

A- Flower/fruit drugs

B- B-Rhizome/whole plant drugs

C- Tannins/ phenolics/steroids/ isoprenoids /Asaphoetida/ Honey/ Castor oil/ Acacia

D- Column Chromatography/ Gas Chromatogram/HPLC (photograph/ instrument used for chemical analysis of drugs

E- Photograh/instrument used for tissue culture

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SIR C R REDDY COLLEGE, ELURU
III Year B.Sc. (VI Semester) PAPER-VIII(B1)
Subject :**BOTANY**

COURSE TITLE	**Biological instrumentation and Methodology**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

COURSE OUTCOMES

CO1:	To Know various Principles of microscopy
CO2:	To understand about pH and Centrifugation.
CO3:	To understand the Principle involved in Spectrophotometer.
CO4:	To gain knowledge about Chromatographic techniques: Principle and applications
CO5:	To gain knowledge about Preparation of molar, molal and normal solutions, buffers, the art of scientific writing

Sir C R REDDY COLLEGE
III B. Sc. - SEMESTER- VI: CLUSTER (B) BOTANYSYLLABUS
PAPER –VIII- B1:Biological instrumentation and Methodology
Total teaching hours 60 @ 4 per week

Learning objectives:

The specific objectives of this course are to expose students to the following topics:

1. Explain the principles of microscopy
2. Describe both ph and centrifugation
3. Explain about principle of spectroscopy
4. Discuss about chromatography techniques
5. Understanding details on label reagent bottle of molarity and normality

PART-A

Unit -I: Imaging and related techniques (12hrs)

Principles of microscopy; Light microscopy; Fluorescence microscopy; Electron Microscopy (a) Flow cytometry (b) Applications of fluorescence microscopy: Chromosome banding, FISH, chromosome painting; Transmission and Scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze fracture, freeze etching.

Unit- II: pH and Centrifugation (12hrs)

pH meter: Principles and instrumentation, Centrifugation: Principles, types of centrifuges, types of rotors, differential and density gradient centrifugation, application. Sonication, Freeze drying.

Unit- III: Spectrophotometry (12hrs)

Principle involved in Spectrophotometer; Spectrophotometric techniques, Instrumentation: ultraviolet and visible spectrophotometry (single anddouble beam, double wavelength spectrophotometers), Infrared spectrometers - Luminometry and densitometry – principles and their applications - Mass Spectroscopy- principlesof analysis, application in Biology.

PART-B

Unit- IV: Chromatography (12hrs)

Chromatographic techniques: Principle and applications – Column - thin layer –paper, affinity and gaschromatography - Gel filtration - Ion exchange and High performance liquid chromatography techniques– Examplesof application for each chromatographic system - Basic principles of electrophoresis.

Unit-V:Preparation of molar, molal and normal solutions, buffers, the art of scientific writing (12hrs)

Understanding the details on the label of reagent bottles.Molarity and normality of common acids and bases.Preparation of solutions.Dilutions.Percentage solutions.Molar, molal and normal solutions.Technique of handling micropipettes; Knowledge about common toxic chemicals and safety measures in their handling.

The art of scientific writing and presentation of scientific matter.Scientific writing and ethics.writingreferences.Powerpointpresentation.Poster presentation.

Introduction to copyright-academic misconduct/plagiarism in scientific writing.

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Suggested activities: Preparing various laboratory reagents, operating laboratory instruments, noting instrument readings, calculating results accurately, Skills on writing scientific articles, presentation of scientific resultsthrough tables, graphs, poster presentations and practicing power point presentations.

Modules	Employability	Entrepreneurship	Skill Development
UNIT I			
Light microscopy; Fluorescence microscopy	✓	✓	✓
pH meter: Principles and instrumentation	✓	✓	✓
UNIT-II			✓
pH meter	✓	✓	✓
Sonication, Freeze drying.	✓		✓
UNIT-III			✓
Spectrophotometric techniques		✓	✓
Mass Spectroscopy	✓	✓	✓
UNIT-IV			✓
Chromatographic techniques	✓	✓	✓
Gel filtration	✓	✓	✓
UNIT-V			✓
Molarity and normality			✓
Technique of handling	✓	✓	✓

Books to Reference:

1. Bajpai, P.K. 2006. Biological Instrumentation and methodology. S. Chand & Co. Ltd.

2. K. Wilson and J. Walker Eds. 2005. Biochemistry and Molecular Biology. Cambridge University Press.

3. K. Wilson andKHGoulding. 1986. Principles and techniques of Practical Biochemistry. (3 edn) Edward Arnold, London.

4. Dawson, C. (2002). Practical research methods.UBS Publishers, New Delhi.

5. Stapleton, P., Yondeowei, A., Mukanyange, J., Houten, H. (1995). Scientific writing for agricultural research scientists – a training reference manual. West Africa Rice Development Association, Hong Kong.

6. Ruzin, S.E. (1999). Plant micro technique and microscopy. Oxford

Video links:

1. **https://youtu.be/dlPMJ3lVIfs**
2. **https://youtu.be/ExnzByQiTLc**
3. **https://youtu.be/gU2st5-T1Go**

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: CLUSTER (B) BOTANY PRACTICAL SYLLABUS

PAPER –VIII- B1:Biological instrumentation and Methodology

30 Hours @ 2 per week

1. Microscopy – Light microscopy: principles, parts & function
2. Micrometry- principle and measurement of microscopic objects: Low power and high power.
3. Camera Lucida drawing with magnification and scale.
4. Principle and working of phase contrast microscope
5. Principle & operation of Centrifuge
6. a)Preparation of standard acid and alkali and their standardization.

b) Preparation of various solutions (normal, molar, and percent) and ppm/ppb by serial dilutions

7. Study of principle and working of pH meter and Measurement of pH of Milk, Pepsi, and Lemon juiceetc. using pH paper and pH meter
8. Study of principle of Chromatography and separation of amino acids mixture by ascending Paper Chromatography
7. Principle & operation of Colorimeter
8. Principle & operation of Spectrophotometer
9. Chromosome banding, FISH, chromosome painting
10. Principle and technique of TLC (demonstration)
11. TLC separation of Amino acids from purified samples and biological materials (demonstration)
12. PCR - The Polymerase Chain Reaction (protocol) -demonstration
13. Study visit to an institute /laboratory

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: MODEL PAPER

SUBJECT: BOTANY PAPER- VIII-A3-CLUSTER

PHARMACOGNOSY AND PHYTOCHEMISTRY

Time : 3hrs **Max. Marks: 75**

Note: 1. Draw labeled diagrams wherever necessary for questions in section A and B.

2. Section A consists of long answer type questions.

3. Section B consists of short answer type questions.

SECTION-A

I. Answer any five of the following questions. **5X10 =50 M**

1.

2.

3.

4.

5.

6.

7.

8.

SECTION- B

II. Answer any five of the following **5X5 = 25 M**

9.

10.

11.

12.

13.

14.

15.

16.

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: CLUSTER (B) BOTANY PRACTICAL MODEL PAPER

PAPER –VIII- B1:Biological instrumentation and Methodology

Time : 3 hrs **Max. Marks: 50**

1. Perform the experiment (A). Write the protocol of the experiment - **15M**

2. Measure the pH of given sample (B) using pH paper and pH meter. Write the procedure andobservation. **-10 M**

3. Identify C, D, and E. Write the principle and use of them. **-3X5 -15 M**

4. Viva voce on Field visit **-05 M**

5. Record **-05 M**

50 M

****

Key

A. Amino acid separation by paper chromatography

B. Milk, Pepsi, Lemon juice etc

C. Camera Lucida/ Micrometer/phase contrast microscope

D. Colorimeter/ Spectrophotometer

E. Chromosome banding, FISH, chromosome painting

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SIR C R REDDY COLLEGE, ELURU
III Year B.Sc. (VI Semester) PAPER-VIII(B2)
Subject :**BOTANY**

COURSE TITLE	**Mushroom Culture and Technology**
TOTAL HOURS	**60 Hrs**
HOURS/WEEK	**4 T+2P**
CODE	
COURSE TYPE	**THEORY**
CREDITS	**3T+2P**
MARKS	**60**

COURSE OUTCOMES

CO1:	To understand the scope of edible mushroom cultivation, Types of edible mushrooms available in India
CO2:	To gain knowledge about Pure culture - preparation of medium (PDA and Oatmeal agar medium)sterilization.
CO3:	To know different types of foods prepared from mushrooms.
CO4:	To understand Cultivation Technology
CO5:	To gain practical knowledge about Storage and nutrition

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: CLUSTER (B) BOTANYSYLLABUS

PAPER –VIII- B2: Mushroom Culture and Technology

Total teaching hours 60 @ 4 per week

PART-A

Learning objectives:

The specific objectives of this course are to expose students to the following topics:

1. Discuss history scope and types of Edible mushrooms
2. Discuss types of food prepared from mushrooms
3. Describe various mushroom cultivating techniques
4. Discuss different kind of food storage methods

Unit I: Introduction, history (12hrs)

Introduction - history - scope of edible mushroom cultivation, Types of edible mushrooms available in India –Volvariellavolvacea, Pleurotuscitrinopileatus, Agaricusbisporus. Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms.

UNIT II:Pure culture-spawn preparation (12hrs)

Pure culture - preparation of medium (PDA and Oatmeal agar medium)sterilization - preparation of test tube slants to store mother culture – culturing of Pleurotus mycelium on Petri plates, preparation of mother spawn in saline bottle and polypropylene bag and their multiplication.

Unit III : Food Preparation (12hrs)

Types of foods prepared from mushrooms; soup, cutlet, omlette, samosa, pickles and curry.
Research Centres - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value

PART- B

Unit IV: Cultivation Technology (12hrs)

Infrastructure: Substrates (locally available) Polythene bags, vessels, Inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves. Factors affecting the mushroom bed preparation - Low cost technology, composting technology in mushroom production.

Unit IV:Storage and nutrition (12hrs)

Short-term storage (Refrigeration - up to 24 hours), Long term Storage (canning, pickels, papads), drying, storage in saltsolutions. Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content – Vitamins.

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Suggested activities: Growing spawn on laboratory prepared medium in petriplates and maintaining, preparing compost and compost beds, packing of beds, spawning, maintaining moisture, picking, blanching and packing. Collecting naturally growing mushrooms and identifying them properly,visits to mushroom houses.

Modules	Employability	Entrepreneurship	Skill Development
UNIT I			
Edible mushroom cultivation	✓	✓	✓
Nutritional and medicinal value of edible mushrooms	✓	✓	✓
UNIT-II			✓
preparation of medium	✓	✓	✓
sterilization.	✓		✓
UNIT-III			✓
Types of foods prepared from mushrooms		✓	✓
Research Centres - National level and Regional level	✓	✓	✓
UNIT-IV			✓
Mushroom bed preparation	✓	✓	✓
composting technology in mushroom production.	✓	✓	✓
UNIT-V			✓
Short-term storage			✓
Long term Storage	✓	✓	✓

Reference Books:

1. Mushroom Cultivation and its Diseases. Dr. Ravinder Singh Rana.
2. Mushroom Cultivation. V. Kumaresan. Paperback.
3. Paul Stamets. 4.8 out of 5 stars 2,225. Paperback.
4. Dr. Chandra Prakash Shukl. Hardcover.

Video links:

1. **https://youtu.be/L2tsEm2Nhhs**
2. **https://youtu.be/Z9gKWDrpdLY**
3. **https://youtu.be/l94383bPVtE**

Suggested Readings

: 1. Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R (1991) Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.

2. Swaminathan, M. (1990) Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.

3. Tewari, Pankaj Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi.

4. Nita Bahl (1984-1988) Hand book of Mushrooms, II Edition, Vol. I & Vol. II.

5.Biswas, S., M. Datta and S.V. Ngachan. 2011. Mushrooms: A Manual For Cultivation. PHI learning private Ltd., New Delhi, India. 30

Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: CLUSTER (B) BOTANYPRACTICAL SYLLABUS

PAPER –VIII- B2: Mushroom Culture and Technology

30Hours @ 2per week

1. Identification of different edible and poisonous mushrooms.
2. Microscopic and anatomical observations of different mushroom species.
3. Pure culture - preparation of medium (PDA and Oatmeal agar medium) sterilization.
4. Isolation and preparation of spawn under controlled conditions(preparation of mother spawnin saline bottle and Polypropylene bag and their multiplication).
5. Types of Compost preparation and sterilization.
6. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves/waste.
7. Inoculation and spawning of compost.
8. Incubation and harvesting of mushrooms (collection, drying and preservation).
9. Diseases of mushrooms (photographs).
10. Post-harvest technology steps (photographs).
11. Study tour to mushroom cultivation farms
12. Project work – cultivation of paddy straw/ oyster/white button mushrooms.

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Sir C R REDDY COLLEGE

III B. Sc. - SEMESTER- VI: MODEL PAPER

MUSHROOM CULTURE AND TECHNOLOGY

Time : 3hrs **Max. Marks: 75**

Note: 1. Draw labeled diagrams wherever necessary for questions in section A and B.

2. Section A consists of long answer type questions.

3. Section B consists of short answer type questions.

SECTION-A

I. Answer any five of the following questions. **5X10 =50 M 1.**

2.

3.

4.

5.

6.

7.

8.

SECTION- B

II. Answer any five of the following **5X5 = 25 M**

9.

10.

11.

12.

13.

14.

15.

16.

Sir C R REDDY COLLEGE
III B. Sc. - SEMESTER- VI: CLUSTER (B) BOTANY PRACTICAL MODEL PAPER
PAPER –VIII- B2:Mushroom Culture and Technology

Time: 3 hrs **Max Marks: 50**

I. Prepare the culture medium for isolation of spawn and make the slants. Write the protocol for preparation of the medium (A) - **20 M**

II. Write the protocol for preparation of compost (B) **08 M**

III. Comment on given specimens C, D and E **-3x4 = 12 M**

IV. Report on Field visit **-05 M**

V. Practical Record **05 M**

50 M

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KEY

A- PDA /Oatmeal agar medium
B- Paddy straw compost
C- Edible mushroom (Photograph)
D- Poisonous mushroom (Photograph)
E. Preservation technique (Photograph)

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III B. Sc. - SEMESTER- VI: CLUSTER (B) BOTANYSYLLABUS

PAPER –VIII- B3:

Internship/ Project Work preferably either in an Institute or Industry

Paper setter Examiners List:

Paper setters	Details
Dr. S.Sai Durga Devi	Head, Dept. of Botany KGRL College (Autonomous) Bhimavaram, W.G.Dt.
Dr. Srinivas reddy	HOD of Botany PB Siddartha college Vijayawada Krishna district
Smt. Ch. Beulah Rajani Lecturer in Botany AG&SG Siddartha college Vijayawad Krishna district	Lecturer in Botany AG&SG Siddartha college Vijayawad Krishna district


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