ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGEOFARTS&SCIENCE, VUYYURU-521165, KRISHNADt, A.P.(AUTONOMOUS).

NAACreaccreditedat'A'level

Autonomous–ISO9001-2015Certified

DEPARTMENT OF BOTANY

BOS MEETING 12 –09 - 2024

ACADEMIC YEAR-(2024-25)

Odd SEM– I, III & V

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P. (AUTONOMOUS).
NAAC reaccredited at 'A' level
Autonomous –ISO 9001-2015 Certified
DEPARTMENT OF BOTANY
BOARD OF STUDIES MEETING: **12 th September 2024**

The Board of studies meeting of Department of Botany was convened at 10:30 pm on 12/09/2024 under the chairmanship of Smt.Ch. Beulah Ranjani 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 I, III & V semester for the academic year 2024-2025 in offline mode

The following members were present.

S.No	Name	Designation	signature
1.	**Smt. Ch. Beulah Ranjani** Head, Department of Botany A.G&S.G.S Degree College Vuyyuru.	Chair person	C. B. Ranjani
2	**prof. ~~Avasan~~ Maruthi** Y. AVASN Bio Sciences & Bio technology Krishna University Machilipatnam.	University Nominee	12/09/2024
3.	**Sri Dr. Ch. Srinivasa Reddy** Lecturer in Botany SRR & CVR Govt. Degree College, Vijayawada.	Subject Expert	
4.	**P. Srinivasa Rao** Department of Botany, P.B. Siddhartha College,	Subject Expert	P. Srinivasa Rao
5.	**Sri. S. Krishna Suman,** Natural farmer, yakamuru Vuyyuru.	Industrialist	S. Krishna Suman
6.	**Sri. N. Ramana Rao** Lecturer in Botany, A.G &S.G.S Degree College Vuyyuru.	Member	N. Ramana Rao
7	**Mr. N.T.V. Mahesh** (P.G Chemistry) Student nominee A.G &S.G.S Degree College Vuyyuru	Student Represent	N. T. V. Mahesh

Agenda:

1. To review recommend the syllabi (Theory &Practical) for First Semester of **I B.Sc. Botany Major of B.Sc. Honours (Major -1, Majaor - 2,)** for the academic year 2024 -2025.

2. To recommend the Model Question paper, Blue Print and Guidelines for Question paper setters for **III** Semester of **II B.Sc. Botany Major of B.Sc. Honours (Major -5, Majaor -6, Major -7, Majaor 8**,) for the academic year 2024 –2025.

3. To recommend the syllabi (Theory & Practical), Model question paper, Blue Print and Guidelines for Question paper setters for V Semester of III B.Sc. (BZC& ABC) for the academic year 2024-25.

4. To introduce Value Added Course (Non-Credits) on **Plant Nursery Management** for III Semester of II B.Sc. (Botany) for the academic year 2024 - 2025.

5. To introduce Environmental Education for I Semester of (I B.A,I B.COM,BOTANY ,AQUA , PHYSICS, CHEMISTRY, MATHS HONORS) for the academic year 2024 – 2025
6. To introduce Principles of Biological science (MDC) for I Semester of (I B.A,I B.COM A&B,IBCA) for the Academic year 2024 – 2025.

7. To recommend the teaching and evaluation methods to be followed under Autonomous status.

8. Any other matter.

CH. Beulah Ranjani

Chairman

RESOLUTIONS:

1. It is resolved to implement the syllabi prescribed by APSCHE for First Semester of **I B.Sc. Botany Major of B.Sc. Honors for** the academic year 2024-2025 without any changes. Paper-1(Introduction to Classical Biology) & paper 2(Introduction to Applied Biology).

2. It is resolved to implement the syllabi prescribed by APSCHE for Third Semester of I**I B.Sc. Botany Major of B.Sc. Honors for** the academic year 2024-2025 without any changes. Paper -5 (Vascular Plants) Paper –6(Plant pathology and Plant diseases) Paper -7 (Plant Breeding) Papers -8(Plant Biotechnology).

3. It is resolved to continue the same syllabus (Theory & Practical), Model question paper, Blue Print and Guidelines for Question paper setters for V Semester of III B.Sc. (BZC, ABC) (501-Plant Tissue Culture &502-Mushroom culture) for the academic year 2024 - 2025.

4. It is resolved to implement semester end internship for III B.Sc B.Z.C in VI Semester.
5. It is resolved to introduce Value Added Course (Non-Credits) on mushroom cultivation for VI Semester of III B.Sc ABC for the academic year 2023 - 2024.
6. It is resolved to implement Environmental Education for II Semester of (I B.A,I B.COM,BOTANY ,ZOOLOGY, AQUA ,PHYSICS,CHEMISTRY,MATHS HONORS) for the academic year 2023 - 2024.
7. It is resolved to implement the following Teaching and Evaluation methods to be followed under Autonomous status.
8. Nil

Evaluation procedure:

Internal Assessment Examination:

- Out of maximum100marks in each paper for I B.Sc. **Botany** Major of B.Sc. Honours 30marks is allocated for internal assessment.
- Out of these 30 marks, 20 marks are allocated for Announced tests (IA-1& IA-2). Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, 5 marks are allocated on the basis of candidate's percentage of attendance and remaining 5 marks are allocated for the assignment.
- Out of maximum100 marks in each paper for III Semester of II B.Sc, BZC &ABC 30marks shall be allocated for internal assessment.
- Out of these 30 marks, 20 marks are allocated for announced tests (IA-1& IA-2). Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, 5 marks allocated on assignment and reaming 5 marks seminar for IV semester. There is no pass minimum for internal assessment for IV Semester.
- Out of maximum100marks in each paper for VI Semester of III B.Sc. BZC &ABC 30marks shall be allocated for internal assessment.
- Out of these 30 marks, 20 marks are allocated for announced tests (IA-1& IA-2). Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, 5 marks allocated on assignment and reaming 5marks seminar for VI semester. There is no pass minimum for internal assessment for VI Semester.
- **Semester–End Examination**:
- The maximum mark for II semester – End examination shall be 70 marks and duration of the examination shall be 3 hours.
- 70 marks are allocated for II Semester of First B.Sc. **Botany** Major of B. Sc. Honours in Semester end Examination. Even through the candidate is absent for two IA exams /obtain zero marks the external marks are considered (if the candidate gets 40/70) and the result shall be declared as "PASS".
- 70 marks are allocated for IV Semester of second B.Sc. BZC & ABC in Semester End Examination. Even through the candidate is absent for two IA exams /obtain zero marks the external marks are considered (if the candidate gets 40/70) and the result shall be declared as "PASS".
- 70marks are allocated for VI Semester of III B.Sc. ABC in Semester End Examination. Even through the candidate is absent for two IA exams / obtain zero marks the external marks are considered (if the candidate gets 40/70) and the result shall be declared as "PASS.

CH. Beulah Ranjani

Chairman

ADUSUMILLI GOPALAKRISHNAIAH & SUGARCANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS)

COURSESTRUCTURE– 2024 - 2025

Semester	Course Code	Course Title	Hours/ Week	CIA	SEE	No. of Credits	Core/LSC/ SDC/MDC Elective/ Cluster
I	23CBLT01	Introduction to Classical Biology	5	30	70	4	Core
	23ABLT01	Introduction to Applied Biology	5	30	70	4	Core
III	**23BOMAL231**	Vascular Plants – (T)	4	30	70	3	Core
		Practical	2	15	35	1	Lab
III	**23BOMAL232**	Plant Pathology and Plant Diseases– (T)	4	30	70	3	Core
		Practical	2	15	35	1	Lab
	23BOMAL233	Plant Breeding – (T)	4	30	70	3	Core
		Practical	2	15	35	1	Lab
	23BOMAL234	Plant Biotechnology – (T)	4	30	70	3	Core
		Practical	2	15	35	1	Lab
V	**BOTSETO1**	Plant tissue culture	3	30	70	4	Core
	BOTSEPO1	Practical	3	10	40	1	Lab
V	BOTSET02	Mushroom cultivation	3	30	70	4	Core
		Practical	3	10	40	1	Lab
IV	VACBOTPN-03	Plant nursery	-	-	-	-	-
II		Environmental Education	2	15	35	2	SDC

ADUSUMILLIGOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGEOFARTS&SCIENCE, VUYYURU-521165, KRISHNA Dt. A.P.(AUTONOMOUS).
NAAC reaccredited at 'A 'level
Autonomous–ISO9001- 2015Certified

Botany Honours

Title of the Paper: **Introduction to classical biology**

Semester:-I

Course Code	23CBLT01	Course Delivery Method	Class Room/Blended Mode-Both
Credits	4	CIA Marks	30
No. of Lecture Hours/Week	5	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction: 2023-2024	Year of Offering 2023-2024	Year of Revision–	Percentage of Revision:0%

Course Pre requisites:

Learning objectives

The student will be able to learn the diversity and classification of living organisms and understand their chemical, cytological, evolutionary and genetic principles.

Course Objectives:

CO:1	Learn the principles of classification and preservation of biodiversity
CO: 2	Understand the plant anatomical, physiological and reproductive processes
CO:3	Knowledge on animal classification, physiology, embryonic development and their economic importance
CO:4	Outline the cell components, cell processes like cell division, heredity and Molecular processes.
CO:5	Comprehend the chemical principles in shaping and driving the macromolecules and life processes.

Syllabus

Course Details

Unit	Learning Units	Hours
I	**Introduction to systematic, taxonomy and ecology.** Systematics – Definition and concept, Taxonomy–Definition and hierarchy. Nomenclature–ICBN and ICZN, Binomial and trinomial nomenclature. Ecology–Concept of ecosystem**,(**Structure and function-outlines) Biodiversity and conservation. (Value of Biodiversity and types of conservation) Pollution and climate change. (Causes, effects of air, water and soil pollution, ozone depletion, acid rain, greenhouse gases, global warming.	12 HRS
II	**Essentials of Botany.** The classification of plant kingdom **(**Whittaker Classification of Planate) Plant physiological processes (Photosynthesis- light & dark reactions, Respiration (- glycolysis, link reaction, Krebs cycle& oxidative phosphorylation, Transpiration-types, stomatal complex, mechanism of stomatal movement based on K+ion movement), phyto hormones-Role of Auxins, Gibberellins, Cytokinins, Abscissic acid ,Ethylene). Structure of flower–Micro and macro sporogenesis, pollination- (types & agents), fertilization and structure of mono and dicot embryos. Mushroom cultivation, oyster, floriculture (of local flowers) and landscaping. (Principles)	15HRS
III	**Essentials of zoology:** Broad classification of Kingdom Animalia upto phyla. Animal Physiology–Basics of Organ Systems and their functions, Hormones and Disorders. Developmental Biology – Gameto genesis, Fertilization, Cleavage andOrganogenesis (Basic concepts) Economic Zoology–Sericulture, Apiculture, Aquaculture (Concepts and Economic Importance.)	12 HRS
IV	**Evolution, Cell Biology and Genetics:** **Origin of life** Cell theory, Ultra structure of prokaryotic and eukaryotic cell, cell cycle (Outlines only) Chromosomes and heredity– Structure of chromosomes, concept of gene. Central Dogma of Molecular Biology(Outlines of transcription and translation, Role of genetic code)	12 HRS
V	**Essentials of chemistry:** Definition and scope of chemistry, applications of chemistry in daily life (Chemistry in food, Agriculture, Hygiene, Cosmetics, and Textiles & Building construction). Branches of chemistry(Inorganic, Organic, Physical, Analytical and Industrial chemistry) Chemical bonds-ionic, covalent, non–covalent–Vander Waals, hydrophobic, hydrogen bonds. Green chemistry	09 HRS

References

1. SharmaO.P. 1993. Plant taxonomy.2nd Edition.Mc Graw Hill publishers.
2. PandeyB.P.2001.ThetextbookofbotanyAngiosperms.4th edition.S.Chandpublishers, New Delhi, India.
3. Jordan E. L., Verma P.S., 2018. Chordate Zoology. Scand publishers, New Delhi, India.
4. Restage, S .C., 2019. Essentials of animal physiology. 4th Edition. New Age International Publishers.
5. Verma P.S. Agarwal V.K., 2006. Cell biology, genetics, Molecular Biology, Evolutionand Ecology. S. Chan publishers, New Delhi, India.
6. Satya narayana U, Chakrapani, U., 2013.Biochemistry.4thEdition.Elsevier publishers.
7. Jain J. L., Sunjay Jain, NitinJain, 2000. Fundamentals of Biochemistry .S. Chand publishers, New Delhi, India.
8. Karen Timber lake, William Timber lake, 2019. Basic chemistry. 5th Edition. Pearson publishers.
9. Subrata Sen Gupta, 2014. Organicchemistry.1st Edition. Oxford publishers.

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA. Dt., A.P. (AUTONOMOUS).

ISEMESTER END EXAMINATIONS

PAPER–I **MODEL PAPER** **Course Code: 23CBLT01**

Title of the paper: Introduction to Classical Biology

Time: 3 Hours **Max. Marks: 70**

Draw neat labeled diagrams wherever necessary.

SECTION – A

Answers any **FIVE** of the following 5x4=20M

1. (a)Tri nominal nomenclature 4M
   OR
   (b) Concept of ecosystems

2. (a) Explain Micro sporogenesis 4M
   OR
   (b) Mushroom cultivation

3. (a)General characters of phylum Coelenterate 4M
   OR
   (b) Fertilization,

4. (a)genetic code 4M
   OR
   (b) Cell theory

5. (a) Chemistry in food 4M
   OR
   (b) Industrial chemistry

SECTION – B

Answer any **FOUR** of the following **5X 10 = 50Marks**

1(a). Write about ICBN and ICZN?
OR
(b)Explain the Biodiversity and conservation?

2. (a)Write an essay on Structure of mono and dicot embryos?

OR

(b) Give an account on floriculture and landscaping. **?**

3. (a) Explain the Basics of Organ Systems and their functions?

OR

(b) Concepts and Economic Importance of Aquaculture?

4. (a) Write an essay on Ultra structure of prokaryotic
OR
(b) Explain modern synthetic theory of evolution.

5. (a) Give an account on applications of chemistry in daily life?
OR

(b) Write about green chemistry?

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

ACTIVITIES-I (At the end of I Semester)

Title of the paper: Introduction to classical Biology

No of Hours: 30 **WEF: 2023-2024**

ACTIVITIES:

1. Make a display chart of life cycle of non flowering plants.
2. Make a display chart of lifecycle of flowering plants.
3. Study of stomata
4. Activity to prove that chlorophyll is essential for photo synthesis
5. Study of pollen grains.
6. Observation of pollen germination.
7. Ikebana.
8. Differentiate between edible and poisonous mushrooms.
9. Visit a nearby mushroom cultivation unit and know the economics of mushroom cultivation.
10. Draw the Ultra structure of Prokaryotic and Eukaryotic Cell
11. Visit to Zoology Lab and observe different types of preservation of specimens
12. Hands-on experience of various equipment–Microscopes, Centrifuge, Ph Meter, Electronic Weighing Balance, Laminar Air Flow
13. Visit to Zoo /Sericulture/Apiculture/Aquaculture unit
14. Listoutdifferenthormonal,geneticandphysiologicaldisordersfromthe society

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

NACC reaccredited at 'A 'level

Autonomous–ISO9001-2015Certified

Title of the Paper: **Introduction to Applied Biology**

Semester:- I

Course Code	**23ABLT01**	Course Delivery Method	Class Room/Blended Mode-Both
Credits	4	CIA Marks	30
No.of Lecture Hours/ Week	5	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction: 2023-2024	Year of Offering 2023-2024	Year of Revision–	PercentageofRevision:0%

Learning objectives

The student will be able to learn the foundations and principles of microbiology, immunology, biochemistry, biotechnology, analytical tools, quantitative methods, and bioinformatics.

Learning Outcomes:

CO: 1	Learn the history, ultra structure, diversity and importance of micro organisms.
CO:2	Understand the structure and functions of macro molecules
CO:3	Knowledge on bio technology principles and its applications in food and medicine
CO: 4	Outline the techniques, tools and their uses in diagnosis and therapy
CO: 5	Demonstrate the bio informatics and statistical tools in comprehending the complex biological data.

Unit	Learning Units	Lecture Hours
I	**Essentials of Microbiology and Immunology** History and Major Milestones of Microbiology, Contributions of Louis Pasteur, Robert Koch, Edward Jenner and Joseph Lister. Structure and characteristics of Bacteria, Fungi, Archaea and Viruses. Applications of micro organisms in Food, Agriculture, Environment and Industry. Immune system– Types of immunity (Innate and Acquired), Cells and organs of immune system.	12 HRS
II	**Essentials of Bio chemistry** Bio molecules I–Carbohydrates, Lipids (General Structure, classification and Biological importance). Bio molecules II–Amino acids(General Structure, classification-Essential and Non- Essential and Biological importance), Proteins(General Structure, classification and Biological importance) Bio molecules III–Nucleic acids-DNA and RNA(Structure, Types and Biological importance) Basics of Metabolism –Anabolism and catabolism (Definition and examples).	12 HRS
III	**Essentials of Biotechnology** History, scope and significance of Biotechnology- Applications of Biotechnology in Plant, Animal Industrial and Pharmaceutical sciences. Environmental Bio technology–Bio remediation and Bio fuels, Bio fertilizers and Bio pesticides. (Definitions and common examples) Genetic engineering–Gene manipulation using restriction enzymes and cloning vectors- P^{BR322}, λ phage. Methods of Gene transfer- Physical- Electro poration, chemical- PEG, and Biological- Transduction. Transgenic plants–Stress tolerant plants (biotic stress–BT cotton, abiotic stress–salttolerance). Transgenic animals – Animal (Fish) and disease models.(Mouse)	12 HRS
IV	**Analytical Tools and techniques in biology–Applications** Applications in forensics – PCR and DNA finger printing (Concept and application) Immunological techniques–Immuno blotting and ELISA. (Concept and application) Monoclonal antibodies – Applications in diagnosis and therapy. Eugenics and Genetherapy (Definition and examples).	12 HRS
V	**Bio statistics and Bioinformatics** Data collection and sampling. Measures of central tendency–Mean, Median, Mode. Measures of dispersion – range, standard deviation and variance. Probability and tests of significance- t- test Introduction, Genomics, Proteomics, types of Biological data, Biological databases-NCBI, EBI, Gene Bank; Protein 3D structures, Sequence alignment. Accessing Nucleic Acid and Protein databases, NCBI Genome Work bench.	12 HRS

REFERENCES

1. Gerard J., Tortora, BerdellR. Funke, ChristineL.Case. 2016.Microbiology:AnIntroduction. 11th Edition. Pearson publications, London, England.
2. Micale, J.Pelczar Jr., E.C.S.Chan., Noel R.Kraig. 2002. Pelczar Microbiology.5thEdition. McGraw Education, New York, USA.
3. Sathya narayanaU. Chakrapani,U.,2013.Biochemistry.4thEdition.Elsevierpublishers.
4. Jain J. L. SunjayJain, Nitin Jain, 2000.FundamentalsofBiochemistry.S.Chandpublishers,New Delhi, India.
5. R.C.D ubey, 2014.AdvancedBiotechnology.S.ChandPublishers, NewDelhi, India.
6. Colin Ratledge, Bjorn, Kristiansen, 2008.
7. U. Sathyanarayana, 2005. Biotechnology. 1stEdition. Books and Allied Publishers pvt. ltd.,Kolkata.
8. Upadhyay, Upadhyay and Nath.2016.BiophysicalChemistry, Principles andHimalaya Publishing House.
9. Arthur M.Lesk.IntroductiontoBioinformatics.5thEdition.Oxfordpublishers.
10. AP Kulkarni, 2020.BasicsofBiostatistics.2nd Edition. C B S publishers.

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREECOLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

I SEMESTER END EXAMINATIONS

PAPER–I **MODELPAPER** **Course Code: 23ABLT01**
Title of the paper: Introduction to Applied Biology

Time: 3Hours **Max.Marks:70**

Draw neat labeled diagrams wherever necessary.

SECTION –A

Answer and FIVE of the following **5X4=20Marks**

(a) Robert Koch 4M
OR
(b) Applications of micro organisms in Food

2. (a) Lipids -Biological importance. 4M

OR

(b) Types of RNA

3. (a)Applications of Biotechnology in Plants & Animals. 4M

OR

(b) PBR^{322}

4. (a)DNA finger printing 4M
OR
(b) Significance-t-test

5. (a) Median 4M
OR
(b) Gene bank

SECTION – B

Answer any Five of the following **5X10=50 Marks**

1(a).Discuss about Structure and characteristics of Bacteria
OR
(b)Explain the Innate and Acquired immunity?

2. (a)Classification of Carbohydrates?
OR
(b) Explain about Structure of -DNA?

3. (a)Explain the Bio remediation and Biofuels?
OR
(Write an essay on transgenic animals?

4. (a)Mono clonal antibodies–Applications in diagnosis and therapy?
OR
(b) Explain Data collection and sampling?

5. (a)Write about NCBI and EBI?
OR
(b) Give an account on protein 3D structures?

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREECOLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS**).**

ACTIVITIES-I (At the end of I Semester)

Title of the paper: Introduction to Applied Biology

No of Hours: 30 WEF: 2024-2025

ACTIVITIES

1. Identification of given organism as harmful or beneficial.
2. Observation of micro organisms from house dust under micro scope.
3. Finding micro organism from pond water.
4. Visit to a microbiology industry or biotech company.
5. Visit to a waste water treatment plant.
6. Retrieving a DNA or protein sequence of a gene'
7. Performing a BLAST analysis for DNA and protein.
8. Problems on bio statistics.
9. Fieldtrip and awareness programs on environmental pollution by different types of wastesand hazardous materials.
10. Demonstration on basic biotechnology lab equipment.
11. Preparation of 3D models of genetic engineering techniques.
12. Preparation of 3D models of transgenic plants and animals.

[**NOTE**: In the colleges where there is availability of faculty for microbiology and bio technology, those chapters need to be handled by microbiology and biotechnology faculty. In other colleges, the above topics shall be dealt by Botany and Zoology faculty]

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

NAAC reaccredited at 'A 'level
Autonomous–ISO9001-2015Certified

Title of the Paper: **Vascular Plants (Pteridophytes, Gymnosperms and Taxonomy of Angiosperms)**

Semester: III **(PAPER -5)**

Course Code	**23BOMAL231**	Course Delivery Method	Class Room / Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2021-22	Year of Offering: 2024 - 25	Year of Revision: --NA	Percentage of Revision: -

Course Description:

A comparative study of pteridophytes, gymnosperms and angiosperms, integrating from function and ecology. This course is designed to introduce students to the major lineages of vascular plants, including the ferns, gymnosperms and flowering plants. Students will be introduces to basic plant structure (anatomy and morphology) and diversity, as well as topics in plant evolution. An understanding of vascular plants is essential for global citizens with interests in biodiversity, ecology, agriculture, forestry, medicine and biochemistry. This course will provide one with a basic and comprehensive understanding of Vascular Plants (Pteridophytes, Gymnosperms and Taxonomy of Angiosperms). Enable the student with depth of topics and helps them to gain an appreciation in the special groups of Pteridophytes and Gymnosperms. On the other hand, importance of understanding Taxonomy of the flowering plant provides an extensive knowledge to the student.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To recognize the morphology, anatomy and reproduction in two groups of archegoniates.
2	To acquire knowledge of the taxonomic aids and classification systems.
3	To read the vegetative and floral characteristics of some forms of angiosperm families along with their economic value.
4	To study the significance of other branches of botany in relation to Plant taxonomy.
5	To evaluate the economic value of Plant species from the families under the study.

Course Outcomes

At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Infer the evolution of vasculature, heterospory and seed habit in Pteridophytes.	**K2**		
CO2	Illustrate the general characteristics of Gymnosperms along with their uses.	**K2**		
CO3	Discuss about some Taxonomic aids and their applications in Plant systematic.	**K6**		
CO4	Compare and contrast the vegetative and floral characteristics of some angiospermic families.	**K4**		
CO5	Defend the utility of evidences from different branches of botany in solving the taxonomic lineages of some species.	**K5**		

CO-PO MATRIX									
CO NO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1									
CO2									
CO3									
CO4									
CO5									

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Syllabus

Course Details:

Unit	Learning Units	Lecture Hours
I	1. General characteristics of Pteridophyta; Smith (1955) classification. 2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of: (a) Lycopsida: *Lycopodium* and (b) Filicopsida: *Marsilea.* 3. Stelar evolution in Pteridophytes: Heterospory and seed habit. 4. Ecological and economic importance of Pteridophytes. **Examples/Applications/Case Studies:** Case Study 1- True Alternation of Generations. Case Study 2- Pteridophytes as Primary Colonizers. **Exercises/Projects:** Project 1- Poster Making of Life Cycle of Pteridophytes Project 2- Model of Types of Steles in Pteridophytes **Specific Resources:** https://www.youtube.com/watch?v=FTZQIeL80hc&pp=ygUNcHRlcmlkb3BoeXRlcw%3D%3D	10
II	1. General characteristics of Gymnosperms; Sporne (1965) classification. 2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of: (a) Cycadopsida: *Cycas* and (b) Gnetopsida: *Gnetum.* 3. Ecological and economic importance of Gymnosperms. **Examples/Applications/Case Studies:** Case Study 1- Analyzing the distribution of seed size Case Study 2- Functionally pleiotropic with defense **Exercises/Projects:** Project 1- Collection of photographs of gymnosperm plants Project 2- Wood elements in locally available gymnosperms **Specific Resources:** https://www.youtube.com/watch?v=zZ6XPDDeVwk&pp=ygULZ3ltbm9zcGVybXM%3D	12
III	1. Aim and scope of taxonomy, species concept, taxonomic hierarchy-major and minor categories. 2. Plant nomenclature: Binomial system, ICBN- rules for nomenclature. 3. Herbarium and its techniques, BSI herbarium and Kew herbarium; concept of digital herbaria. 4. Bentham and Hooker system of classification. 5. Phylogenetic systematics: primitive and advanced, homology and analogy, parallelism and convergence, monophyly, paraphyly, polyphyly, clades. synapomorphy, symplesiomorphy, apomorphy. APG-IV classification. **Examples/Applications/Case Studies:** Case Study 1- Identification, Classification and Description of Plants Case Study 2- Interrelationship between plants **Exercises/Projects:** Project 1- A brief report on present status of plant taxonomy Project 2- List of systems of plant taxonomy **Specific Resources:** https://www.youtube.com/watch?v=5kuuNHCGkTo&pp=ygUccHJpbmNpcGxlcyBvZiBwbGFudCB0YXhvbm9teQ%3D%3D	10
IV	**Descriptive Plant Taxonomy** Systematic description and economic importance of the following families: 1. Polypetalae: (a) Annonaceae (b) Curcurbitaceae 2. Gamopetalae: (a) Asteraceae (b) Asclepiadaceae 3. Monochlamydae: (a) Amaranthaceae (b) Euphorbiaceae 4. Monocotyledonae: (a) Arecaceae (b) Poaceae	(12Hrs)

	Examples/Applications/Case Studies: Case Study 1- Poster making of comparative study of above said families Case Study 2- Identification of 10 members of different families by each student **Exercises/Projects:** Project 1- Collection of inflorescence of above said families Project 2- Preparation of herbarium of above said families **Specific Resources:** https://www.youtube.com/watch?v=CVaPfKr101c&pp=ygUOcGxhbnQgZmFtaWxpZXM%3D	
V	**Evidences for Plant Systematics** 1. Anatomy and embryology in relation to plant systematics. 2. Cytology and cytogenetics in relation to plant systematics. 3. Phytochemistry in relation to plant systematics. 4. Numerical taxonomy. 5. Origin and evolution of angiosperms. **Examples/Applications/Case Studies:** Case Study 1- Assignment on evolution of angiosperms Case Study 2- Assignment on plant taxonomy and its contribution **Exercises/Projects:** Project 1- Identifying the diversity among different plant species Project 2- Understanding the numerical taxonomy by applying numerical units to the available plants **Specific Resources:** **https://www.youtube.com/watch?v=z5STVo2jRrI&pp=ygUfZXZpZGVuY2VzIGZvciBwbGFudCBzeXN0ZW1hdGljcw%3D%3D**	(12Hrs)

Textbook:

- Botany–IV(Vrukshasastram-II): Telugu Academy, Hyderabad
- Pandey,B.P. (2013)*CollegeBotany, Volume-III*,S. Chand Publishing, New Delhi

Recommended Reference book:

- Aravind Kumar&S.S. Purohit (1998) *Plant Physiology – Fundamentals and Applications*, Agro Botanica, Bikaner
- Datta, S.C. (2007) *Plant Physiology*, New AgeInternational (P)Ltd., Publishers, New Delhi

Course Delivery method: Face-to-face / Blended.
Course has focus on:Foundation
Websites of Interest:
https://youtu.be/4to_4guDx50
https://youtu.be/j0BN8RfeqD0
https://youtu.be/Uc4lDTd1JXs
https://youtu.be/LVxdoH9MLU4
https://youtu.be/MSsVrzYibI8
https://youtu.be/YoNgSOIsk0A

Co-curricular Activities:

1. Question and answer session at the end of class.
2. Observing animations.
3. Written assignments.
4. Group Discussion (GD)/ Quiz.
5. Power Point Presentations.

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE
COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

III SEMESTER END EXAMINATIONS

PAPER– 5 **MODELPAPER** **Course Code: 23BOMAP231**

Title of the paper: Vascular Plants

Time: 3Hours **Max.Marks:50 (CIA+SEE)**

.....

Section-A

Answer the following questions. **5 x 5M = 25Marks**

1) Sporocarp in marselia
(OR)
Heterospory

2) Describe the internal structure of coralloid root of cycas
(OR)
Write about relationship of Gnetum with angiosperms

3) Nomenclature
(OR)
Species concept

4) Economic importance of Cucurbitaceae
(OR)
Floral characters of Asteraceae

5) Chemotaxonomy
(OR)
Alkaloids

Section-B

Answer the following questions. **5 x 10M = 50Marks**

6) Write morphology anatomy reproduction and life cycle of Lycopodium.
(OR)
Write about stelar evolution in Pteridophytes.

7) Give an account on anatomy cycas leaflet.
(OR)
Describe male and female cone in Gnetum

8) Define herbarium. Write the functions and importance of herbarium in Taxonomy.
(OR)
Write an essay on Bentham and Hooker system of classification it merits and demerits

9) Describe the floral characters of family Asclepiadaceae and write pollination mechanism
(OR)
Describe the vegetative floral character poaceae mention its economic importance

10) Explain the role of embryology in relation to plant systematic
(OR)
Give an account on role of cytology in relation to plant Systematics

Botany Major: III Semester

Course 5: Vascular Plants (Pteridophytes, Gymnosperms and Angiosperm Taxonomy)

Practical 02 hours /Week Credits -1

I. Course Outcomes: On successful completion of this practical course, student shall be able to:

1. Distinguish the Pteridophytes and Gymnosperms based on their morphological, anatomicaland reproductive structures.
2. Make systematic classification of plant species using vegetative and floral characters.
3. Identify angiosperm plant species and make herbarium specimens.

II Laboratory/field exercises:

I. Study/ microscopic observation of vegetative, sectional/anatomical and reproductivestructures of the following using temporary or permanent slides/specimens/ mounts:

1. Pteridophyta: *Lycopodium* and *Marselia*

2. Gymnosperms: *Cycas* and *Gnetum*

II. Technical description of locally available plant species from the following angiospermfamilies:

1. Annonacae 2. Cucurbitaceae 3. Asteraceae 4. Asclepiadaceae
5. Amaranthaceae 6. Euphorbiaceae 7. Arecaceae 8. Poaceae

III. Demonstration of herbarium techniques.

IV. Field trip to a local floristic area/forest (Submission of 30 number of Herbarium sheets ofwild plants with the standard system are mandatory).

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

III SEMESTER END EXAMINATIONS

PAPER– 5 **MODELPAPER** **Course Code: 23BOMAP231**

Title of the paper: Vascular Plants (Pteridophytes, Gymnosperms and Angiosperm Taxonomy)

Time: 3Hours **Max.Marks:50 (CIA+SEE)**

I. Semester end Lab Exam

I. Answer the following questions: **Max.Marks:25**

Q1:

Q2:

Q3:

Q4:

Q5:

6 .Viva voce: …….…….. 2M

7 .Record ……..8M

B. Continuous internal Assessment……15 M

TOTAL: (A+B) =50M

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU- 521165, KRISHNA Dt., A.P. (AUTONOMOUS).

NAAC reaccredited at 'A 'level

Autonomous –ISO 9001-2015 Certified

Title of the Paper: **PLANT PATHOLOGY AND PLANT DISEASES (PAPER- 6)**

Course Code	**23BOMAL232**	Course Delivery Method	Class Room / Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2024-25	Year of Offering: 2024 - 25	Year of Revision: --	Percentage of Revision: -

Course Description:

The course introduces the basic concepts of plant disease biology and control, covering disorders caused by fungi, viruses, bacteria, and nematodes, as well as the role of environmental factors (including temperature, moisture, and others) in contributing to the development of epidemics. Upon completion, students will be able to find, interpret, and use scientific literature on plant diseases and discuss a range of control strategies suitable for both traditional and organic growers. Plant diseases are major constraints in the production of food and other crops. The effective control of plant diseases requires understanding the biology of plant diseases and the factors conducive to their development. This course introduces students to basic concepts regarding the biology of plant pathogens, the role of environmental conditions in promoting development of plant diseases, and the development of effective approaches to disease control. At the end of the course, students will be able to find, interpret, and apply scientific information on plant diseases to make management decisions.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To study various plant pathogens, their survival and dispersal mechanisms.
2	To understand the process involved in infection and pathogenesis in plants.
3	To study the common diseases of some important field crops.
4	To study the common disease of some horticultural crops.
5	To understand the management practices of plant diseases.

Course Outcomes:

At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Identify major groups of plant pathogens and classify plant diseases.	**K1**		
CO2	Explain various stages in infection, plant pathogenesis and responsible factors.	**K2**		
CO3	Elaborate the preventive and control measures for plant diseases.	**K2**		
CO4	Discuss about some diseases of field crops and their management.	**K2**		
CO5	Discuss about some diseases of horticultural crops and their management.	**K2**		

CO-PO MATRIX									
CO NO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1									
CO2									
CO3									
CO4									
CO5									

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure:

Syllabus

Course Details

Unit	Learning Units	Lecture Hrs
I	**Plant pathogens, survival and dispersal** 1. Plant pathology: definition, importance of plant diseases, important famines in world; scope and objectives of plant pathology. 2. Important plant pathogenic organisms with examples of diseases caused by them. 3. Classification of plant diseases based on important criteria. 4. A brief account on survival of plant pathogens. Dispersal of plant pathogens – active and passive processes. **Examples/Applications/Case Studies:** Case Study 1- Identifying the survival life a pathogen in and around Case Study 2- Identifying the dispersal of pathogen in and around **Exercises/Projects:** **Activity:** Field Survey and making a report on various plant pathogens, their survival and dispersal mechanisms. **Evaluation method:** Field reports, presentations and visual documentation based on a rubric. **Specific Resources:** **https://youtu.be/W8fBGL3p08c**	12
II	**Infection and pathogenesis in plants** 1. Infection process – pre-penetration, penetration and post-penetration. 2. Role of enzymes in plant pathogenesis. 3. Role of toxins in plant pathogenesis. 4. Role of growth regulators in plant pathogenesis. Defense mechanisms in plants against pathogens. **Examples/Applications/Case Studies:** Case Study 1- Making report on fairly distinct infection causing stages Case Study 2- Poster making on epiphytotic factors **Exercises/Projects:** **Activity:** Case studies on plant infections and factors contributing to disease development. **Evaluation method:** Diagnostic evaluation of case study report for problem-solving and critical thinking skills. **Specific Resources:** **https://www.youtube.com/watch?v=xi4Q0AvJha4&pp=ygUkaW5mZWN0aW9uIGFuZCBwYXRob2dlbmVzaXMgaW4gcGxhbnRz**	12
III	**Plant disease management** 1. Plant disease epidemiology; plant disease forecasting; remote sensing in plant pathology. 2. General principles of plant diseases management. 3. Regulatory methods, cultural methods; biological control and PGPR. 4. Physical methods, chemical methods; host plant resistance. 5. Integrated plant disease management (IDM) – Concept, advantages and importance. **Examples/Applications/Case Studies:** Case Study 1- Assignment on impairment of the normal state of a plant Case Study 2- Assignment on making a goal to reduce the economic and aesthetic damage caused by plant diseases **Exercises/Projects:** **Activity:** A survey report on various preventive and control measures for plant diseases practiced by the farmers in their locality. **Evaluation method:** Peer review by students on the quality of report. **Specific Resources:** **https://www.youtube.com/watch?v=rwiKxaCrHGM&pp=ygUYcGxhbnQgZGlzZWFzZSBtYW5hZ2VtZW50**	12

IV	**Diseases of field crops** Symptoms, etiology, disease cycle and management of major diseases of following crops: a) Rice: Blast of rice, bacterial blight and Tungro b) Bajra: Downy mildew and Ergot c) Pigeon-pea: Phytophthora blight, wilt and sterility mosaic d) Groundnut: Tikka leaf spot, rust and root rot **Examples/Applications/Case Studies:** Case Study 1- Crop disease impact on fields yield Case Study 2- Self –study of disease management in selected crops **Exercises/Projects:** **Activity:** Field survey and data collection on diseases of local field crops. **Evaluation method:** Assessment of the quality of report bases on a rubric. **Specific Resources:** **https://www.youtube.com/watch?v=8FKMzQAeLzs&pp=ygUeZGlzZWFzZXMgb2YgaG9ydGljdWx0dXJlIGNyb3Bz**	12
V	**[Diseases of horticultural crops]** Symptoms, etiology, disease cycle and management of major diseases of following crops: a) Brinjal: Phomopsis blight and Little leaf b) Okra: Powdery mildew and Yellow vein mosaic c) Pomegranate: Alternaria fruit spot and Anthracnose d) Coconut: Bud rot and Basal stem rot **Examples/Applications/Case Studies:** Case Study 1- Sustainable farming practices to avoid diseases of the above said crops Case Study 2- Increased productivity and quality **Exercises/Projects:** **Activity:** Microscopic observations and making drawings of diseased samples. **Evaluation method:** Formative assessment of presentation of findings through visuals/ drawings. **Specific Resources:** **https://www.youtube.com/watch?v=8FKMzQAeLzs&pp=ygUeZGlzZWFzZXMgb2YgaG9ydGljdWx0dXJlIGNyb3Bz**	12

Text Books:

1. R.S. Mehrotra (2008) Plant Pathology, Tata McGraw-Hill Education, New Delhi
2. P.D. Sharma (2011) Fundamentals of Plant Pathology, Tata McGraw-Hill Education, New Delhi

References:

1. Singh, R. P., and U. S. Singh (2020). Plant diseases: Identification, management and challenges. Springer, Singapore.

***

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

III SEMESTER END EXAMINATIONS

PAPER– 5 **MODELPAPER** **Course Code: 23BOMAP232**

Title of the paper: Plant Pathology and Plant diseases

Time: 3Hours **Max.Marks:50 (CIA+SEE)**

Section-A

Answer the following questions. 5 x 5M = 25Marks

1) Principles of plant pathology

(OR)

Dispersal of plant pathogen.

2) Factors involved in infection

(OR)

Role of toxins in plant pathogenesis.

3) Remote Sensing.

(OR)

General principles of plant diseases management.

4) Downy mildew.

(OR)

Tikka leaf spot

5) Powdery mildew.

(OR)

Anthracnose

Section-B

Answer the following questions. 5 x 10M = 50Marks

6) Discuss the important famines in word.

(OR)

Describe the classification of plant diseases based on important criteria.

7) Explain the processes of infection of pathogen in plants.

(OR)

Give an account on role of growth regulators in plant pathogenesis

(OR)

8) Describe plant diseases forecasting mechanism.

(OR)

Write an essay on cultural methods used in plant Disease Control

9) Write about symptoms etiology, disease cycle and management of bacterial leaf bright of rice

(OR)

Explain the symptoms etiology, Disease cycle and management of ergot disease in Bajra.

10) Write an essay on symptoms etiology, disease cycle& management of phomopsis blight disease in Brinjal.

(OR)

Write the symptoms etiology, Disease cycle and management of Alternaria fruit spot disease in pomegranate.

Semester-III

Course 6: Plant Pathology and Plant Diseases Credits -1

II. Course Outcomes: On successful completion of this practical course, student shall be able to:

1. Handle equipment and instruments in plant pathology laboratory.
2. Isolate plant pathogenic microbes.
3. Identify the plant diseases based of histo pathological observations.

III. Laboratory/field exercises:

1. Familiarity with general plant pathological laboratory and field equipment.
2. Isolation and Identification of plant pathogenic fungi.
3. Isolation and Identification of plant pathogenic bacteria.
4. Identification of phanerogamic plant parasites.
5. Isolation and Identification of plant pathogenic nematodes.
6. Demonstration of Koch's postulates
7. Identification and histopathological studies of selected diseases of field crops.
8. Identification and histopathological studies of selected diseases of horticultural crops.

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

III SEMESTER END EXAMINATIONS

PAPER– 6 **MODELPAPER** **Course Code: 23BOMAP232**

Title of the paper: Plant Pathology and Plant Diseases

Time: 3Hours **Max.Marks:50 (CIA+SEE)**

IV. Semester end Lab Exam

I. Answer the following questions: **Max.Marks:25**

Q1:

Q2:

Q3:

Q4:

Q5:

6 .Viva voce: …….…….. 2M

8 .Record ……..8M

B. Continuous internal Assessment……15 M

TOTAL: (A+B) =50M

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE

OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P. (AUTONOMOUS).

NAAC reaccredited at 'A 'level

Autonomous –ISO 9001-2015 Certified

Title of the Paper: **PLANT BREEDING (Paper -7)**

Course Code	**23BOMAL233**	Course Delivery Method	Class Room / Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2021-22	Year of Offering: 2024 - 25	Year of Revision: --	Percentage of Revision: -

Course Description:

Genetic manipulation in plants has underpinned improvements in productivity and has enhanced Sustainability of farming systems worldwide. As well, plant genetic diversity is fundamental to understand Adaptation in natural systems. This course introduces the fundamental concepts of plant breeding and plant Adaptation those are applicable to agricultural and natural systems. Extensive industry engagement is also Undertaken as part of the course curriculum where students connect with industry leaders in the plant Breeding discipline, whether in broad-acre cropping or horticulture. The topics covered include: genetic Diversity in relation to adaptation, productivity, pest and disease resistance and end-use quality; strategies for Setting breeding objectives and maximising selection and improvement of key traits; breeding methodologies for self or cross pollinated plants.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To learn the objectives of plant breeding along with reproductive methods in plants.
2	To learn the scope of plant breeding along with reproductive methods in plants.
3	To understand the breeding methods in plant for production of new varieties
4	To have a comprehensive knowledge on tools in plant breeding.
5	To have a comprehensive knowledge on techniques in plant breeding.

Course Outcomes

At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Compare and contrast the methods of reproduction and also pollination mechanisms.	**K2**		
CO2	Design appropriate pollination method for a given crop plant.	**K6**		
CO3	Recommend the best possible breeding method for a crop species.	**K5**		
CO4	Propose the steps for production of hybrid varieties of crop plants.	**K6**		
CO5	Apply molecular techniques to develop a tailored plant variety.	**K3**		

CO-PO MATRIX									
CO NO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1									
CO2									
CO3									
CO4									
CO5									

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure:

Syllabus

Course Details

Unit	Learning Units	Lecture Hrs
I	**Basic Concepts of Plant Breeding]** 1. Definition, aim, objectives and scope of plant breeding; concepts in plant breeding: genetic variation, heritability, and selection. 2. Advantages and disadvantages of asexual and sexual reproduction; apomixis: definition, types and significance. 3. A brief account of self and cross-pollination, their genetic consequences and significance; classification of crop plants based on mode of pollination and mode of reproduction. **Examples/Applications/Case Studies:** Case Study- Making a report on effect on salt stress on plant breeding. **Exercises/Projects:** Project- Written assessment on reproduction and pollination mechanisms in plants. **Evaluation method:** Awarding grade based on writing appropriate points in a descriptive way. **Specific Resources:** **https://youtu.be/NaRkGTRDiLQ**	12
II	**Contrivances for Cross Pollination** 1. Self-incompatibility in plants – Definition, heteromorphic and homomorphic systems; exploitation of self-incompatibility in hybrid production. 2. Male sterility- Genetic, cytoplasmic and cytoplasmic-genetic, utilization in plant breeding. 3. Domestication of plants centres of origin of crop plants. **Examples/Applications/Case Studies:** Case Study- Report on pollen from fields of fiber. **Exercises/Projects:** Project- Collection of scientific literature on contrivances in plants to promote cross fertilization. **Evaluation method:** Quality and organization of the report in a systematic way with data collected and analysis made. **Specific Resources:** **https://youtu.be/zlM5C6tXvYs**	12
III	**Breeding Method in Plant** 1. Plant introduction – types, objectives, plant introduction agencies in India, procedure, merits and demerits; germplasm collections, genetic erosion, gene sanctuaries. 2. Selection – natural and artificial selection – basic principles of selection. 3. Self-pollinated crops: pure line selection method – procedure, advantages and disadvantages, achievements. 4. Vegetatively propagated crops: Clonal selection - procedure, advantages and disadvantages, achievements. **Examples/Applications/Case Studies:** Case Study- Assignment of yield testing. **Exercises/Projects:** Project 1- Hands on activity of selection procedure for a given crop plant. **Evaluation method:** Assessment of understanding and applying appropriate selection procedure. **Specific Resources:** **https://youtu.be/JPtaseBgU3k?list=PLE4QPzlkt9Kx6Wqw1NQITNbkb2L_fG7gg**	12
IV	**Breeding Methods in Cross Pollinated Plants** 1. Hybridization – objectives, types, procedure, advantages and disadvantages, achievements. 2. Cross-pollinated crops: back cross method - procedure, advantages and disadvantages, achievements. 3. Heterosis: definition, genetic bases of heterosis – dominance, over dominance and epistasis hypotheses; physiological bases of heterosis – commercial utilization. 4. Synthetics and composites – production procedures – merits, demerits and achievements. **Examples/Applications/Case Studies:**	12

	Case Study- An overview of pedigree method **Exercises/Projects:** Project- Field trip to an agriculture or a horticulture research station to learn hybridization techniques. **Evaluation method:** Active participation and learning skills on production of hybrid plants. **Specific Resources:** **https://youtu.be/Pz-D2EoZbD0**	
V	**Modern Methods in Plant Breeding** 1. Mutation breeding: spontaneous and induced mutations- characteristic features of mutations- procedure of mutation breeding-applications-advantages, limitatins and achievements. 2. Polyploidy breeding: auto-polyploids and allopolyploids- applications in crop improvement and limitations. 3. DNA markers and their applications in plant breeding: RFLP, SSR AND SNP. 4. Marker Assisted Selection (MAS) and its applications in plant breeding. **Examples/Applications/Case Studies:** Case Study- Study of maize cultivation by modern methods **Exercises/Projects:** Project- Case studies of modern applications of molecular techniques in crop improvement. **Evaluation method:** Based on a rubric with specified criteria and performance levels of the learner. **Specific Resources:** **https://youtu.be/3WlqbuQPzyg**	12

Text Books:

1. Singh, B. D. (2001) Plant breeding: Principles and methods. Kalyani Publishers, New Delhi, India.

References:

1. Acquaah, G. 2012. Principles of plant genetics and breeding, 2nd ed. Wiley-Blackwell, Ames, Iowa, USA.
2. Allard, R. W. 1999. Principles of plant breeding. John Wiley & Sons, New York, USA.

***

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

III SEMESTER END EXAMINATIONS

PAPER– 7 **MODELPAPER** **Course Code: 23BOMAL233**

Title of the paper: Plant Breeding

Time: 3Hours **Max.Marks:70**

Draw neat labeled diagrams wherever necessary.

SECTION –A

Answer and FIVE of the following **5X4=20Marks**

1. (a). What is plant breeding? 4M

OR

(b). Write a note on parthenogenesis .4M

2. (a) Heteromorphic system . 4M

OR

(b) What are the main features of gameto phytic system? 4M

3. (a) Plant introduction . 4M

OR

(b) NBPGR.4M

4.(a)Back cross method 4M

OR

(b) Mass pedigree method. 4M

5. (a) types of polyploidy 4M

OR

(b) Restriction fragment length polymorphism (RFLP markers).4M

SECTION – B

Answer any Five of the following **5X10=50 Marks**

6. (a). What is selection? Write the various types of selection method in plant breeding.

OR

(b). what is sexual reproduction? What are the advantages and disadvantages of sexual reproduction?

7. (a) Describe the centres of orgin of crop plants .

OR

(b) Define self incompatibility write the various types of self incompatibility systems .

8 (a). Define plant introduction. explain the types and object use of plant introduction .

OR

(b). Define selection write about natural and artificial selection.

9. (a).Write an essay on different types of hybridization

OR

(b). Write an essay on commercial utilization of heterosis

10. (a) Define mutation. Write the classification of mutations.

OR

(b) Write an essay on DNA markers and their applications in plan reading.

III Semester Course 7:

Plant Breeding Credits -1

Course Outcomes: On successful completion of this practical course, student shall be able to:

1. Distinguish self and cross-pollinated plant species based on floral biology.
2. Perform skills related to self and cross pollination in plants.
3. Make hybridization to produce new varieties.

II. Laboratory/field exercises:

1. Floral biology in a self and a cross pollinated plant species.
2. Identification and classification of plants based on pollination mechanism.
3. Pollen viability test.
4. Observation on pollen germination.
5. Practicing emasculation technique.
6. Practicing selfing and crossing techniques.
7. Assessment of genetic variability.
8. Estimation of heterosis and inbreeding depression.
9. Studying mutant and polyploids in crop plants.

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

III SEMESTER END EXAMINATIONS

PAPER– 7 **MODELPAPER** **Course Code: 23BOMAP233**

Title of the paper: Plant Breeding

Time: 3Hours **Max.Marks:50 (CIA+SEE)**

V. Semester end Lab Exam

I. Answer the following questions: **Max.Marks:25**

Q1:

Q2:

Q3:

Q4:

Q5:

6 .Viva voce: …….…….. 2M

9 .Record ……..8M

B. Continuous internal Assessment……15 M

TOTAL: (A+B) =50M

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P. (AUTONOMOUS).

NAAC reaccredited at 'A 'level

Autonomous –ISO 9001-2015 Certified

Title of the Paper: **PLANT BIOTECHNOLOGY (paper-8)**

Course Code	**23BOMAL234**	Course Delivery Method	Class Room / Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2021-22	Year of Offering: 2024 - 25	Year of Revision: --	Percentage of Revision: -

Course Description:

The course deals with the study of plant life and application of technical approaches to biological environments and living organisms.

Students undertaking this course will be introduced to concepts and applications of modern plant biotechnology in agriculture. Areas to be covered include: Introduction to plant biotechnology; Tissue culture media and preparation; Sterilisation techniques; In vitro micropropagation; Application of tissue culture to plant breeding; Introduction to molecular biology; Genome organization, structure and function; Basic molecular techniques; PCR based techniques; Genetic markers; Applications of molecular; Gene Cloning; Gene transfer in plants; Transgenics in crop improvement; and Impact of recombinant DNA technology.

Course Aims and Objectives:

S.NO	**COURSE OBJECTIVES**
1	To familiarize the students with the key developments in the sphere of Plant Biotechnology.
2	To understand the basics principles of Plant Tissue culture Techniques.
3	To Learn Basic Sterilization Techniques used in Plant Tissue culture.
4	To acquire Knowledge of secondary metabolites and Biotransformation Techniques.
5	To Know the Applications of Transgenic plants.

Course Outcomes:

At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	To understand the basics principles of plant sciences and molecular biology	**K1**		
CO2	To have a knowledge of laboratory techniques used in plant biotechnology.	**K2**		
CO3	To understand the industrial applications of biotechnology in developing new products.	**K2**		
CO4	To undertake research in plant biotechnology.	**K3**		
CO5	Gain basic knowledge on trait improvement in plants.	**K4**		

CO-PO MATRIX									
CO NO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1									
CO2									
CO3									
CO4									
CO5									

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Syllabus

Course Details

Unit	Learning Units	Lecture Hrs
I	**Basic techniques in plant tissue culture** 1. Plant Tissue Culture: Defination, scope and Significance; infrastructure and equipment required to establish a tissue culture laboratory. 2. Sterilization Techniques; formulation of media for plant tissue culture. 3. Concept of totipotency; initiation and maintenance of callus cultures; induction of morphogenesis in vitro. 4. Somatic embryogenesis and organogesis; factors affecting somatic embryogenesis and organogesis synthetic seeds and their Applications. **Applications:** Assignment 1 : Basics of PlantTissue culture protocols. Assignment 2: Laboratory safety Rules and Guidelines. Activity 1: MS media(Murashige – Skoog) composition and preparation Activity 2: Preparation of callus cultures **Specific Resources:** https://passel2.unl.edu/view/lesson/a2f44b5b9a27/1 https://byjus.com/biology/plant-tissue-culture/	12
II	1. Importance and applications of meristem culture, zygotic embryo culture, endosperm culture. 2. Micro propagation and it's uses, commercial exploitation of micro propagation. 3. Production of haploids using another, pollen and unfertilized ovule cultures characterization and applications. **Applications** Assignment 1: Prepare PPT on Different culture Techniques Assignment 2: Prepare PPT on Micro propagation and it's applications **Specific Resources:** https://byjus.com/biology/tissue-culture/ https://www.geeksforgeeks.org/micropropagation/	12
III	**Cell and protoplast cultures.** 1. Cell suspension-continuous and batch cultures; mass cultivation of plant cell using bioreactors. 2. Production of secondary metabolites from cell cultures, strategies used for enhanced production of secondary metabolites. Biotransformation using plant cell cultures. 3. Isolation, purification and culture of protoplast; methods used for protoplast fusion. 4. Somatic hybridization/ cybridization - selection systems for somatic hybrids/ cybrids, their characterization and applications. **Applications**: Assignment 1: Prepare PPT on Bioreactor. Assignment 2: Prepare PPT on Secondary metabolites production **Specific Resources:** https://byjus.com/biology/tissue-culture/ https://www.geeksforgeeks.org/micropropagation/	12
IV	**Transgenic plants** 1. Transgenic plants - Defination, bio safety and ethical issues associated with transgenic plants. 2. Herbicide resistance (glyphosphate), insect resistance (alpha amylase inhibitor). 3. Virus resistance (coat protein mediated, nucleocapsidgene), disease resistance (antifungal proteins,PR protein). Quality improvement (Golden rice), shelf-life enhancement (flavr savr tomato). **Applications:** Assignment 1: Prepare PPT on Transgenic plants. Assignment 2: Prepare PPT on insect resistance plants **Specific Resources:** **https://www.geeksforgeeks.org/transgenic-plants/**	12

V	**Advances in plant biotechnology** 1. Plant synthetic biology and it's applications; plant-based vaccines and therapeutics. 2. Biofortification and genetically modified foods. 3. Biodegradable plastics, poly hydroxyl butyate. 4. Applications of plant biotechnology in bio energy production and environmental remediation. **Applications:** Assignment 1: Prepare PPT on Bioremediation. Assignment 2: Prepare PPT on genetically modified foods. **Specific Resources:** **https://www.slideshare.net/slideshow/applications-of-plant-biotechnology/130591402** **https://delhigreens.com/2020/08/20/5-uses-of-biotechnology-in-environmental-protection/**	12

Text Books:

1. Ignacimuthu, S., (2003) Plant Biotechnology. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

2. Kalyan Kumar De., (1997) Plant Tissue Culture - New Central Book Agency (P) Ltd., Calcutta.

3. Mascarenhas A.F., (1991) Hand book of Plant Tissue Culture. Indian Council of Agricultural Research. New Delhi.

References:

1. C. Neal Stewart Jr. (2018) Plant Biotechnology and Genetics: Principles, Techniques, and Applications John Wiley & Sons, Inc. in Hoboken, New Jersey, USA.

2. Adrian Slater, Nigel W. Scott, and Mark R. Fowler (2008) Plant Biotechnology: The Genetic Manipulation of Plants Oxford University Press in Oxford, UK.

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

III SEMESTER END EXAMINATIONS

PAPER– 8 **MODELPAPER** **Course Code: 23BOMAL232**

Title of the paper: Plant Biotechnology

Time: 3Hours **Max.Marks:70**

Draw neat labeled diagrams wherever necessary.

SECTION –A

Answer and FIVE of the following **5X4=20Marks**

1. (a). Synthetic seeds 4M

OR

(b). Totiotency 4M

2. (a) Micropropopagation . 4M

OR

(b) Embryo culture 4M

3. (a) Importance of protoplast 4M

OR

(b) Bio transformation 4M

4. (a) transgenic plants 4M

OR

(b) Insect resistance 4M

5. (a) Biodegradable plastics 4M

OR

(b) Genetically modified foods 4M

SECTION – B

Answer any Five of the following **5X10=50 Marks**

1. (a).Define Sterilization .write various techniques of sterilization.

OR

(b) Define Tissue culture? Write its scope and significance.

2. (a) write an essay on endosperm culture.

OR

(b) Give an account on commercial exploitation of micro propagation?

3. (a) write an essay on mass cultivation of plant cells using bioreactors.

OR

(b).what are the various methods used for protoplast fusion.

4. (a). Write an essay on herbicide resistance.(glyphosphate)

OR

(b) Describe the steps involved in production of Trans genic plants.

5. (a)give an account on Bio fortification and genetically modified foods?

OR

(b) Define plant synthetic biology. Writes its applications?

Semester -III

Plant Biotechnology Credits -1

I. Course Outcomes: On successful completion of this practical course, student shall be able to:

1. Operate all the equipment and instruments in a plant tissue culture laboratory.
2. Establish callus and organ culture.
3. Obtain quality plants using micro-propagation techniques.

II. Laboratory/field exercises:

1. Equipment used in plant tissue culture.
2. Sterilization techniques in plant tissue culture laboratory.
3. Preparation of culture media
4. Callus induction and sub culturing.
5. Organogenesis using PGRs'
6. Demonstration of cell and protoplast culture.
7. Demonstration of organ cultures.
8. Demonstration of anther and pollen cultures.

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

III SEMESTER END EXAMINATIONS

PAPER– 8 **MODELPAPER** **Course Code: 23BOMAP234**

Title of the paper: Plant Biotechnology

Time: 3Hours **Max.Marks:50 (CIA+SEE)**

A. Semester end Lab Exam

I. Answer the following questions: **Max.Marks:25**

Q1:

Q2:

Q3:

Q4:

Q5:

6 .Viva voce: …….. 2M

7 .Record ……..8M

B. Continuous internal Assessment: ……15 M

TOTAL: (A+B) =50M

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt, A.P.(AUTONOMOUS).

NAAC reaccredited at 'A 'level

Autonomous– ISO9001-2015Certified

Title of the Paper: **Plant tissue culture**

Semester:-VI

Course Code	BOTSE01	Course Delivery Method	Class Room/Blended Mode - Both
Credits	4	CIA Marks	30
No. of Lecture Hours/Week	3	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction:2022-23	Year of Offering 2022-2023	YearofRevision–2023- 24	Percentage of Revision:0%

Type of the Course: Skill Enhancement Course (Elective: Theory),

Course Outcomes: Students at the successful completion of the course will be able to:

CO1	Comprehend the basic knowledge and applications of plant tissue culture.
CO2	Identify various facilities required to setup a plant tissue culture laboratory.
CO3	Acquire a critical knowledge on sterilization techniques related to plant tissue culture.
CO4	Demonstrate skills of callus culture through hands on experience.
CO5	Understand the bio transformation technique for production of secondary metabolites.

Syllabus

Course Details:

Unit	Learning Units	Lecture Hours
I	**Basic concepts of plant tissue culture** Plant tissue culture: Definition, history, scope and significance. Totipotency, differentiation, dedifferentiation, and redifferentiation; types of cultures. Infra structure and equipment required to establish a tissue culture laboratory.	**12**
II	**Sterilization techniques and culture media** Aseptic conditions – Fumigation, wet and dry sterilization, UV sterilization, ultra filtration. Nutrient media: Types of media. Composition and preparation of Murashige and Skoog culture medium.	**12**
III	**Callus culture technique** Explant: Definition, different explants for tissue culture, surface sterilization, inoculation methods. Callus culture: Definition, various steps in callus culture. Soma clonal variations and their isolation.	**12**
IV	**Micro propagation** Direct and indirect morphogenesis, organogenesis, role of PGRs; Somatic embryogenesis and synthetic seeds. Protoplast Culture. Cybrids.	**12**
V	**Applications of plant tissue culture** Germ plasm conservation: cryopreservation methods, slow growth, applications and limitations; cryo protectants. r DNA Technology. Transgenic plants - gene transfer methods, BT cotton, Golden Rice.	**12**

-References/Text Book /e-books/websites:

1. Razdan, M.K.(2005)Introduction to Plant Tissue Culture, Oxford & IBH Publishers, Delhi

2. Bhojwani, S.S.(1990) Plant Tissue Culture: Theory and Practical (a revised edition).Elsevier Science Publishers, New York, USA.

Reference Materials on the Web / web links:

https://www.youtube.com/watch?v=dFrx-t5J0PA

https://www.youtube.com/watch?v=A6qEgc6Jt3Q

Co – Curricular Activities

A) Mandatory:(Training of students by teacher infield related skills:(lab:10+field:05)

1. **For Teacher**: Training of students by teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of sterilization procedures, preparation of media, establishment of callus culture, growth measurements; morphogenesis and organogenesis; acclimatization and hardening of plantlets.

2. **For Student**: Students shall (individually) visit anyone of plant tissue culture laboratories in universities/research organizations/private facilities, write their observations on tools, techniques, methods and products of plant tissue culture; and submit a hand-written Fieldwork/Project work Report not exceeding 10 pages to the teacher in the given format.

3. Max marks for Fieldwork/Project work Report: 05

4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.

5. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.

2. Assignments (including technical assignments like identifying tools in plant tissue culture and their handling, operational techniques with safety and security, IPR)

3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).

4. Preparation of videos on tools and techniques in plant tissue culture.

5. Collectionofmaterial/figures/photosrelatedtoproductsofplanttissueculture,writing and organizing them in a systematic way in a file.

6. Visitstoplanttissueculture/biotechnologylaboratoriesinuniversities,research organizations, private firms, etc.

7. Invitedlecturesandpresentationsonrelatedtopicsbyfield/industrialexperts**.**

A.G &S.G. SIDDHARTHA DEGREECOLLEGE OFARTS ANDSCIENCE, VUYYURU
(An Autonomous college in the jurisdiction of Krishna University)

TITLE OF THE PAPER: PLANT TISSUE CULTURE

Model Question Paper

Max.Time:3Hrs. Course Code: **BOTSE01** Max.Marks:75M

SECTION–A

Answer any FIVE of the following questions. 5x5=25Marks

(Draw diagrams wherever necessary)

Each answer carries 5marks. Atleast1question should be given from each Unit

1. What is totipotency? Explain.CO1L4**.**
2. Describe the method of dry sterilization.**CO2L1.**
3. Enumerate the soma clonalvariations.**CO3,L1.**
4. Discuss about the cybrids.**CO4, L2.**
5. Prepare a note on role of auxins.**CO5,L3.**
6. State a note on Bt Cotton.**CO5,L1.**
7. What is morphogenesis? Describe.**CO4,L1.**
8. Describe the synthetic seeds in detail.**CO4,L1.**

SECTIONB 5x10 =50Marks

Answer allquestions.Eachanswercarries10marks.Twoquestionsshouldbegiven from each unit with internal choice.

9. (a) State the concepts differentiation, dedifferentiation, andRedifferentiation.**CO1,L1**

OR

(b) Enumerate an account of Infrastructure and equipment required to establish a tissue culture laboratory.**CO1, L1**

10.(a) Explain various methods of sterilization.**CO2, L4**

OR

(b)Discriminate an account ofthecompositionandpreparationofMSmedia.**CO2, L4**

11.(a)Paraphrasevariouswaysofsurfacesterilizationofexplants.**CO3,L2**

OR

(b)Summarizeanaccountofcallusculture.**CO3, L2**

12. (a) Illustrate about somatic embryogenesis.**CO4,L3**

OR

(b)Demonstrate the process of Organogenesis in plant tissue culture.**CO4,L3**

13.(a).Explain the steps involved in r DNA Technology.**CO5,L2.**

OR

(b) Memorize the Agro bacterium mediated gene transfer method.**CO5, L4**

A.G&S.G.SIDDHARTHADEGREECOLLEGEOFARTSANDSCIENCE, VUYYURU
(An Autonomous college in the jurisdiction of Krishna University)
Practical Syllabus
SEMESTER-VI **PAPER-II** **CREDITS: 01**

BOTANY	BOTSEP01	WEF:2023-2024	B.Sc (BZC), AQUA

Title of the paper: **PLANT TISSUE CULTURE** **NO.OF.HOURS:30**
Type of the Course: Skill Enhancement Course (Elective: Practical),

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Demonstrate the applications of autoclave, laminar air flow, hot air oven.
CO2: Sterilize the glassware and tools used for tissue culturing.
CO3: Prepare different stock solutions, media.
CO4: Measure the growth of callus formed.
CO5: Demonstrate the hardening and acclimatization in greenhouse.

II: Practical (Laboratory) Syllabus :(30Periods): At least 8Practicals….

1. Principles and applications of - Autoclave, Laminar Air flow, Hot Air Oven.

2. Sterilization techniques for glass ware, tools etc.

3. MS medium – Preparation of different stock solutions; media preparation

4. Explants preparation, inoculation and initiation of callus from carrot.

5. Callus formation, growth measure ments.

6. Induction of somatic embryos, preparation of synthetic seeds.

7. Multiplication of callus and organogenesis.

8. Hardening and acclimatization in green house.

III. Lab References:

1. Reinert ,J. and M.M.Yeoman,1982. Plant Cell and Tissue Culture – A Laboratory

2. Manual ,Springer –Verlag Berlin Heidelberg

3. RobertN.TrigianoandDennisJ.Gray,1999. Plant Tissue Culture Concepts and Laboratory Exercises. CRC Press, Florida

4. AshokKumar,2018.PracticalManualforBiotechnology,CollegeofHorticulture&Forestry, Jhalawar, AU, Kota
5. Chawla,H.S.,2003.PlantBiotechnology:APracticalApproach,NovaSciencePublishers,New York
6. Web sources suggested by the teacher concerned.

Practical Question Paper

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

……

Time Allowed : 3hours **Max.Marks:40**

1.Demonstration of a sterilization technique ‘A’ 7 M

2.Preparation of MS medium ‘B’ 8 M

3. Demonstration of callus culture technique /synthetic seeds ‘C’ 5M

4. Scientific observation and data analysis…… ..4 x 3 =12 M

D. Tissue culture equipment /photograph

E. Morphogenesis or organogenesis - photograph

F. Direct gene transfer methods/Secondary metabolite

G. Transgenic plant/photograph

5. Record 5M

6.Vivavoce 3M

Evaluation Scheme	Marks
One Major Experiment (Experiment No :)	15
One Minor Experiment (Experiment No:)	10
Slide Preparation, if any	5
Practical Record + Viva Voce	10
Total	40

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

NAAC reaccredited at 'A 'level
Autonomous–ISO9001-2015Certified

Title of the Paper: **Mushroom cultivation (7C)**

Semester:-VI

Course Code	BOTSE02	Course Delivery Method	Class Room/Blended Mode - Both
Credits	4	CIA Marks	25
No. of Lecture Hours/Week	3	Semester End Exam Marks	75
Total Number of Lecture Hours	60	Total Marks	100
YearofIntroduction:2022-23	Year of Offering 2022-2023	YearofRevision–2023- 24	Percentage of Revision:0%

Course Out comes: Students at the successful completion of the course will be able to:

CO1	Comprehend the value of mushrooms
CO2	Identify the methods of composting and the materials required.
CO3	Acquire a critical knowledge on spawning and casing.
CO4	Demonstrate skills in cultivation of various mushrooms.
CO5	Understand the Post-harvest technology.

Syllabus

Course Details:

Unit	Learning Units	Lecture Hours
I	Mushrooms: Definition, structure of a mushroom and a brief account of life cycle; historical account and scope of mushroom cultivation; difference between edible and poisonous mushrooms. Morphological features of any four edible mushrooms, Button mushroom (*Agaricus bisporus*), Milky mushroom (*Calocybe indica*), Oyster mushroom (*Pleurotu ssajor-caju*) and Paddy straw mushroom (*Volvariellavolvacea*). Nutritional value of mushrooms; medicinal mushrooms in South India – Ganoderma lucidum, Phellinus rimosus, Pleurotus florida and Pleurotus pulmonaris – their therapeutic value ; Poisonous mushrooms - harmful effects.	**12**
II	**Basic requirements of cultivation system** Small village unit and larger commercial unit; lay out of a mushroom farm –location of building plot, design of farm, bulk chamber, composting, equipment and facilities, pasteurization room and growing rooms. **Compost and composting**: Definition, machinery required for compost making, materials for compost preparation. Methods of composting –long method of composting and short method of composting	**12**
III	**Spawning and casing** Spawn and spawning: Definition, facilities required for spawn preparation; preparation of spawn substrate. Preparation of pure culture, media used in raising pure culture; culture maintenance, storage of spawn. Casing: Definition, Importance of casing mixture, Quality parameters of casing soil, different types of casing mixtures, commonly used materials.	**12**
IV	**Mushroom cultivation** Raw material, compost, spawning, casing, cropping, and problems in cultivation (diseases, pests and nematodes, weed molds and their management strategies), picking and packing for any Four of the following mushrooms: (a) Button mushroom (b) Oyster mushroom (c) Milky mushroom and (d) Paddy straw mushroom.	**12**
V	**Post harvest technology** Shelf life of mushrooms; preservation of mushrooms - freezing, dry freezing, drying and canning. Quality assurance and entrepreneurship - economics of different types of mushrooms; value added products of mushrooms. Management of spent substrates and waste disposal of various mushrooms.	**12**

References / Text Book/ e-books/websites

1. Tewari Pankaj Kapoor, S.C.(1988). Mushroom Cultivation. Mittal Publication, New Delhi.

2. Pandey R.K,S.K Ghosh,(1996). A Hand Book on Mushroom Cultivation. Emkey Publications

3. Web resources suggested by the teacher concerned and the college librarian including reading material.

Reference Materials on the Web/weblinks:

https://www.youtube.com/watch?v=DwMCw14khIU

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

IV Co – Curricular Activities

(a) Mandatory: (Training of students by teacher in field related skills:(lab:10+field:05)

1. **For Teacher**: Training of students by teacher in the laboratory/field for not less than 15 hours on the field techniques/skills of identification of edible and poisonous mushrooms, basic facilities of a mushroom culture unit, preparation of compost and spawn, cultivation practices of edible mushrooms, storage and marketing of produce.

2. **For Student**: Students shall (individually) visit mushroom culture units in universities/research organizations/private sector write their observations on infrastructure, cultivation practices and products of a mushroom culture unit etc., and submit to the teacher a hand-written Fieldwork/Project work Report not exceeding 10 pages in the given format.

3. Max marks for Field work /ProjectworkReport:05.

6. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.

4. Unit tests (IE).

b) Suggested Co – Curricular Activities:

1. Training of students by related industrial experts.

2. Assignments (including technical assignments like identifying various mushrooms, tools and techniques for culture, identification and control of diseases etc.,

3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).

4. Preparation of videos on tools and techniques in mushroom culture.

5. Collection of material /figures /photos related to edible and poisonous mushrooms, cultivation of mushrooms in cottage industries, writing and organizing them in a systematic way in a file.

6. Visits to mushroom culture units in universities, research organizations, private firms, etc.

7. Invitedlecturesandpresentationsonrelatedtopicsbyfield/industrialexperts.

A.G&S.G.SIDDHARTHADEGREECOLLEGEOFARTSANDSCIENCE, VUYYURU

(An Autonomous college in the jurisdiction of Krishna University)

TITLE OF THE PAPER: Mushroom Cultivation

Model Question Paper Structure for SEE

Max.Time:3Hrs. Course Code: BOTSE02 Max.Marks:75M

……

Short Answer Questions **SECTION–A**

Answer any Five questions. **5x5 =25Marks**
Each answer carries 5marks.Atleast1questionshouldbegivenfromeach Unit

1. Extend the medicinal value of Ganoderma.CO2,L2
2. Describe the small village unit.CO2,L1
3. List the facilities required for spawn preparation.CO3,L1
4. Explain weed mold inmushroomcultivation.CO4,L4
5. IllustratetheNovelValueAddedProductsofMushrooms.CO5,L3
6. Enumerate the Poisonous mushrooms.CO1,L1
7. Summarize Lay out of a mushroom farm.CO2,L2
8. Explain about the Casing oil.CO3,L4

SECTIONB **5x10 =50Marks**

Answer all questions. Each answer carries 10marks.Two questions should be given from each unit with internal choice.

9. (a)Describe the life cycle of a mushroom.**CO1,L1**

OR

9. (b) Describe the morphological features of Paddy straw and oyster mushroom.**CO1,L1.**

10. (a) Explain various types of composting methods.**CO2,L4**

OR

10. (b) Point out basic requirements of mushroom cultivation.**CO2,L4.**

11.(a) What is casing ? Explain different types of casing mixture and their Importance.**CO3, L4**

OR

11.(b)Appraise an account of different types of media used for preparation of pureculture.**CO3,L4**

12.(a)Summarize the process of cultivation of Milky mushroom.**CO4,L1**

OR

12. (b) Extend an account cultivation of Oyster mushroom.**CO4,L1**

13. (a) Explain the shelf life of mushrooms? What are the conditions required to improve shelf life of mushrooms? **CO5,L4**

OR

13. (b) Explain how mushrooms are preserved through Freeze drying method.**CO5,L4**

A.G&S.G.SIDDHARTHADEGREECOLLEGEOFARTSANDSCIENCE,VUYYURU

(An Autonomous college in the jurisdiction of Krishna University)

Practical Syllabus

SEMESTER-V **PAPER- V** **CREDITS:01**

BOTANY	BOTSEC02	**WEF:2023-2024**	**B.Sc (BZC), AQUA**

MUSHROOMCULTIVATION

Type of the Course: Skill Enhancement Course (Elective: Practical),

I. **Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Identify different types of mushroom.
CO2: Demonstrate preparation of pure culture of an edible mushroom.
CO3: Prepare compost and casing mixture.
CO4: Crop and harvest mushrooms.
CO5: Prepare value - added products.

II: Practical (Laboratory) Syllabus :(30Periods): Atleast8Practicals….

1. Identification of different types of mushrooms.

2. Preparation of pure culture of an edible mushroom.

3. Preparation of mother spawn.

4. Production of planting spawn and storage.

5. Preparation of compost and casing mixture.

6. Demonstration of spawning and casing.

7. Hands on experience on cropping and harvesting.

8. Demonstration of storage methods.

9. Preparation of value-added products.

III. Lab References:

1. SushmaSharmaSapnaThakurAjarNathYadav,2018. Mushroom Cultivation: A Laboratory Manual, Eternal University, Sirmour, H.P.

2. Kadhila-Muandingi,N.P.,F.S.MubianaandK.L.Halueendo,2012.Mushroom Cultivation: A Beginners Guide, The University of Namibia

3. Gajendra Jagatap and Utpal Dey, 2012. Mushroom Cultivation: Practical Manual, LAMBERT Academic Publishing, Saarbrücken, Germany

4. DeepakSom,2021.APracticalManualonMushroomCultivation,P.K.Publishers& Distributors, Delhi

5. Web sources suggested by the teacher concerned.

Question Paper Pattern: Practical

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

.....

Time Allowed: Three hours **Max.Marks:40**

1. Demonstration of preparing pure culture / mother spawn 'A' 7 M
2. Preparationmethodforplantingspawnandstorage/compostandcasingmaterial'B' 8 M

3. Demonstration of spawning and casing/storage and making a value - added product'C'5 M

4. Scientific observation and data analysis 4x 3 =12M

D. Edible /poisonous mushroom specimen/photograph
E. Infrastructure /tool used in mushroom cultivation
F. Material for compost/casing
G. Storage practice /a value- added product

5. Record 5M
6. Viva Voce 3M

Evaluation Scheme	Marks
One Major Experiment (Experiment No :)	15
One Minor Experiment (Experiment No :)	10
Slide Preparation, if any	5
Practical Record + Viva Voce	10
Total	40

Multi disciplinary Courses

PRINCIPLES OF BIOLOGICAL SCIENCES

Credits: 2 2 hrs/week

Learning Objectives: By the end of this course the learner can:

1. Acquire logic to evaluate fundamental biological concepts at various levels of biological organisation including the molecular, cellular, organism and systems levels.
2. Communicate fundamental biological knowledge between tiers of biological organisation.
3. Apply common biological principles across all levels of biological organization.

Learning Outcomes: On completion of this course students will be able to:

1. Understand the relationship between structure and function at all levels.
2. Recognise the mechanisms under lying biological evolution, its patterns, and its significance as biology's overarching unifying principle.
3. Understand the contributions of biology to the resolution of medical, ethical, social, and environmental concerns in human affairs.

unit	Learning Unit	Lecture Hours
I	**Diversity of Life** 1.Introduction to Biology, Branches of Biology, Basic Principles of Biology 2. Biological Classification-Two kingdom and Five kingdom classification. 3. Tobacco mosaic Viruses.	
II	**Bio molecules and metabolisim** 1. Ultra structure of cell and Cell organelles (Structure and Functions), Plant cell vs Animal cell. 2. Nitrogen fixation. 3. Human Physiology: Digestion System, structure of heart.	
III	Genetics: 1. Mendel's laws of inheritance, Genetic disorders- Sickle cell anemia. 2. Evolution: Geological time scale. 3. Common Human Diseases: causing organism, prevention and treatment- cancer, corona. 4. Common Plant Diseases: causing organism, prevention and treatment- late Blight of Rice, Citrus Canker. 5. Biotechnology: Tools and process of recombinant DNA technology, Applications of biotechnology in agriculture, food industry, medicine and transgenic animals.	

A.G&S.G.SIDDHARTHADEGREECOLLEGEOFARTSANDSCIENCE, VUYYURU

(An Autonomous college in the jurisdiction of Krishna University)

TITLE OF THE PAPER: PRINCIPLES OF BIOLOGICAL SCIENCES

Model Question Paper Structure for SEE

Max.Time: 2Hrs. Course Code: Max.Marks:35M

……

SECTION–A

I. Answer any THREE of the following Questions. 3x5=15M

1. Tobacco mosaic Viruses.

2. Citrus Canker

3. Mitochondria

4. Plant cell

5. Corona

6. Branches of Biology

SECTION–B

II. Answer any TWO of the following Questions. 2x10=20M

7. Write about Five kingdom of classification.

8. Explain Human Digestion System.

9. Process of recombinant DNA

10. Applications of biotechnology in agriculture, food industry.

INTERNALS: 15M

ADUSUMILLIGOPALAKRISHNAIAH&SUGARCANEGROWERSSIDDHARTHADEGREEC OLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P.(AUTONOMOUS).

NAAC reaccredited at 'A 'level

Autonomous–ISO9001-2015Certified

Value added course

PLANT NURSERY MANAGEMRNT

OBJECTIVES:

The main objective of the nursery is to grow plants in an open environment, maintain a good quality of plants and protect the plants from pests and diseases.

METHODOLOGY:

Planning - demand for planting material, provision of mother blocks, requirement of land area, water supply, working tools, growing structures and input availability.

Implementation - land treatment, protection against biotic interference and soil erosion, proper layout, input supply, etc.

Duration:

A.G. & S.G. Siddhartha Degree College of Arts & Science

Vuyyuru-521165, Krishna District, Andhra Pradesh

Value Added Course

Title: PLANT NURSERY

Date : From to

Date	Content	Module No.
	Introduction to Plant Nursery 1. Plant nursery: definition, importance. 2. Different types of nurseries on the basis of duration, plant partsused for propagation. 3. Basic facilities for a nursery: layout and components of a goodnursery.	**UNIT-1**
	Basic Requirements for Nursery 1. Nursery beds – types and precautions to be taken during preparation. 2. Growing media, nursery tools and implements, containers for plantnursery in brief. 3. Outlines of vegetative propagation techniques to produce plantingmaterial. 4. Sowing methods of seeds and planting material.	**UNIT-2**
	1. Seasonal activities and routine operations in a nursery. 2. Nursery management- watering, weeding and nutrients: pests anddiseases. 3. Common possible errors in nursery activities. 4. Economics of nursery development, pricing and recordmaintenance. Online nursery information and sales systems	**UNIT-3**
	Practical Syllabus 1. Demonstration of Nursery bed making of propagation media.2. Demonstration of preparation of media for Nursery. 3. Hands on training on vegetative propagation techniques. 4. Hands on training on showing methods of seeds and other material.5. Visit to an agriculture/horticulture/forest nursery. 5. Case study on establishment and success of a plant nursery.	**UNIT-4**

A.G. & S.G. Siddhartha Degree College of Arts & Science

Vuyyuru-521165, Krishna District, Andhra Pradesh

Value Added Course

Title: PLANT NURSERY

Test Exercise:

1. Horticulture is the study that includes

a) Fruits, vegetables and flowers b) All food crops c)Vegetable gardens and lawns near hotels only d)Some bush crops and apples

2. Root suckers are

a) Insects that suck nutrients from the roots of plants
b) Shoots that arise from roots to form new plant
c) New plant parts that arise from the branches of fruit trees
d) Roots of neighbouring plants that share water with the another plant

3. A variety or strain produced by horticultural or agricultural techniques and not normally found in natural population is called

a) Hybrid b) Tissue culture c) GMO d) Cultivar

4. Cryopreservation is a technique used for

a)Crystallization of food b) Food packing
c) Seed saving d) Preservation of excess production of vegetables

5. In hybridization this is not part of the technique used

a) Transfer pollen b) Collect pollen
c) Emasculate d) Use of two plants to bridge the stems together

6. Tissue culture is a good technique to

a) Cross two varieties b) Rapidly increase the size of a trees by strengthening the stem
c) Eliminate virus d) Improve yield of crops

7. The following is not a plant growth regulator

a) Acetic acid b) Auxins c) Gibberellins d) Ethylene

8. Mycorrhizae is associated with the following

a) Formation of root nodules b) Hyphae penetrating the soil
c) Found mostly in lower plants d) Soil erosion

9. The pH in soils can be raised by adding

a) Sand b) lime c) sulphur d) nitrogen

10. In cold places frost damage can be reduced in horticultural crops using these methods except

a) Overhead sprinklers at night b) Green houses and shade nets
c) Wind breaks placement d) Appropriate fungicide application

11. For seed treatment is a suitable fungicide.

(a) carbandzim (b) monocrotophos (c) copper (d) zinc

12. The soil for a nursery should preferably be_____.

(a) Clayey (b) sandy (c) sandy loam (d) black

13. The nursery must be free from _____.

(a) water logging (b) organic matter (c) fertiliser (d) irrigation water

14. A _____ type of nursery protects seedlings from extreme weather conditions.

(a) Thatched roof (b) shade-net (c) poly-tunnel (d) None of the above

15. The type of nursery bed prepared during the rainy season is _____.

(a) sunken (b) raised (c) flat (d) furrow

16. The soil that must be used as growing medium is _____.

(a) clayey (b) sandy loam (c) red soil (d) acidic

17. Sphagnum moss is commercially used as a rooting medium in _____.

(a) air layering (b)budding (c) grafting (d) cutting

18. Organic compound, which promotes or inhibits the growth of the plant, is known as _____.

(a) PGR (b) nitrogen (c) boron (d) vermin compost

19. High value annual seeds are, generally, sown _____.

(a) by broadcasting (b) in line sowing (c) in pro-trays (d) in pots

20. The common growing medium in plug-trays is _____.

(a) coco peat (b) sand (c) vermiculite (d) soil

21. Removal of plants from pots for planting is called _____.

(a) Re-potting (b) de-potting (c) potting (d) None of the above 4. Application of fertilisers through

22. Irrigation water is known as _____.

(a) surface application (b) sub-surface application (c) fertigation (d) top dressing

23. _____ is the most common disease in a nursery.

(a) Powdery mildew (b) Damping-off (c) Leaf spot (d) Blight

24. Which among the given cities is known as Garden city?

(a) Bangalore (b) Delhi (c) Pune (d) Chennai

25. Chip budding is done in

(a) Rose (b) Grapes (c) Hibiscus (d) Rubber

A.G. & S.G. Siddhartha Degree College of Arts & Science

Vuyyuru-521165, Krishna District, Andhra Pradesh

Value Added Course

Title: PLANT NURSERY

Key:

1 a) Fruits, vegetables and flowers
2 b) Shoots that arise from roots to form new plant
3 d) Cultivar
4 c) Seed saving
5. d) Use of two plants to bridge the stems together
6 c) Eliminate viruses
7 a) Acetic acid
8 a) Formation of root nodules
9 .b) lime
10 b) Green houses and shade nets
11 (a) carbandzim
12 c) sandy loam
13(d) irrigation water
14(c) poly-tunnel
15(b) raised
16 (a) clayey
17(a) air layering
18 (a) PGR
19(b) in line sowing
20(a) coco peat
21(a) Re-potting
22.(c) fertigation
23(b) Damping-off
24(a) Bangalore
25 (a) Rose

COMMON VALUE-ADDED COURSE

w.e.f. AY 2023-24

ENVIRONMENTAL EDUCATION

2 hrs/weekCredits: 2

B.A,B.COM, BCA,BSc,COURSES

Course objective: A Generic Course intended to create awareness that the life of human beings is an integral part of environment and to inculcate the skills required to protect environment from all sides.

Learning outcomes: On completion of this course the students will be able to

1. Understand the nature, components of an ecosystem and that humans are an integral part of nature.

2. Realize the importance of environment, the goods and services of a healthy biodiversity, dependence of humans on environment.

3. Evaluate the ways and ill effects of destruction of environment, population explosion on ecosystems and global problems consequent to anthropogenic activities.

4. Discuss the laws/ acts made by government to prevent pollution, to protect biodiversity and environment as a whole.

5. Acquaint with international agreements and national movements, and realize citizen's role in protecting environment and nature.

A.G. & S.G. Siddhartha Degree College of Arts & Science

Vuyyuru-521165, Krishna District, Andhra Pradesh

ENVIRONMENTAL EDUCATION

	Content
UNIT-1	**Environment and Natural Resources06 Hrs.** 1. Multidisciplinary nature of environmental education; scope and importance. 2. Man as an integral product and part of the Nature. 3. A brief account of land, forest and waterresources in India and their importance. 4. Biodiversity: Definition; importance of Biodiversity - ecological,consumptive, productive, social, ethical and moral, aesthetic, and option value. 5. Levels of Biodiversity: genetic, species and ecosystem diversity.
UNIT-2	**Unit-2: Environmental degradation and impacts10Hrs** 1. Human population growth and its impacts on environment; land use change, land degradation, soil erosion and desertification. 2. Use and over-exploitation of surface and ground water, construction of dams, floods, conflicts over water (within India). 3. Deforestation: Causes and effects due to expansion of agriculture, firewood, mining, forest fires and building of new habitats. 4. Non-renewable energy resources, their utilization and influences. 5. A brief account of air, water, soil and noise pollutions; Biological, industrial and solid wastes in urban areas. Human health and economic risks. 6. Green house effect - global warming; ocean acidification, ozone layer depletion, acid rains and impacts on human communities and agriculture. 7. Threats to biodiversity: Natural calamities, habitat destruction and fragmentation, over exploitation, hunting and poaching, introduction of exotic species, pollution, predator and pest control.
UNIT-3	**Unit 3: Conservation of Environment10 Hrs** 1. Concept of sustainability and sustainable development with judicious use of land, water and forest resources; afforestation. 2. Control measures for various types of pollution; use of renewable and alternate sources ofenergy. 3. Solid waste management: Control measures of urban and industrial waste. 4. Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. 5. Environment Laws: Environment Protection Act; Act; Wildlife Protection Act; Forest Conservation Act. 6. International agreements: Montreal and Kyoto protocols; Environmental movements: Bishnois of Rajasthan, Chipko, Silent valley.

Suggested activities to learner: (4 hours)

1. Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc
2. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural site.
3. Study of common plants, insects, birds and basic principles of identification.
4. Study of simple ecosystems-forest, tank, pond, lake,mangroves etc.
5. Case study of a Forest ecosystem or a pond ecosystem.

Question Paper

Section-A

Answer any THREE from the following 3x5=15Marks

1.

2.

3.

4.

5.

Section-B

Answer any TWO from the following 2 x10 = 20Marks

6.

7.

8.

9.

Evaluation

Type of the Test	Max.Marks	Required
Single IA Test	30	10
Attendance	5	5
Total		15