SRR & CVR Government Degree College

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Machavaram, Vijayawada, Krishna District, AP-520 004

Board of Studies - AY:2021-22

Botany

Department of Botany

SRR & CVR Government Degree College

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Machavaram, Vijayawada, Krishna District, AP-520 004

Department of Botany

Report on Board of Studies Meeting for UG Programmes of the Department for AY-2021-22

The Board of Studies meeting in Botany was convened on 27th November 2022 at 10.30 A.m. in the Department of Botany (Botany Lab 2), under Chairmanship of Ms. G. Swapna , In- Charge of the Department, SRR & CVR Govt. Degree College (Autonomous), Vijayawada – 520004 for the Academic year 2021-2022 .

SRR & CVR Govt. Degree College (Autonomous), Vijayawada, is one of the prestigious educational institutions, located in a historically important place like Vijayawada in Krishna District, Andhra Pradesh. Vijayawada is a place of historical and cultural significance and importance. In the same way SRR & CVR Govt. Degree College, has also acquired its significance and prominence in and around Vijayawada by moulding the lives of many students to become great personalities. This college is named after late Sri Raja Rangayyappa Rao and late Sri Chunduru Venkata Reddy, who have been great and noble donors of the city Vijayawada, by whose generosity the college has reached and attained such and this elevated status by way of shaping the lives of many generations of students making them worthy citizens of the country. This college has acquired great standards academically by the contributions of great teachers as well because in the history of any educational institution its teachers play a vital role. The college was established in 1937. It offers undergraduate and postgraduate academic programs. The institution was accredited with grade B+ with C.G.P.A 2.6 during March, 2017 by NAAC and got ISO 9001: 2015 certificate during 2019 and ranked by NIRF in 101-150 band at NIRF-2020 & 151-200 band in NIRF 2019.

The Department of Botany is the oldest Department in the college. The Department offers two B.Sc programmes, BSc BZC (Botany, Zoology, Chemistry) program in both Telugu and English media and B.SC BHC (Botany, Horticulture, Chemistry) program in English medium. The department has continually been striving for excellence in teaching and research. CBCS has been implemented for both UG B.Sc (BZC) and B.Sc (BHC) programmes. The department has its own well established and well equipped Labs along with a 24x7 internet facility. This academic year the department got an opportunity to offer a B.Sc Horticulture program on an autonomous platform. The department is ready to utilize this golden opportunity to offer a new UG Program on academic autonomous status. Definitely the department will frame the curriculum on Learning Outcomes-based Framework to enrich knowledge in the area of Plant Sciences.

Board of Studies Composition -Botany

S.No	Name of the Resource person	Designation
1	Ms. G.Swapna In-charge of the Department Department of Botany	Chairman of BOS
2	Dr.T.Rose Mary HOD, Department of Botany Andhra Loyola College, Vijayawada-08 Mobile: 9989892440	University Nominee
3	Dr.R.V.Sujatha Associate Professor, Department of Agricultural Economics Dr.YSR Horticultural University, Venkataramannagudem, West Godavari District Mobile: 9666621341	Subject Expert
4	Mr. K.GaniRaju Lecturer in Botany Government College (A), Rajahmundry-533105 Mobile:9948088250	Subject Expert
5	Dr. S. Siva Rama Krishna ((Industry nominee) Jeevaka Ayurveda, Tenali Mobile: 9441898805 e-mail:srksamala@gmail.com	Industrialist
6	GoriparthiVenkataSai Ram Yadav Mobile: 9989059219	Alumni
7	V. Naga Padmavati Lecturer in Botany Mobile: 9182179891	Member
8	Dr. Ch. Srinivasa Reddy Lecturer in Botany Mobile: 9908721905	Member

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Department of Botany

BOTANY COURSE STRUCTURE: 2021-2022

S.No.	*Semester*	*Title of the Course (Paper)*	*Hours/ week*	*Marks (SEE)*	*Marks in CIA*	*Credits*
1.	Sem.-I/ Course-1	Fundamentals of Microbes and Nonvascular Plants	04	60	40	4
	Course-1 Practical 02	Fundamentals of Microbes and Nonvascular Plants	03	25	25	1
2	Sem.-II/ Course-2	Basics of Vascular plants and Phytogeography	04	60	40	4
	Course-2 Practical	Basics of Vascular plants and Phytogeography	03	25	25	1
3.	Sem.-III/ Course-3	Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity	04	60	40	4
	Course-3 Practical 02	Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity	03	25	25	1
4	Sem.-IV Course-4	Plant Physiology and Metabolism	04	60	40	4
	Course4 Practical	Plant Physiology and Metabolism	03	25	25	1
5	Sem.-IV Course- 5	Cell Biology, Genetics and Plant Breeding	04	60	40	4
	Course5 Practical 03	Cell Biology, Genetics and Plant Breeding	03	25	25	1

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Department of Botany

BOARD OF STUDIES MEETING FOR BOTANY
ACADEMIC YEAR: 2021-22

The Board of Studies meeting in Botany was convened on 27th November 2022 at 10.30 A.m. in the Department of Botany (Botany Lab 2), under Chairmanship of Ms. G. Swapna , In- Charge of the Department, SRR & CVR Govt. Degree College (Autonomous), Vijayawada – 520004 for the Academic year 2021-2022 .

Agenda

1. To Discuss the Course structure and Syllabus , suggest if any modifications and approve the Structure of the Course, syllabus , blueprint,model question paper, question banks for the Academic Year (2021-2022) for B.SC (Botany Zoology Chemistry) I Semester Botany Paper I and II Semester Botany Paper II .

2. To Discuss the Course structure and Syllabus , suggest if any modifications and approve the Structure of the Course, syllabus , blueprint, model question paper, question banks for the Academic Year (2021-2022) for III Semester Botany Paper III and IV Semester Botany Paper IV .

3. To Discuss the Course structure and Syllabus , suggest if any modifications and approve the Structure of the Course, syllabus , blueprint, model question paper, question banks for the Academic Year (2021-2022) for V Semester Botany Paper V and paper VI .

4. To Discuss the Course structure and Syllabus , Selecting Suitable courses asper Choice based Credit System for Elective and Cluster papers and suggest if any modifications in the selected papers and approve the Structure of the Course, syllabus , blueprint, model question paper, question banks for the Academic Year (2021-2022) for VI Semester Botany Paper VII Elective paper and Cluster papers .

5. To Discuss the Course structure and Syllabus , suggest if any modifications and approve the Structure of the selected skill development course offered by Botany Department as prescribed by higher authority ,its syllabus , blueprint, model question paper, question banks for the Academic Year (2021-2022) for BSC BZC I Semester .
6. To Discuss the Course structure and Syllabus , suggest if any modifications and approve the Structure of the selected skill development Course offered by Botany Department as prescribed by higher authority , its syllabus , blueprint, model question paper, question banks for the Academic Year (2021-2022) for BSC BZC II Semester .
7. To Discuss the various Life skill Course structures and Syllabi , Selecting Suitable Life skill course asper Choice based Credit System and suggest if any modifications in the selected paper and approve the Structure of the Course, syllabus , blueprint, model question paper, question banks for the Academic Year (2021-2022) for B.SC BZC (Botany , Zoology, Chemistry) III Semester .

8. To Discuss and suggest or approve a panel of names to the Academic Council for appointment of examiners and Question paper setters.
9. To discuss and suggest measures coordinating research, teaching, extension and other academic activities in the department.
10. To suggest Proposals for Community Service/Extension Activities/ Projects for the benefit of society.
11. Any other Proposal / matter with the permission of the Chair.

Members Presented

S.No	Name of the Resource person	Designation	Signature
1	Ms. G.Swapna In-charge of the Department Department of Botany	Chairman of BOS	
2	Dr.T.Rose Mary HOD, Department of Botany Andhra Loyola College, Vijayawada-08	University Nominee	
3	Dr. R.V. Sujatha Associate Professor in Ag. Economics Dr. YSR Horticultural University Venkataramannagudem West Godavari District	Subject Expert	
4	Mr. K.Gani Raju Lecturer in Botany Government College (A), Rajahmundry-533105	Subject Expert	
5	Mr. S. Siva Rama Krishna (Industry nominee) Jeevaka Ayurveda, Tenali Mobile: 9441898805 e-mail:srksamala@gmail.com	Industrialist	
6	Goriparthi Venkata Sai Ram Yadav	Alumni	
7	V. Naga Padmavati Lecturer in Botany	Lecturer	Child care Leave
8	Dr. Ch. Srinivasa Reddy Lecturer in Botany	Lecturer	

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Department of Botany

BOARD OF STUDIES MEETING FOR BOTANY

CONDUCTED ON 27th November, 2021

MINUTES

ACADEMIC YEAR: 2021-22

The Minutes of Board of Studies meeting in Botany which was convened in blended mode on 27th November 2021 at 10.30 a.m. under Chairmanship of Ms G.Swapna, the In- Charge of the department is as follows:

Minutes and Resolutions of Board of Studies Meeting

Agenda 1: To Discuss the Course structure and Syllabus , suggest if any modifications and approve the Structure of the Course, syllabus , blueprint,model question paper, question banks for B.SC (Botany Zoology Chemistry) I Semester Botany Paper I and II Semester Botany Paper II f***or the admitted batch 2021-22.***

Proposal*:* The Chairperson, Ms G.Swapna, the In- Charge of the department welcomed the members of BoS and initiated discussion on agenda points. Dr.Ch. Srinivasa Reddy, Member of BoS presented Botany Semester I and Semester II Courses structure, syllabus , model question paper,question bank,blueprint before BOS members for the approval , Suggestions and inputs if any and opened the discussion.

Discussion: The University Representative, Dr. T.Rosemary enquired about the changes made in the course titles, credits of courses, and framework of the courses. Then Mr.K.Gnai Raju , Mr S. SIva Rama krishna and Alumni member suggested some modifications in two courses. Every other member approved and the suggested changes are incorporated in the Proposed syllabus.. These are no notable changes in credits of courses, Blue print , Model Question paper and framework of the courses.

Resolution 1: After thorough analysis and discussion the Board members resolved to approve the Course syllabus (which was designed and modified after taking feedback from students) along with modifications proposed in discussion, blue print ,model question paper, question bank proposed for I Semester Botany Paper I and II Semester Botany Paper II for the admitted batch 2021-22

Agenda 2: To Discuss the Course structure and Syllabus , suggest if any modifications and approve the Structure of the Course, syllabus , blueprint,model question paper, question banks for the

Academic Year (2021-2022) for III Semester Botany Paper III and IV Semester Botany Paper IV .

Proposal: The proposed syllabi (which was designed and modified after taking feedback from students) for the Botany courses in Semester III and Semester IV is placed before the members for open discussion , suggestions and approval.

Discussion: Madam Dr. T.RoseMary, the University Representative the subject expert Mr K.Gani Raju, Mr S. Sivaramakrishna enquired about the level of changes made in courses. Ms G. Swapna, Chairman of BOS and Dr Ch. Srinivasa Reddy explained the changes made in the courses and rationality behind the assigning number of teaching hours per each Unit in the courses. They also assured the syllabi had been prepared with Learning Outcomes-based Framework to reach Course specific outcomes and overall programme outcomes of the institution. The chairman of BoS explained that the syllabus is modified taking into consideration the feedback of students. Dr T. Rosemary University Nominee , Mr K. Ganiraju Subject Expert, and Alumni Mr G.V Sairam Yadav suggested some modifications to upgrade the knowledge.. All the members in the meeting felt that the proposed syllabi will suit the present needs of the students to gain required knowledge in the concerned areas. The pedagogy of the department will impart the curricular material to students.

Resolution 2: After lengthy discussion the Board members resolved to approve the Course syllabus (which was designed and modified after taking feedback from students) along with modifications proposed in discussion, blue print ,model question paper, question bank proposed for III Semester Botany Paper III and IV Semester Botany Paper IV for the academic year 2021-22

Agenda 3: To Discuss the Course structure and Syllabus , suggest if any modifications and approve the Structure of the Course, syllabus , blueprint,model question paper, question banks for the Academic Year (2021-2022) for V Semester Botany Paper V and paper VI .

Proposal: The proposed syllabi for the courses in Semester V for Botany Paper V and Paper VI is placed before the BOS Committee welcoming the needed suggestions and approval

Discussion: The BoS chairman Ms G. Swapna explained the syllabi for the Paper V and VI Courses and course outcomes of each course. In pursuance of the Course outcomes, all Board members felt that the course has in depth knowledge that must be drilled in Plant Breeding concepts like Hybridisation. .The faculty members of the department assured the implementation of suggestions in Practical Lab sessions .. All the members in the meeting felt that the proposed syllabi will suit the present needs.of the students to gain required knowledge in Genetics and Plant Breeding and Ecology. The faculty assured that the pedagogy of the department will impart the curricular material to students.

Resolution 3: Board members resolved to approve the Course structure and the same syllabus (Same syllabus of 2020-2021 after taking inputs and feedback from Students), blue print, model question paper, question bank proposed for V Semester Botany Paper V and Paper VI for the academic year 2021-2022 .

Agenda 4: To Discuss the Course structure and Syllabus , Selecting Suitable courses asper Choice based Credit System for Elective and Cluster papers and suggest if any modifications in the selected papers and approve the Structure of the Course, syllabus , blueprint,model question paper, question banks for the Academic Year (2021-2022) for VI Semester Botany Paper VII Elective paper and Cluster papers .

Proposal: As per Higher authorities (APSCHE) - Botany structure,in VI Semester there are three Generic Elective Course optionals (i) Organic farming and Sustainable Agriculture (ii) Nursery , gardening and Floriculture (iii) Plant tissue culture and its Biotechnological Applications . Out of these 3 its proposed to Choose " Plant tissue culture and its Biotechnological Applications " as Elective and proposed to chose Group B Cluster electives {i}Biological instrumentation and Methodology (ii) Mushroom culture and Technology (iii) Project work preferably either in Institute or Industry .

Discussion: In the Discussion Dr T. Rose Mary and Subject Expert Mr K. Ganiraju enquired about the choice of elective among the 3 options and the relevance . BOS Chairman Ms G. Swapna explained the necessity of technical courses like Plant tissue culture and its Biotechnological Application, Skill based courses like Mushroom technology , Biological instrumentation and the necessity of needed exposure to students in Industry or in Institute . All the BOS members agree with the selection keeping in view the present day requirements of students , they felt that students should have in-depth conceptual knowledge on Biotechnology and skill based courses. . The representatives of University and Industry and alumni specified the need of conceptual enrichment as an option for learners. All the participants discussed course outcomes and methodology.

Resolution: keeping in view the present day requirements of students , BOS members felt that students should have in-depth conceptual knowledge on technical concepts like Biotechnological applications and felt that selected elective paper and cluster options B are the best ones and resolved to approve the Courses structure and the same syllabus (Same syllabus of 2020-2021 after taking inputs and feedback from Students), blue print, model question paper, question bank proposed for VI Semester Botany Paper VII Elective paper and Cluster options VIII A , VIII B, VIII C for the academic year 2021-2022 .

Agenda 5 : To Discuss the Course structure and Syllabus , suggest if any modifications and approve the Structure of the selected skill development course " Plant Nursery" offered by Botany Department as prescribed by higher authority ,its syllabus , blueprint,model question paper, question banks for BSC BZC I Semester for the Academic Year 2021-2022.

Proposal: Dr Ch. Srinivasa Reddy proposed syllabi for the Skill development course " Plant Nursery" in Semester I and placed before the BOS Committee welcoming the needed suggestions and approval of the same.

Discussion : Mr S. Sivaramakrishna , Industrialist and Mr K. Ganiraju Subject expert and other members discussed and felt the syllabus was perfect in the course and suitable to be offered by the Department of Botany and suggested involving students in nursery activities . Faculty members agreed to make the students actively involved in Nursery activities and will provide the basic training .

Resolution : After thorough analysis and discussion the Board members approved the Skill development course "Plant Nursery " and resolved to approve same syllabus (from 2020-2021 after taking inputs and feedback from Students), blue print ,model question paper, question bank for the academic year 2021-2022 for B.SC (Botany Zoology Chemistry) I Semester.

Agenda 6 : To Discuss the Course structure and Syllabus , suggest if any modifications and approve the Structure of the selected skill development Course offered by Botany Department as prescribed by higher authority , its syllabus , blueprint ,model question paper, question banks for the Academic Year (2021-2022) for the BSC BZC II Semester .

Proposal: Ms G.Swapna proposed syllabi for the Skill development course "Fruits and Vegetables" in Semester II and placed before the BOS Committee welcoming the needed suggestions and approval of the same.

Discussion : BOS members discussed the content unit wise and felt no changes needed in the syllabus and suitable to be offered by the Department of Botany . Faculty members agreed to make the students actively involved in Project works like Nutrition related awareness activities .

Resolution : After thorough analysis and discussion the Board members approved the Skill development course "Fruits and vegetables " and resolved to approve same syllabus (from 2020-2021 after taking inputs and feedback from Students), blue print ,model question paper, question bank for the academic year 2021-2022 for B.SC (Botany Zoology Chemistry) II Semester.

Agenda 7 : To Discuss the various Life skill Course structures and Syllabi , Selecting Suitable Life skill course asper Choice based Credit System and suggest if any modifications in the selected paper and approve the Structure of the Course, syllabus , blueprint, model question paper, question banks for the Academic Year (2021-2022) for B.SC BZC (Botany , Zoology, Chemistry) III Semester .

Proposal: Dr Ch. Srinivasa Reddy proposed syllabi for the Life Skill Course "Health and Hygiene" in Semester III and placed before the BOS Committee welcoming the needed

suggestions and approval of the same.

Discussion : BOS members discussed the content unit wise and felt no changes needed in the syllabus and suitable to be offered by the Department of Botany . Faculty members agreed to make the students actively involved in extension activities related to health and hygiene concepts

Resolution : After thorough analysis and discussion the Board members resolved to select theLife skill course entitled "Health and Hygiene " as the suitable course and resolved to approve syllabus , blue print ,model question paper, question bank for the academic year 2021-2022 for B.SC (Botany Zoology Chemistry) III Semester.

Agenda 8 : To Discuss and suggest or approve a panel of names to the Academic Council for appointment of examiners and Question paper setters.

Proposal: The chairman placed the list of Question paper setters and Examiners before the participants for seeking their approval welcoming the needed suggestions if any.

Discussion : BOS members discussed the panel of examiners and question paper setters and suggested some more names to incorporate if possible .

Resolution : Board members unanimously approved a panel of examiners and question paper setters along with some more names which were being incorporated into the proposed panel for the academic year 2021-2022.

Agenda 9 : To discuss and suggest measures coordinating research, teaching, extension and other academic activities in the department.

Proposal: Ms G. Swapna initiated a discussion on proposing some academic activities before the BOS Committee welcoming the needed suggestions and inputs.

Discussion : All BOS members, University Nominee and subject experts , Industrialist and Alumni members suggested extension activities like field works ,Seminars, Group discussions, Projectworks ,Workshops, Training programs , Industrial exposure hands on experience on various concepts of curriculum. Faculty members agreed to incorporate all the academic activities in the Action plans of the department .

Resolution : Board members resolved to approve all academic activities which were proposed in panel discussion for the academic year 2021-2022.

Agenda 10 : To suggest Proposals for Community Service/Extension Activities/ Projects for the benefit of society.

Proposal: Dr T. Rose Mary initiated a discussion on proposing some extension activities before

the BOS members citing the necessity of the extension activities.

Discussion : All BOS members, University Nominee and subject experts , Industrialist and Alumni faculty members suggested extension activities like field works , Medicinal plants drive , Public awareness activities related to plant sciences . Faculty members agreed to incorporate them in action plan

Resolution : Board members resolved to approve all extension activities which were proposed in panel discussion for the academic year 2021-2022.

Agenda 11: Any other Proposal / matter with the permission of the Chair.

To consider and approve the Student Evaluation Policy and Procedure and split- up of CIA & SEE.

Proposal: The chairman proposed the evaluation system in each course will be 40 : 60 for Internal Continuous Internal Evaluation (CIA) and Semester End Evaluation (SEE).

Discussion: The members of BoS discussed the merits, demerits and feasibility for the implementation of (40% CIA & 60% SEE) proportion and split-up of CIA. Faculty members of the department expressed their willingness to frame question papers based on the active verbs used to frame question paper pattern on **Blooms Taxonomy**.

Resolution : It is resolved to approve the Student Evaluation Policy and Procedure and split-up of CIA & SEE.

(Ms G. Swapna)
Chairman, Board of Studies

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Department of Botany

Student Evaluation Policy and Procedure

1. EVALUATION POLICY AND PROCEDURE:

Students are evaluated for 100 marks in each course. These 100 Marks are splitted into Continuous Internal Assessment (CIA) and Semester End Evaluation (SEE). 40 marks are allocated to CIA and 60 marks for SEE.

1.1. CONTINUOUS INTERNAL ASSESSMENT (CIA) FOR 40 MARKS:

1.1.1 Out of a maximum of 100 marks in each theory paper, 40 marks shall normally be allotted for continuous internal assessment. The Assessment shall be made by the teacher handling that paper in the manner prescribed here under. Where the same paper is handled by two or more teachers, the Head of the Department shall decide upon the teacher, who shall make the internal assessment or fix the proportion of the marks among the teachers for the internal assessment of the students.

1.1.2 **Out of these 40 marks, 10 marks are allotted to Continuous Internal Exams.** Two Continuous Internal exams are conducted for 10 marks in each exam and the average of these two exams scale down to 10 marks, shall be deemed as the marks obtained by the student in Continuous Internal Exams.

1.1.3 **Out of these 40 marks, 10 marks are allotted to Assignments.** Five assignments are given to the students during the course. 2 marks are allotted for each assignment and the total of these five assignments are included in Continuous Internal Assessment. The students can submit assignments through blended mode.

1.1.4 **Out of these 40 marks, 10 marks are allotted to Project Work/ Group Discussion.** Students will be assigned a student study project for 10 Marks under CIA. Then the student has to submit a project report under the supervision of a Faculty Member. These 10 marks may also be assigned to group discussion also. Students will be evaluated here based on his/her way of expression, conceptual strength, attitude, listening -understanding skills and level of participation in the discussion.

1.1.5 **Out of these 40 marks, 5 marks are allotted to Student Seminar and 5 marks for Viva-Voce.** Each Student may give a student seminar to the peer team. This student seminar will carry 5 marks. Here feedback will be collected on a 5 points scale from the participants in the student seminar [or] Viva- Voce will be conducted by the concerned subject faculty for 5 marks.

The summarized continuous internal assessment is:

1. Average of Two Continuous Internal exams	-	10 Marks
2. Total of Two Assignments	-	10 Marks
3. Project Work/ Group Discussion	-	10 Marks
4. Student Seminar	-	5 Marks
5. Feedback /Viva-Voce	-	5 Marks

S.No	**Theory internal**	**Max marks**
1	**Internal assessment**	**10 Marks**
2	**Assignments**	**2 x 5= 10 Marks**
3	**Seminars**	**05 Marks**
4	**Project**	**10 Marks**
5	**Attendance/Viva**	**05 Marks**

BLUE PRINT FOR QUESTION PAPER

Pattern of question Paper: Model question papers were set according to the semester pattern. Total marks for question paper is set for maximum 60 marks.

The question paper is divided into two sections as Part **A**, Part **B**, as follows.

Part	Type of Questions	Total No. of questions	Marks for each question	No. of questions to be attempted	Total Marks
Part - A	**Short answer questions**	**08 One question from each unit**	**4 M**	**5**	**20 M**
Part - B	**Long answer questions**	**10 Two form each unit with internal choice**	**8 M**	**5**	**40 M**
TOTAL		**18 Questions**		**10**	**60 M**

Blue Print for question Paper						
S. No	**Type of Questions Units**	**SA**	**SA**	**LA**	**LA**	**Total Marks**
		Questions to attempt 5/8	**Total Marks**	**Questions to attempt 5/10**	**Total Marks**	
1	**Unit 1**	**1/2Q**	**4**	**1Q**	**8M**	
2	**Unit2**	**1/2Q**	**4**	**1Q**	**8M**	
3	**Unit 3**	**1/2Q**	**4**	**1Q**	**8M**	
4	**Unit 4**	**1/2Q**	**4**	**1Q**	**8M**	
5	**Unit 5**	**1/2Q**	**4**	**1Q**	**8M**	
	Total	**5Q**	**5x4=20**	**5Q**	**5x8=40**	**60**
	Note: Short Answer Questions should be minimum one from each unit . **Total Number of Short answer questions to attempt out of 8 are 5** **Total Number of Long answer questions to attempt out of 10 internal choice are 5**					

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Department of Botany

List of Question paper setters and examiners

Sl. No.	Name of the Examiner	Designation	College	Place
1	Dr M. Bhupathirayalu 9705377344	Lecturer	GDC Kovvuru	Kovvuru EG District
2	Dr KNVSS Eswari 9948899093	Lecturer	ASD GDC (w)(A)	Kakinada
3	Mrs Uma Nischal 9985166449	Lecturer	Guntur Women's College (A)	Guntur
4	Mrs T.V.S Padamavathi 94417 81221	Lecturer	GDC Eluru	Eluru
5	Mrs Santoshi Kumari 8247092267	Lecturer	Guntur Women's College (A)	Guntur
6	Ch. Satish 9705763711	Lecturer	GDC Tiruvuru	Tiruvuru Krishna District
7	Varaprasad 9908876727	Lecturer	GDC Tuni	Tuni EG District
8	Eswara Lakshmi	Lecturer	GDC (W)(A)	Guntur
9.	Dr E. Sreedevi	Lecturer	GDC (M)	Anantapur
10	K.Raju Gani	Lecturer	GDC	Rajahmundry

Members Presented

S.No	Name of the Resource person	Designation	Signature
1	Ms. G.Swapna In-charge of the Department Department of Botany	Chairman of BOS	
2	Dr.T.Rose Mary HOD, Department of Botany Andhra Loyola College, Vijayawada-08	University Nominee	T. Rose mary
3	Dr. R.V. Sujatha Associate Professor in Ag. Economics Dr. YSR Horticultural University Venkataramannagudem West Godavari District	Subject Expert	
4	Mr. K.Gani Raju Lecturer in Botany Government College (A), Rajahmundry-533105	Subject Expert	
5	Mr. S. Siva Rama Krishna (Industry nominee) Jeevaka Ayurveda, Tenali Mobile: 9441898805 e-mail:srksamala@gmail.com	Industrialist	
6	Goriparthi Venkata Sai Ram Yadav	Alumni	
7	V. Naga Padmavati Lecturer in Botany	Lecturer	Child care Leave
8	Dr. Ch. Srinivasa Reddy Lecturer in Botany	Lecturer	

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

I-BZC	BOTANY-I	SEM-I	Course code: BOT N-1321	2021-22	No. of Credits:4	No. of Hrs /Week:4

FUNDAMENTALS OF MICROBES AND NONVASCULAR PLANTS (VIRUSES, BACTERIA, FUNGI, LICHENS, ALGAE AND BRYOPHYTES)

On successful completion of this course, the students will be able to:

CO1: Explain origin of life on the earth.
CO2: Illustrate diversity among the viruses and prokaryotic organisms and can categorize.
CO3: Classify non vascular plants based on their structure, reproduction and life cycles.
CO4: Analyze and ascertain the plant disease symptoms due to microbes and fungi.
CO5: Evaluate the ecological and economic value of microbes, thallophytes and bryophytes.

Unit-1: Origin of life and Viruses 12Hrs.

1. Origin of life, concept of primary Abiogenesis; Miller and Urey experiment. Five kingdom classification of R.H. Whittaker
2. Discovery of microorganisms, Pasteur experiments, germ theory of diseases.
3. Shape and symmetry of viruses; structure of TMV and Gemini virus; multiplication of TMV; A brief account of Prions and Viroids.
4. A general account on symptoms of plant diseases caused by Viruses. Transmission of plant viruses and their control.

Unit-2: Special groups of Bacteria and Eubacteria 12Hrs.

1. Brief account of Archaebacteria, Actinomycetes and Cyanobacteria.
2. Eubacteria: Cell structure, nutrition and reproduction
3. Economic importance of Bacteria with reference to their role in Agriculture and industry (fermentation and medicine).
4. A general account on symptoms of plant diseases caused by Bacteria; Citrus canker.

Unit-3: Fungi & Lichens 12 Hrs.

1. General characteristics of fungi and Ainsworth classification (upto classes).
2. Structure, reproduction and life history of (a)*Rhizopus* (Zygomycota)and (b)*Puccinia* (Basidiomycota), economic uses of fungi in food industry, pharmacy and agriculture.
3. A general account on symptoms of plant diseases caused by Fungi; Blast of Rice.

4. Lichens- structure and reproduction; ecological and economic importance.

Unit -4: Algae **12 Hrs.**

1. General characteristics of Algae (pigments, flagella and reserve food material);Fritsch classification (upto classes).
2. Thallus organization and life cycles in Algae.
3. Occurrence, structure, reproduction and life cycle of (a) *Spirogyra* (Chlorophyceae) and(b) *Polysiphonia* (Rhodophyceae).
4. Economic importance of Algae.

Unit -5: Bryophytes **12 Hrs.**

1. General characteristics of Bryophytes
2. Classification of Bryophytes upto classes.
3. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life cycle of (a) *Marchantia* (Hepaticopsida) and (b) *Funaria* (Bryopsida).
4. General account on evolution of sporophytes in Bryophyte.

Text books:

1. Pandey, B.P. (2013). College Botany, Volume-I, S. Chand Publishing, New Delhi
2. Hait, G., Bhattacharya, K. and Ghosh, A.K. (2011). A Text Book of Botany, Volume-I, New Central Book Agency Pvt. Ltd., Kolkata
3. Bhattacharjee, R.N. (2017). Introduction to Microbiology and Microbial Diversity. Kalyani Publishers, New Delhi.

Books for Reference:

1. Dubey, R.C. and Maheswari, D.K. (2013). A Text Book of Microbiology, S.Chand & Company Ltd., New Delhi.
2. Presscott, L. Harley, J. and Klein, D. (2005). Microbiology, 6th edition, Tata McGraw –Hill Co. New Delhi.
3. John Webster & R. W. S. Weber. (2007). Introduction to Fungi,Cambridge University Press, New York
4. Shaw, A.J. & Goffinet, B. (2000). Bryophyte Biology. Cambridge University Press, New York.
5. Robert Edward Lee (2008). Phycology. Cambridge University Press, New York.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

I-BZC	BOTANY-I	SEM-I	Course code: BOT N-1321P	2021-22	No. of Credits:1	No. of Hrs /Week:2

FUNDAMENTALS OF MICROBES AND NONVASCULAR PLANTS

(VIRUSES, BACTERIA, FUNGI, LICHENS, ALGAE AND BRYOPHYTES)

Practical Syllabus

1. Knowledge of Microbiology laboratory practices and safety rules.
2. Knowledge of different equipment for Microbiology laboratory
    a. Spirit lamp
    b. Inoculation loop
    c. Hot-air oven
    d. Autoclave/Pressure cooker
    e. Laminar air flow chamber and
    f. Incubator and their working principles.
3. Demonstration of Gram's staining technique for Bacteria.
4. Study of Viruses (Corona, Gemini and TMV) using electron micrographs/ models.
5. Study of Archaebacteria and Actinomycetes using permanent slides/ electron micrographs/diagrams.
6. Study of *Anabaena* and *Oscillatoria* using permanent/temporary slides.
7. Study of different bacteria (Cocci, Bacillus, Vibrio and Spirillum) using permanent or temporary slides/ electron micrographs/ diagrams.
8. Study/ microscopic observation of vegetative, sectional/anatomical and reproductive structures of the following using temporary or permanent slides/ specimens/ mounts :
    a. Fungi : *Pencillium, Rhizopus,* and *Puccinia*
    b. Lichens: Crustose, foliose and fruticose
    c. Algae : *Spirogyra*, *Ectocarpus* and *Polysiphonia*
    d. Bryophyta : *Marchantia* and *Funaria*
9. Study of specimens of Tobacco mosaic disease, Citrus canker and Blast of Rice.
10. Local visit to *Spirulina* cultivation and powder unit

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
I. B.Sc., BOTANY SEMESTER END EXAMINATION; Course-I
(FUNDAMENTALS OF MICROBES AND NONVASCULAR PLANTS)
(VIRUSES, BACTERIA, FUNGI, LICHENS, ALGAE AND BRYOPHYTES)

Course Code: BOT N-1321 **Max. Marks: 60M**
Time: 3hrs **Pass Min: 24M**

MODEL QUESTION PAPER
SECTION-A

I. Answer any <u>five</u> of the following **5 X 4 = 20M**

1. Structure of TMV
2. Prions and Viroids
3. Actinomycetes
4. Blast of rice
5. Pigments in Algae
6. Gemma cup
7. Asexual reproduction in Lichen
8. Nutrition in Bacteria

II. Answer the following **5X8=40M**

9. a) Describe about the R.H. Whittaker's five kingdom Classification of microorganisms in detail.

Or

b) Describe about Discovery of microorganisms, theories of origin of life in detail.

10. a) Describe the Economic importance of Bacteria.

Or

b) Explain the Cell structure in Bacteria.

11. a) Describe the life cycle of *Puccinia* on primary host.

Or

b) What are lichens? Give an account of different types of lichens.

12. a) Describe the range of thralls organization in Algae.

Or

b) Give an account of reproduction in Spirogyra.

13. a) Give an account of sporophyte evolution in Bryophytes.

Or

b) Describe the structure of *Funaria* capsule.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
I. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-I
(FUNDAMENTALS OF MICROBES AND NONVASCULAR PLANTS)
(VIRUSES, BACTERIA, FUNGI, LICHENS, ALGAE AND BRYOPHYTES)

Course Code: BOT N-1321P **Max. Marks: 25M**
Time: 2hrs **Pass Min : 10M**

1. Take the T.S. of material 'A' (Fungi), make a temporary mount and identify giving reasons----------**4M**
2. Identify any 2 algae from the mixture (material 'B') given and specify reasons----------**4M**
3. Take the T.S. of material 'C' (Bryophyta), make a temporary mount and identify giving reasons----------**4M**
4. Identify the following with specific reasons----------**4x2=8M**
   A. A laboratory equipment of Microbiology
   B. Virus
   C. Archaebacteria /Ascomycetes /Cyanobacteria/ Eu-Bacteria
   D. Lichen
5. Record + Viva-voce **3+2 = 5 M**

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

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I-BZC	BOTANY-I	SEM-I	Course code: BOT N-1321	2021-22	No. of Credits:4	No. of Hrs /Week:4

FUNDAMENTALS OF MICROBES AND NONVASCULAR PLANTS (VIRUSES, BACTERIA, FUNGI, LICHENS, ALGAE AND BRYOPHYTES)

QUESTION BANK

UNIT-I

Essays

1. Describe about the R.H. Whittaker's five kingdom Classification of microorganisms in detail.
2. Describe about Discovery of microorganisms, theories of origin of life in detail.
3. Give an account of Transmission of plant viruses and their control.

Short answers

11. Structure of TMV
12. Prions and Viroids
13. Gemini virus
14. Symptoms of viral diseases

UNIT-II

Essays

1. Describe the Economic importance of Bacteria.
2. Explain the Cell structure in Bacteria.
3. Give a brief account of Cyanobacteria.

Short answers

1. Citrus canker
2. Actinomycetes
3. Nutrition in Bacteria
4. Symptoms of Bacterial diseases

UNIT-III

Essays

1. Describe the life cycle of *Puccinia* on primary host.
2. Explain the uses of fungi in food industry, pharmacy and agriculture.
3. What are lichens? Give an account of different types of lichens.

Short answers

1. Blast of Rice
2. Asexual reproduction in *Rhizopus*
3. Asexual reproduction in Lichens
4. Special structures in fungi

UNIT-IV

Essay

1. Describe the range of thralls organization in Algae
2. Give an account of reproduction in Spirogyra.
3. Explain the post fertilization changes in *Polysiphonia.*

Short Answer

1. Algae in food industry
2. Pigments in algae
3. Tetra sporophyte
4. Diplontic life cycle

UNIT-V

Essay

1. Give an account of sporophyte evolution in Bryophytes.
2. Describe the structure of the Funaria capsule.
3. Write an essay on Antheridiophore and Archegoniophore in Marchantia.

Short Answer

1. Gemma cup
2. Antheridial head in Funaria
3. Anthoceropsida
4. Protonema

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An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

I-BZC	BOTANY-II	SEM-II	Course code: BOT N-2321	2021-22	No. of Credits:4	No. of Hrs /Week:4

BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY

(PTERIDOPHYTES, GYMNOSPERMS, TAXONOMY OF ANGIOSPERMS AND PHYTOGEOGRAPHY)

On successful completion of this course, the students will be able to:

CO1: Classify & know morphology, anatomy, reproduction, life cycles and evolutionary trends in Pteridophytes

CO2: Classify, know morphology, anatomy, reproduction and life cycles of Gymnosperms and fossilization .

CO3: Able to recognize the Angiosperm plant families based on morphology of local plants

CO4: Evaluate the ecological, ethnic and economic value of tracheophytes for human welfare.

CO5: Can understand principles and regions of Phytogeography

Unit-1: Pteridophytes 12 Hrs.

1. General characteristics of Pteridophyta; classification of Smith (1955) upto divisions.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed)and life history of (a) *Lycopodium* (Lycopsida) and (b) *Marsilea* (Filicopsida)
3. Stelar evolution in Pteridophytes
4. Heterospory and seed habit.

Unit-2: Gymnosperms 14 Hrs.

1. General characteristics of Gymnosperms; Sporne classification up to classes.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) *Pinus* (Coniferopsida) and (b) *Gnetum* (Gnetopsida)
3. Outlines of geological time scale.
4. A brief account on *Cycadeoidea*

Unit -3: Basic aspects of Taxonomy 13 Hrs.

1. Aim and scope of taxonomy; Species concept: Taxonomic hierarchy, species, genus andfamily
2. Plant nomenclature: Binomial system, ICN- rules for nomenclature
3. Herbarium Methodology, BSI herbarium and Kew herbarium; concept of digital herbaria
4. Bentham and Hooker system of classification

Unit-4: Systematic taxonomy **13 Hrs.**

1. Systematic description and economic importance of the following families: Annonaceae, Malvaceae, Cucurbitaceae
2. Systematic description and economic importance of the following families: Asteraceae, Asclepiadaceae, Euphorbiaceae, Orchidaceae, Poaceae
3. Outlines of Angiosperm Phylogeny Group (APG IV)
4. Vegetation types in Andhra Pradesh

Unit-5: Phytogeography **08 Hrs.**

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Endemism-types and causes.
3. Phytogeographic regions of World.
4. Phytogeographic regions of India.

TEXT BOOKS:

1. Acharya, B.C. (2019). Archchegoniates. Kalyani Publishers, New Delhi
2. Bhattacharya, K. Hait, G. & Ghosh, A. K. (2011). A Text Book of Botany, Volume-II, New Central Book Agency Pvt. Ltd., Kolkata
3. Pandey, B.P. (2013). College Botany, Volume-I, S. Chand Publishing, New Delhi.

REFERENCE BOOK:

1. Sharma, O.P.(2012). Pteridophyta. Tata McGraw-Hill, New Delhi.
2. Bhatnagar, S.P. & AlokMoitra (1996).Gymnosperms. New Age International, New Delhi.
3. Singh, G. (2012). Plant Systematics: Theory and Practice. Oxford & IBH Pvt. Ltd., NewDelhi.
4. Simpson, M.G. (2006). Plant Systematics. Elsevier Academic Press, San Diego, CA, U.S.A.
5. Good, R. (1997). The Geography of flowering Plants (2nd Edn.)Longmans, Green & Co., Inc., London & Allied Science Publishers, New Delhi.

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I-BZC	BOTANY-II	SEM-II	Course code: BOT N-2321P	2021-22	No. of Credits:1	No. of Hrs /Week:2

BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY

(PTERIDOPHYTES, GYMNOSPERMS, TAXONOMY OF ANGIOSPERMS AND PHYTOGEOGRAPHY)

Practical syllabus

1. Study/ microscopic observation of vegetative, sectional/anatomical and reproductive structures of the following using temporary or permanent slides/ specimens/ mounts :
    a. Pteridophyta : *Lycopodium* and *Marselia*
    b. Gymnosperms : *Cycas, Pinus* and *Gnetum*
2. Study of fossil specimens of *Cycadeoidea* (photographs /diagrams can be shown if specimens are not available).
3. Demonstration of herbarium techniques.
4. Systematic / taxonomic study of locally available plants belonging to the families prescribed in theory syllabus. (Submission of 30 number of Herbarium sheets of wild plants with the standard system is mandatory).
5. Mapping of phytogeographical regions of the India and World.

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BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY
(PTERIDOPHYTES, GYMNOSPERMS, TAXONOMY OF ANGIOSPERMS AND PHYTOGEOGRAPHY)

Course Code : BOT N-2321 **Max. Marks: 60M**
Time: 3hrs **Pass Min: 24M**

MODEL QUESTION PAPER

SECTION-A

Answer any five of the following **5 X 4 = 20M**

1. *Lycopodium* cone L.S.
2. Cycadeoidea
3. Typification
4. Periplocoideae and Cynanchoideae
5. Grasslands of world
6. Vegetation of Andhra Pradesh
7. *Pinus* ovule
8. Digital herbaria

SECTION-B

Answer the following questions **5 x 8 = 40 M**

9. a) Describe stelar evolution in Pteridophytes.

Or

b) Describe the internal structure of *Marselia* petiole and rhizome.

10. a) Describe the internal structure of the Pinus needle. Add a note on its xerophytic characters

Or

b) Give an account of geological time scale.

11. a) Describe the salient features of Bentham and Hooker's system of classification.

Or

b) Explain various steps involved in Herbarium preparation.

12. a) Describe the vegetative and floral characters of family Malvaceae.

Or

b) Give an account of floral characters of family Poaceae and add a note on its economic importance.

13. a) Describe the phytogeographical regions of India.

Or

b) Give an account of Principles of Phytogeography.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
I. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-II
(BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY)
(PTERIDOPHYTES, GYMNOSPERMS, TAXONOMY OF ANGIOSPERMS AND PHYTOGEOGRAPHY)

Course Code : BOT N-2321P **Max. Marks : 25M**
Time: 2hrs **Pass Min :10M**

1. Take T.S. of the material 'A' (Pteridophyta), make a temporary slide and justify the identification with apt points.----------**5M**
2. Take T.S. of the material 'B' (Gymnosperms), make a temporary slide and justify the identification with apt points.----------**5M**
3. Describe the vegetative and floral characters of the material 'C' (Taxonomy of Angiosperms) and derive its systematic position.----------**5M**
4. Write the Botanical name and family of herbarium sheet supplied to you ----------**2X2=2M**
5. Locate the specified phytogeographical regions in India map------**2X1=2M**
5. Record + Herbarium & Field note book----------**2+2 +2 = 6 M**

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

I-BZC	BOTANY-II	SEM-II	Course code: BOT N-2321	2021-22	No. of Credits:4	No. of Hrs /Week:4

BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY

(PTERIDOPHYTES, GYMNOSPERMS, TAXONOMY OF ANGIOSPERMS AND PHYTOGEOGRAPHY)

QUESTION BANK

UNIT-I

Essays

1. Describe stelar evolution in Pteridophytes.
2. Explain various types of prothallus in *Lycopodium.*
3. Describe the internal structure of *Marselia* petiole and rhizome.

Short answers

1. *Lycopodium* cone L.S.
2. Heterospory
3. Urostachya and Rhopalostachya
4. *Marsilea* sporocarp

UNIT-II

Essays

1. Describe the internal structure of *pinus* needle and add a note on its xerophytic adaptations.
2. Describe male and female cone in *Pinus.*
3. Give an account of geological time scale.

Short answers

1. Morphology of ovuliferous scale in *Pinus*
2. Ovule in *Gnetum*
3. Male cone in *Gnetum*
4. *Cycadeoidea*

UNIT-III

Essays

1. Describe the salient features of Bentham and Hooker's system of classification.
2. Give an account of ICN rules.
3. Explain various steps involved in Herbarium preparation.

Short answers

1. Binomial nomenclature
2. Concept of Digital herbaria
3. Vegetation types of Andhra Pradesh
4. Typification

UNIT-IV

Essays

1. Describe the vegetative and floral characters off family Malvaceae.
2. Describe the floral characters of family Euphorbiaceae and add note on its economic importance
3. Give an account of floral characters of family Poaceae and add a note on its economic importance.

Short answers

1. Head inflorescence
2. Periplocoideae and Cynanchoideae
3. Flower in Orchidaceae
4. Morphology of tendrils in Cucurbitaceae

UNIT-V

Essays

1. Describe the phytogeographical regions of India.
2. What is Endemism? What are the causes and types of endemism?
3. Give an account of Principles of Phytogeography.

Short answers

1. Discontinuous species
2. Grasslands of the world
3. Wides
4. Boreal forest

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II-BZC	BOTANY-III	SEM-III	Course code: BOT N-3321	2021-22	No. of Credits:4	No. of Hrs /Week:4

ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY

On successful completion of this course, the students will be able to:

CO1: Understand the various tissues, tissue systems and secondary growth in plants.

CO2: Able to learn male, female gametophytes, endosperm development and embryogeny

CO3: Able to understand the concept of ecosystem ,succession, role of Abiotic, biotic and edaphic factors on ecosystem,

CO4: Understand the concepts population, community, Production ecology and biogeo chemical cycles

CO5: Learn about the biodiversity , threats Hotspots and conservation

Unit-1: Anatomy of Angiosperms 12 Hrs.

1. Meristems: Organization of apical meristems: Apical cell theory, Tunica-corpus theory, Histogen theory and Korper-Kappe theory
2. Tissue systems-Epidermal, ground and vascular tissue system
3. Anomalous secondary growth in *Boerhaavia* and *Dracaena.*
4. Study of timbers of economic importance - Teak, Red sanders and Rosewood.

Unit-2: Embryology of Angiosperms 12 Hrs.

1. Structure of anther, anther wall, types of tapetum. Microsporogenesis and development of male gametophyte.
2. Structure of ovule, types of ovules, megasporogenesis; monosporic (*Polygonum*), bisporic (*Allium*) and tetrasporic (*Peperomia*) types of embryo sacs.
3. Endosperm-Types of endosperm- Free nuclear, cellular, helobial and ruminate.
4. Embryogeny: Development of Dicot (*Capsella bursa-pastoris*) embryo, Monocot (*Sagittaria sagittifolia*) embryo and Polyembryony

Unit-3: Basics of Ecology 12 Hrs.

1. Ecology: definition, branches and significance of ecology.
2. Ecological factors: Climatic (light and temperature), edaphic (Soil profile, Soil water, Humus only) and biotic factors.
3. Ecosystem: Concept and components, energy flow, food chain, food web, ecological pyramids.
4. Ecological succession: General process of succession, Hydrosere and Xerosere.

Unit-4: Population, Community and Production Ecology 12 Hrs.

1. Population ecology: Natality, mortality, Survivorship curves, growth curves, ecotypes, ecads
2. Community ecology: Quantitative characters- Frequency, density, cover, Qualitative characters-life forms, biological spectrum
3. Concepts of productivity: GPP, NPP, Secondary productivity
4. Biogeochemical cycles: CO2, Phosphorus and Hydrological

Unit-5: Basics of Biodiversity **12 Hrs.**

1. Biodiversity: Levels of Biodiversity and value of Biodiversity
2. Biodiversity Hotspots in India. Biodiversity in North Eastern Himalayas and Western Ghats.
3. Threats to Biodiversity, IUCN threat-categories, RED data book
4. Principles of conservation: In-situ conservation (National parks, Wild life sanctuaries, Biosphere reserves), Ex-situ conservation (Botanical garden and seed banks). Role of NBPGR and NBA in the conservation of Biodiversity.

Text books:

1. Botany – III (Vrukshasastram-I): Telugu Akademi, Hyderabad
2. Botany – IV (Vrukshasastram-II): Telugu Akademi, Hyderabad

Books for Reference:

1. Esau, K. (1971). Anatomy of Seed Plants. John Wiley and Son, USA.
2. Bhojwani, S. S. and S. P. Bhatnagar (2000). The Embryology of Angiosperms (4th Ed.),Vikas Publishing House, Delhi.
3. Kormondy, Edward J. (1996) Concepts of Ecology,Prentice-Hall of India Private Limited, New Delhi .
4. Kumar H.D. (2000): Biodiversity & Sustainable Conservation Oxford & IBH Publishing Co Ltd. New Delhi.
5. Kumar, U. (2007). Biodiversity : Principles & Conservation, Agrobios (India), Jodhpur

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An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

II-BZC	BOTANY-III	SEM-III	Course code: BOT N-3321 P	2021-22	No. of Credits:1	No. of Hrs /Week:2

ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY

1. Tissue organization in root and shoot apices using permanent slides.
2. Anomalous secondary growth in stems of *Boerhavia* and *Dracaena*.
3. Study of anther and ovule using permanent slides/photographs.
4. Study of pollen germination and pollen viability.
5. Structure of endosperm (nuclear and cellular) using permanent slides / Photographs.
6. Developmental stages of dicot and monocot embryos using permanent slides / photographs.
7. Ecology Instruments: 1. Soil thermometer
   2. Maximum and minimum thermometer
   3. Anemometer
   4. Rain gauze
   5. Lux meter.
8. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (02 each).
9. Find out the alpha-diversity of plants in the area
10. Mapping of biodiversity hotspots of India.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
II. B.Sc., BOTANY SEMESTER END EXAMINATION; Course-III
(ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY)

Course Code : BOT N-3321 **Max. Marks: 60M**
Time: 3hrs **Pass Min: 24 M**

MODEL QUESTION PAPER
SECTION-A

I. Answer any five of the following **5 X 4 = 20M**

1. Types of stomata
2. Types of ovules
3. Ecological pyramids
4. Raunkier's life form
5. IUCN categories
6. Rose wood
7. Photoperiodism
8. NBPGR

SECTION-B

II. Answer the following questions **5 x 8 = 40 M**

9. a) Describe vascular tissue system.

Or

b) Describe the process of anomalous secondary growth in *Boerhaavia.*

10. a) Explain various types of endosperm seen in angiosperms.

Or

b) Describe the process of Dicot embryo development with the help of suitable example

11. a) Describe the structure of a typical Ecosystem.

Or

b) Explain the process of plant succession in aquatic environment

12. (a) Explain characters of a population studied by you.

Or

(b) Give an account of productivity of an ecosystem.

13. (a) What are the major threats to loss of Biodiversity.

Or

(b) Discuss Biodiversity in North Eastern Himalayas and Western Ghats.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
II. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-III
(ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY)

Course Code: BOT N-3321P **Max. Marks: 25M**
Time: 2hrs **Pass Min: 10M**

1. Take the T.S of the given material **"A" (Anatomy).** Stain, mount and leave the slide for evaluation. Identify giving reasons with the help of labeled diagrams----------**5M**

2. Write the procedure for the experiment '**B**' **(Embryology)** and demonstrate the same----------**5 M**

3. Take the T.S of the given material **"C". (Ecology)** Stain, mount and leave the slide for evaluation. Identify giving reasons with the help of labeled diagrams----------**5M**

4. Identify the following with specific reasons----------4 x 2 = 8 M

D. Anatomy/Embryology

E. Embryology

F. Ecology specimen

G. Ecological instrument

5. Viva-voce **2 M**

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

II-BZC	BOTANY-III	SEM-III	Course code: BOT N-3321	2021-22	No. of Credits:4	No. of Hrs /Week:4

ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY

QUESTION BANK

UNIT-I

Essays

1. Describe vascular tissue system.
2. Describe the process of anomalous secondary growth in *Boerhaavia.*
3. Explain various theories of shoot apical meristem organization.

Short answers

1. Types of stomata
2. Rose wood
3. Classification of meristems
4. Theories of root apical meristem

UNIT-II

Essays

1. Explain various types of endosperm seen in angiosperms.
2. Describe the process of Dicot embryo development with the help of suitable example
3. Explain various types of embryo sacs seen in angiosperms with one type each.

Short answers

1. Types of ovules
2. Tapetum
3. Polyembryony
4. Anther wall

UNIT-III

Essays

1. Describe the structure of a typical Ecosystem.
2. Explain the process of plant succession in aquatic environment.
3. Describe light as an ecological factor.

Short answers

1. Ecological pyramids
2. Soil profile
3. Food chains
4. General process of succession

UNIT-IV

Essays

1. Explain characters of a population studied by you.
2. Give an account of productivity of an ecosystem.
3. Describe quantitative characters of a Community

Short answers

1. Ecotypes
2. Biological spectrum
3. Ecads
4. Growth curves

UNIT-V

Essays

1. What are the major threats to loss of Biodiversity?
2. Discuss Biodiversity in North Eastern Himalayas and Western Ghats.
3. Explain the role of national parks, wild life sanctuaries and biosphere reserves in the conservation of Biodiversity.

Short answers

1. NBPGR
2. Western Ghats
3. Value of Biodiversity
4. Levels of Biodiversity

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

II-BZC	BOTANY-IV	SEM-IV	Course code: BOT N-4321	2021-22	No. of Credits:4	No. of Hrs /Week:4

PLANT PHYSIOLOGY AND METABOLISM

On successful completion of this course, the students will be able to:

CO1: Understand plant structures in the context of physiological functions of plants in relation to water

CO2: Unravel the concepts of Mineral nutrition , Respiration and Enzymes

CO3: Know the Concepts of Photosynthesis , Photosystems,Photorespiration and Carbon assimilation pathways.

CO4: Learn detailed pathway of Nitrogen and lipid metabolism

CO5: Learn about the growth and development, Physiological changes and effects of plant growth regulators

Unit-1: Plant-Water relations 10 Hrs.

1. Importance of water to plant life, physical properties of water, diffusion, imbibition, osmosis. Water potential, osmotic potential, pressure potential.
2. Absorption and lateral transport of water; Ascent of sap
3. Transpiration: stomata structure and mechanism of stomatal movements (K^+ ion flux).
4. Mechanism of phloem transport; source-sink relationships.

Unit-2: Mineral nutrition, Enzymes and Respiration 14 Hrs.

1. Essential macro and micro mineral nutrients and their role in plants; symptoms of mineral deficiency
2. Absorption of mineral ions; passive and active processes.
3. Characteristics, nomenclature and classification of Enzymes. Mechanism of enzyme action, enzyme kinetics.
4. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation

Unit-3: Photosynthesis and Photorespiration 12 Hrs.

1. Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect
2. Concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation
3. Carbon assimilation pathways (C3, C4 and CAM);
4. Photorespiration - C2 pathway

Unit-4: Nitrogen and lipid metabolism 12 Hrs.

1. Nitrogen metabolism: Biological nitrogen fixation- asymbiotic and symbiotic nitrogen fixing organisms.
2. N2 cycle, Mechanism of nitrogen fixation
3. Lipid metabolism: Classification of Plant lipids, saturated and unsaturated fatty acids.
4. β-oxidation of fatty acids, Glyoxylate cycle.

Unit-5: Plant growth-development 12 Hrs.

1. Growth and Development: Definition, phases and kinetics of growth.
2. Physiological effects of Plant Growth Regulators (PGRs)-auxins, gibberellins, cytokinins, ABA, ethylene and brassinosteroids.
3. Physiology of flowering: Photoperiodism, role of phytochrome in flowering.
4. Seed germination and senescence; physiological changes.

Text books:

1. Botany-IV (Vrukshasastram-II) : Telugu Akademi, Hyderabad.
2. Pandey, B.P. (2013.) College Botany, Volume-III, S. Chand Publishing, New Delhi

Books for Reference:

1. Hopkins, W.G. & N.P.A. Huner (2014). Introduction to Plant Physiology, Wiley India Pvt. Ltd., New Delhi.
2. Noggle Ray & J. Fritz (2013). Introductory Plant Physiology, Prentice Hall (India), New Delhi.
3. Salisbury, Frank B. & Cleon W. Ross (2007). Plant Physiology, Thomsen & Wadsworth, Austalia &U.S.A

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

II-BZC	BOTANY-IV	SEM-IV	Course code: BOT N-4321P	2021-22	No. of Credits:1	No. of Hrs /Week:2

PLANT PHYSIOLOGY AND METABOLISM

1. Determination of osmotic potential of plant cell sap by plasmolytic method using *Rhoeo*/ *Tradescantia* leaves.
2. Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte.
3. Determination of rate of transpiration using Cobalt chloride method / Ganong's potometer (at least for a dicot and a monocot).
4. Effect of Temperature on membrane permeability by colorimetric method.
5. Study of mineral deficiency symptoms using plant material/photographs.
6. Separation of chloroplast pigments using paper chromatography technique.
7. Demonstration of Polyphenol oxidase enzyme activity (Potato tuber or Apple fruit)
8. Anatomy of C3, C4 and CAM leaves
9. Minor experiments – Osmosis, Arc-auxanometer, ascent of sap through xylem, Cytoplasmic streaming.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
II. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-IV
(PLANT PHYSIOLOGY AND METABOLISM)

Course Code : BOT N-4321 **Max. Marks: 60M**
Time: 3hrs **Pass Min: 24M**

MODEL QUESTION PAPER
SECTION-A

I. Answer any five of the following **5 X 4= 20M**

1. Water potential
2. Macronutrients
3. Photorespiration
4. Glyoxylate cycle
5. Senescence
6. Pentose phosphate pathway
7. Classification of lipids
8. Cytokinins.

SECTION-B

II. Answer the following questions **5 x 8 = 40 M**

9. a) Explain various theories of Ascent of sap.
   Or
   b) Describe the opening and closing mechanism of stomata with suitable theories.

10. a) Explain the mechanism of enzyme enzyme action.
    Or
    b) Describe the reactions of Glycolysis.

11. a) Give an account of the photosynthetic carbon reduction pathway.
    Or
    b) Describe the mechanism of photosynthetic electron transport.

12. (a) Give an account of biological nitrogen fixation.
    Or
    (b) Describe β-oxidation pathway.

13. (a) Explain the role of phytochrome in flowering
    Or
    (b) Describe the physiological effects of Auxins.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
II. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-IV
(PLANT PHYSIOLOGY AND METABOLISM)

Course Code : BOT N-4321 **Max. Marks: 25M**
Time: 2hrs **Pass Min: 10 M**

1. Perform the experiment 'A' (Major experiment). Write aim, principle, material and apparatus/equipment, procedure, tabulate results and make conclusion----------**------8 M**
2. Demonstrate the experiment 'B' (Minor experiment). Write the principle, Procedure and give inference----------**6M**
3. Identify the following with giving reasons. **2 x 3 = 6 M**

   C. Mineral nutrition deficiency
   D. Cytoplasmic streaming/Polyphenol oxidase activity/growth measurement by Arc auxanometer

4. Record + Viva-voce **3 + 2 = 5 M**

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004
An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

II-BZC	BOTANY-IV	SEM-V	Course code:	2021-22	No. of Credits:4	No. of Hrs /Week:4

CELL BIOLOGY, GENETICS AND PLANT BREEDING

On successful completion of this course, the students will be able to:

CO1: Understand structure and composition of plant cell wall, plasma Membrane, Plastids
CO2: Understand the Morphology of chromosome, aberrations and organization of DNA in chromosomes.
CO3: Understand Mendelian laws of inheritance , genetic interactions , concepts of Linkage and Crossing over , maternal inheritance
CO4: Understand Structure and functions of DNA, RNA , Genetic code , Translation , Regulation of gene expression
CO5: Understand the plant breeding methods and molecular breeding

Unit -1: The Cell **12 Hrs.**

1. Cell theory; prokaryotic vs eukaryotic cell; animal vs plant cell; a brief account on the ultrastructure of a plant cell.
2. Ultrastructure of cell wall.
3. Ultrastructure of plasma membrane and various theories on its organization.
4. Polymorphic cell organelles (Plastids); ultrastructure of chloroplast. Plastid DNA.

Unit-2: Chromosomes **12 Hrs.**

1. Prokaryotic vs eukaryotic chromosome. Morphology of a eukaryotic chromosome.Euchromatin and Heterochromatin; Karyotype and ideogram.
2. Special type of chromosomes-Lamp brush, Polytene and B-Chromosome
3. Brief account of chromosomal aberrations - structural and numerical changes
4. Organization of DNA in a chromosome (solenoid and nucleosome models).

Unit-3: Mendelian and Non-Mendelian genetics **14Hrs.**

1. Mendel's laws of inheritance. Incomplete dominance and codominance; Multiple allelism.
2. Complementary, supplementary and duplicate gene interactions (plant based examples are to be dealt).
3. A brief account of linkage and crossing over; Chromosomal mapping - 2 point and 3 point test cross.

4. Concept of maternal inheritance (Corren's experiment on *Mirabilis jalapa*); Mitochondrial DNA.

Unit-4: Structure and functions of DNA **12 Hrs.**

1. Watson and Crick model of DNA. Brief account on DNA Replication (Semi-conservative method).
2. Brief account on Transcription, types and functions of RNA.
3. Gene concept and genetic code and Translation.
4. Regulation of gene expression in prokaryotes - Lac Operon and Trp Operon

Unit-5: Plant Breeding **12 Hrs.**

1. Plant Breeding and its scope. Plant Introduction and acclimatization.
2. Definition, procedure, applications and uses; advantages and limitations of :(a) Mass selection, (b) Pure line selection and (c) Clonal selection.
3. Hybridization-Procedure, Advantages and Limitations; Heterosis (hybrid vigour).
4. A brief account on Molecular breeding – DNA markers in plant breeding. RAPD, RFLP.

Text Books :

1. Botany-III (Vrukshasastram-I) : Telugu Akademi, Hyderabad.
2. Pandey, B.P. (2013).College Botany, Volume-III, S. Chand Publishing, New Delhi

Books for Reference:

1. Gupta, P.K. (2002). Cell and Molecular biology,Rastogi Publications, New Delhi
2. Singh, B.D. (2008) Genetics. Kalyani Publishers, Ludhiana.
3. Chaudhari, H.K.(1983). Elementary Principles of Plant Breeding, TMH publishers Co.,

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II-BZC	BOTANY-IV	SEM-V	Course code:	2021-22	No. of Credits:1	No. of Hrs /Week:2

CELL BIOLOGY, GENETICS AND PLANT BREEDING

1. Study of ultrastructure of plant cell and its organelles using Electron microscopic Photographs/models.
2. Demonstration of Mitosis in *Allium cepa*/*Aloe vera* roots using squash technique; observation of various stages of mitosis in permanent slides.
3. Demonstration of Meiosis in P.M.C.s of *Allium cepa* flower buds using squash technique; observation of various stages of meiosis in permanent slides.
4. Study of structure of DNA and RNA molecules using models.
5. Solving problems monohybrid, di-hybrid, back and test crosses.
6. Solving problems on gene interactions (at least one problem for each of the gene interactions in the syllabus).
7. Chromosome mapping using 3- point test cross data.
8. Demonstration of emasculation, bagging, artificial pollination techniques for hybridization.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
II. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-V
(CELL BIOLOGY, GENETICS AND PLANT BREEDING)

Course Code : **Max. Marks: 60M**
Time: 3hrs **Pass Min: 24 M**

MODEL QUESTION PAPER
SECTION-A

I. Answer any five of the following **5 X 4= 20M**

1. Cell wall
2. Euchromatin and Heterochromatin
3. Nucleosome model
4. Mitochondrial DNA
5. Types of RNA
6. DNA structure
7. Pure line selection
8. Lac operon

SECTION-B

II. Answer the following questions **5 x 8 = 40 M**

9. a) Describe the ultrastructure of plasma membrane with the help of various theories.

Or

b) Give a brief account of ultrastructure of plant cell.

10. a) Write an account of chromosomal structural aberrations.

Or

b) Describe the morphology of eukaryotic chromosome.

11. a) What are gene interactions? Give an account of Complementary genes.

Or

b) Explain di-hybrid cross with the help of checkerBoard.

12. a) Write an essay on translation.

Or

b) Explain the replication process of DNA.

13. a) Explain the role of Molecular markers in plant breeding.

Or

b) What is hybridization? Describe the procedure, advantages and limitations of Hybridization.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
II. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-V
(CELL BIOLOGY, GENETICS AND PLANT BREEDING)

Course Code: **Max. Marks: 25M**
Time: 2hrs **Pass Min: 10 M**

1. Make a cytological preparation of given material 'A' (mitosis or meiosis in Onion) by squash technique, report any two stages, draw labeled diagrams and write the reasons.----------7 M
2. Solve the given Genetic problem (Dihybrid cross/ Interaction of genes/ 3-point test cross) 'B' and write the conclusions. ----------7 M
3. Identify the following and justify with apt reasons. ----------2 x 3 = 6 M
   - **C.** Cell Biology (Cell organelle-Mitochondria, Chloroplast, Endoplasmic reticulum)
   - **D.** Plant Breeding (Emasculation/Bagging)
4. Record + Viva-voce 3 + 2 = 5 M

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II-BZC	BOTANY-V	SEM-IV	Course code:	2021-22	No. of Credits:4	No. of Hrs /Week:4

CELL BIOLOGY, GENETICS AND PLANT BREEDING

UNIT-I

Essays

1. Describe the ultrastructure of plasma membrane with the help of various theories.
2. Give a brief account of the ultrastructure of the plant cell.
3. Describe the ultrastructure of chloroplast with the help of a neat labelled diagram.

Short answers

1. Cell wall
2. Plastid DNA
3. Cell theory
4. Ribosomes

UNIT-II

Essays

1. Write an account of chromosomal structural aberrations.
2. Describe the morphology of the eukaryotic chromosome.
3. Give an account of special types of chromosomes

Short answers

1. Euchromatin and Heterochromatin
2. Karyotype
3. Nucleosome model
4. Polyploidy

UNIT-III

Essays

1. What are gene interactions? Give an account of Complementary genes.
2. Explain di-hybrid cross with the help of checker Board.
3. Explain various theories of crossing over

Short answers

1. Mitochondria DNA
2. Gametic coupling and repulsion
3. Incomplete dominance
4. 3-point test cross

UNIT-IV

Essays

1. Write an essay on translation.
2. Describe the process of DNA replication.

3. Give an account of Genetic code.

Short answers

1. Lac operon
2. Tryptophan operon
3. Types of RNA
4. Structure of DNA

UNIT-V

Essays

1. Explain the role of Molecular markers in plant breeding.
2. What is hybridization? Describe the procedure, advantages and limitations of Hybridization.
3. Give an account of procedure, applications, advantages and limitations of Pure line selection.

Short answers

1. Plant Introduction
2. Clonal selection
3. Heterosis
4. RAPD and RFLP

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An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

III-BZC	BOTANY-V	SEM-V	Course code:BOT 5321-5	2021-22	No. of Credits:3	No. of Hrs /Week:3

CELLBIOLOGY, GENETICS AND PLANT BREEDING

On successful completion of this course, the students will be able to:

CO1: Gain knowledge about Structure and functions of cell, cell organelles and Chromosomes.
CO2: Gain knowledge about Structure, function and Replication of DNA,RNA
CO3: Understand about Mendel's laws, chromosome theory of Inheritance, significance of Linkage and Crossing over.
CO4: Get a clear understanding about objectives of plant Breeding and Crop improvement methods
CO5: Get a clear understanding about Breeding, Crop Improvement, Biotechnology, Mutations, Somaclonal variations and Molecular Breeding

Unit-I: Cell Biology: 12 Hrs.

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

Unit-II: Genetic Material 12 Hrs.

1. DNA as the genetic material: Griffith's and Avery's transformation experiment, Hershey – Chase bacteriophage experiment.
2. DNA structure (Watson & Crick model) and replication of DNA (semi-conservative)
3. Types of RNA (mRNA, tRNA, rRNA), their structure and function.

Unit-III: Mendelian Inheritance 12 Hrs.

1. Mendel's laws of Inheritance (Mono- and Di- hybrid crosses); backcross and test cross.
2. Chromosome theory of Inheritance.
3. Linkage: concept, complete and incomplete linkage, coupling and repulsion; linkage maps based on two and three factor crosses.
4. Crossing Over: concept & significance.

Unit IV: Plant Breeding 12 Hrs.

1. Introduction and Objectives of plant breeding.
2. Methods of crop improvement: Procedure, advantages and limitations of Introduction, Selection, and Hybridization (outlines only).

Unit-V: Breeding, Crop Improvement and Biotechnology 12 Hrs.

1. Role of mutations in crop improvement.
2. Role of somaclonal variations in crop improvement.
3. Molecular breeding – use of DNA markers in plant breeding and crop improvement (RAPD, RFLP).

Books for Reference

1. Lea, P.J. and Leegood R.C. 1999, Plant Biochemistry and Molecular Biology, John Wiley and Sons, London.
2. Power C.B. 1984, Cell Biology, Himalaya Publishing Co. Mumbai
3. De Robertis and De Robertis, 1998, Cell and Molecular Biology, K.M. Verghese and Company.
4. Sinnott, E.W., L.C. Dunn & J. Dobshansky (1958): Principles of Genetics (5^{th} Edition) McGraw Hill Publishing Co., N.Y. Toronto, London.

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An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

III-BZC	BOTANY-V	SEM-V	Course code:BOT-5321-5P	2021-22	No. of Credits:2	No. of Hrs /Week:2

CELLBIOLOGY, GENETICS AND PLANT BREEDING

Practical syllabus

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

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SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
III B.Sc., BOTANY SEMESTER END EXAMINATION; Course-V
(CELL BIOLOGY, GENETICS AND PLANTBREEDING)

Course Code : BOT 53215 **Max. Marks: 60M**
Time: 3hrs **Pass Min: 24 M**

MODEL QUESTION PAPER

SECTION-A

Answer any five of the following **5X4=20M**

1. Euchromatin and Heterochromatin
2. Structure of DNA
3. Cryopreservation
4. Chromosomal theory of linkage
5. Objectives of plant breeding
6. Mutagens
7. Functions of RNA
8. Cell theory

SECTION – B

Answer the following **5X8=40M**

9. a) Describe the ultrastructure of plasma membrane with the help of various theories.

(OR)

b)Describe the morphology of Eukaryotic chromosome.

10.a)Describe semiconservative mode of DNA replication.

(OR)

(b) Give a brief account of types of RNA.

11. a) Define Linakge. Explain gametic coupling and repulsion.

(OR)

b) Explain various theories of crossing over.

12. a) What is hybridization? Describe the procedure, advantages and limitations of Hybridization.

(OR)

b) Give an account of procedure, applications, advantages and limitations of Pure line selection.

13. a)Explain the role of molecular markers in plant breeding.

(OR)

b) Give an account of soma clonal variations in crop improvement.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
III. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-V
(CELLBIOLOGY, GENETICS AND PLANT BREEDING)

Course Code:BOT5321-5 **Max. Marks: 25M**
Time: 2hrs **Pass Min : 10M**

1. Perform the Experiment A .Perform squash on onion root tip, prepare the slide, identify at least one division stage. Write the procedure and draw the diagram of reported stage-6M

2. Identify the B and C giving reasons----------2X3=6M
3. Solving numerical problems on Mendelian in heritance D and E-------- 2x 4 =8M
4. Record ----------5M

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III-BZC	BOTANY-V	SEM-V	Course code: BOT5321-5	2021-22	No. of Credits:4	No. of Hrs /Week:3

CELL BIOLOGY, GENETICS AND PLANTBREEDING

UNIT-I

Essays

1. Describe the ultrastructure of plasma membrane with the help of various theories.
2. Give a brief account of ultrastructure of plant cell.
3. Describe the morphology of eukaryotic chromosome.

Short answers

1. Cell wall
2. Euchromatin and Heterochromatin
3. Cell theory
4. Ribosomes

UNIT-II

Essays

1. Describe the semiconservative mode of DNA replication.
2. Give an account of various types of RNA.
3. Give an account of any two experimental proof for DNA as genetic material.

Short answers

1. DNA structure
2. Functions of RNA
3. Hershy and chase Bacteriophage experiment

UNIT-III

Essays

1. Define Linakge. Explain gametic coupling and repulsion.
2. Explain di-hybrid cross with the help of checker Board.
3. Explain various theories of crossing over

Short answers

1. Chromosomal theory of linkage
2. Gametic coupling and repulsion
3. Test cross and Back cross
4. 3-point test cross

UNIT-IV

Essays

1. What is hybridization? Describe the procedure, advantages and limitations of Hybridization.
2. Give an account of procedure, applications, advantages and limitations of Pure line selection.
3. What are the advantages and disadvantages of clonal selection.

Short answers

1. Mass selection
2. Objectives of plant breeding
3. Limitations of clonal selection

4. Procedure for Introduction

UNIT-V

Essays

1. Explain the role of Molecular markers in plant breeding.
2. Explain the role mutations in plant breeding.
3. Give an account of somaclonal variations in crop improvement.

Short answers

1. Mutagens
2. RAPD
3. RFLP

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

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III-BZC	BOTANY-VI	SEM-V	Course code: BOT5321-6	2021-22	No. of Credits:3	No. of Hrs /Week:3

PLANT ECOLOGY AND PHYTOGEOGRAPHY

On successful completion of this course, the students will be able to:

CO1: Gain knowledge about Ecology, Climatic, Edaphic and Biotic factors
CO2: Gain knowledge about Concepts and Components of Ecosystem and Bio geo chemical cycles.
CO3: Understand about Population characteristics, Ecotypes, Plant communities and Interaction between plant communities.
CO4: Get a clear understanding about Phytogeography and Endemism
CO5: Get a clear understanding about levels and loss of Biodiversity hotspots, Seed banks

Unit-I: Elements of Ecology 12 Hrs.

1. Ecology: definition, branches and significance of ecology.
2. Climatic Factors: Light, Temperature, precipitation.
3. Edaphic Factor: Origin, formation, composition and soil profile.
4. Biotic Factor: Interactions between plants and animals.

Unit-II: Ecosystem Ecology 12 Hrs.

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

Unit-III: Population &Community Ecology 12 Hrs.

1. Population -definition, characteristics and importance, outlines –ecotypes.
2. Plant communities- characters of a community, outlines – Frequency, density, cover, life forms, competition.
3. Interaction between plants growing in a community.

Unit-IV: Phytogeography 12 Hrs.

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Phytogeographic regions of India.
3. Phytogeographic regions of World.
4. Endemism – types and causes.

Unit-V: Plant Biodiversity and its importance 12 Hrs.

1. Definition, levels of biodiversity-genetic, species and ecosystem.
2. Biodiversity hotspots- Criteria, Biodiversity hotspots of India.
3. Loss of biodiversity-causes and conservation (In-situ and ex-situ methods).
4. Seed banks - conservation of genetic resources and their importance.

Books for Reference

1. Billings, W.B. (1965): Plants and the Ecosystem Wadsworth Publishing Co., Inc., Belmont.
2. Misra, R. (1968): The Ecology work Book Oxford and INH Publishing Co., Calcutta
3. Odum E.P. (1971): Fundamentals of Ecology (2nd Edn.,) Saunders and Co., Philadelphia and Natraj Publishers, Dehradun.
4. Odum E.P. (1975): Ecology By Holt, Rinert and Winston.
5. Newman, E.I. (2000): Applied Ecology Blackwell Scientific Publisher, U.K.
6. Chapman, J.L&M.J. Reiss (1992): ecology (Principles and Applications). Cambridge University Press, U.K.

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An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

III-BZC	BOTANY-VI	SEM-V	Course code: BOT5321-6P	2021-22	No. of Credits:2	No. of Hrs /Week:2

PLANT ECOLOGY AND PHYTOGEOGRAPHY

On successful completion of this course, the students will be able to:

Practical syllabus

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

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
III B.Sc., BOTANY SEMESTER END EXAMINATION; Course-VI
(PALNT ECOLOGY AND PHYTOGEOGRAPHY)

Course Code : BOT5321-6 **Max. Marks: 60M**
Time: 3hrs **Pass Min: 24 M**

MODEL QUESTION PAPER

SECTION-A

Answer any five of the following **5X4=20M**

1. Vernalization
2. Ecological pyramids
3. Ecotypes
4. Wides
5. Seed Banks
6. Levels of Biodiversity
7. Growth curves
8. Humus

SECTION – B

Answer the following **5X8=40M**

9. a) Describe the role of light as an ecological factor.

(OR)

b) Give an account of interactions between plants growing in community.

10.a)Describe structure of a typical ecosystem.

(OR)

(b) What are Biogeochemical cycles? Describe nitrogen cycle.

11. a) Explain characters of a population studied by you.

(OR)

b) Describe quantitative characters of a community.

12. a) Describe phytogeographical regions of India.

(OR)

b) Give an account of principles of phytogeography.

13. a)What are the major threats to loss of Biodiveristy.

(OR)

b) Explain the role of national parks, wild life sanctuaries and biosphere

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
III. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-VI
(PLANT ECOLOGY AND PHYTOGEOGRAPHY)

Course Code: BOT5321-6P **Max. Marks: 25M**
Time: 2hrs **Pass Min : 10M**

1. Take the T.S given material "A". Stain, mount and leave your preparation for valuation and identify giving reasons----------7M
2. Describe the procedure for experiment "B"----------5M
3. Identify ecological instrument C and D giving reasons----------2X2=4M
4. Identify E & F giving reasons----------2X2=4M
5. Record----------5M

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

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III-BZC	BOTANY-V	SEM-V	Course code: BOT5321-6	2021-22	No. of Credits:3	No. of Hrs /Week:3

PLANT ECOLOGY AND PHYTOGEOGRAPHY

UNIT-I

Essays

1. Describe the role of light as an ecological factor.
2. Give an account of interactions between plants growing in a community
3. Write an essay on origin, formation of soil

Short answers

1. Branches of Ecology
2. Vernalization
3. Soil profile
4. Humus

UNIT-II

Essays

1. Describe the structure of a typical Ecosystem.
2. Give an account of energy flow in an ecosystem.
3. What are biogeochemical cycles? Describe Nitrogen cycle.

Short answers

1. Ecological pyramids
2. Food chains
3. Productivity of an ecosystem

UNIT-III

Essays

1. Explain characters of a population studied by you.
2. Give an account of productivity of an ecosystem.
3. Describe quantitative characters of a Community

Short answers

1. Ecotypes
2. Biological spectrum
3. Growth curves

UNIT-IV

Essays

1. Describe the phytogeographical regions of India.
2. What is Endemism? What are the causes and types of endemism?
3. Give an account of Principles of Phytogeography.

Short answers

1. Discontinuous species
2. Grass lands of the world
3. Wides

UNIT-V

Essays

1. What are the major threats to loss of Biodiversity?
2. Discuss Biodiversity in North Eastern Himalayas and Western Ghats.
3. Explain the role of national parks, wild life sanctuaries and biosphere reserves in the conservation of Biodiversity.

Short answers

1. Seed Banks
2. Importance of conservation of genetic resources
3. Levels of Biodiversity

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

III-BZC	BOTANY-VII	SEM-VI	Course code: BOT 7321B	2021-22	No. of Credits:3	No. of Hrs /Week:3

PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICAL APPLICATION

On successful completion of this course, the students will be able to:

CO1: Students can gain overall knowledge about Principles and types of tissue cultures

CO2: Students can understand the Methodology , sterilization , Culture media, Phytohormones in tissue culture

CO3: Students will be able able to understand the processes of .Callus culture, Somatic embryogenesis, Endosperm culture , Cryopreservation and embryo rescue techniques

CO4: Students can know about the concepts of Restriction Endonucleases , Cloning vectors and Gene Cloning , ,gene transfer methods and transgenics

CO5: Students can unravel the applications of biotechnology like genetic engineering ,genetic Modifications and Transgenics

Unit-I: Plant tissue culture-1 12Hrs.

1. History of plant tissue culture research - basic principles of plant tissue callus culture, meristem culture, organ culture, Totipotency of cells.
2. Methodology - sterilization (physical and chemical methods), culture media, Murashige and Skoog's (MS medium), phytohormones, medium for micro-propagation/clonal propagation of ornamental and horticulturally important plants.
3. Callus subculture maintenance, growth measurements, morphogenesis in callus culture – organogenesis, somatic embryogenesis.

Unit-II: Plant tissue culture -2 12 Hrs.

1. Endosperm culture – Embryo culture -culture requirements – applications, embryo rescue technique.
2. Cryopreservation; Germ plasm conservation.

Unit-III: Recombinant DNA technology 12 Hrs.

1. Restriction Endonucleases (history, types I-IV, biological role and application); concepts of restriction mapping.
2. Cloning Vectors: Prokaryotic (pUC 18, pBR322,Ti plasmid and Lambda phage, Eukaryotic Vectors (YAC and briefly PAC)
3. Gene cloning (Bacterial Transformation and selection of recombinant clones, PCR mediated gene cloning)

Unit-IV: Methods of gene transfer 12 Hrs.

1. Methods of gene transfer- Agrobacterium-mediated, direct gene

transfer by Electroporation, Microinjection, Micro projectile bombardment.

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

Unit –V: Applications of Biotechnology **12 Hrs.**

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

Books for Reference

1. Pullaiah. T. and M.V.Subba Rao. 2009. Plant Tissue culture. Scientific Publishers, New Delhi.
2. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
3. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology-Principles and Applications of recombinant DNA. ASM Press, Washington.
4. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms. Vikas Publication House Pvt. Ltd., New Delhi. 5th edition.
5. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics. John Wiley and Sons, U.K. 5th edition.
6. Stewart, C.N. Jr. (2008). Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

III-BZC	BOTANY-VII	SEM-VI	Course code: BOT7321BP	2021-22	No. of Credits:3	No. of Hrs /Week:4

PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICAL APPLICATION

Practical syllabus

1. (a) Preparation of MS medium.
(b) Demonstration of in vitro sterilization methods and inoculation methods using leaf and nodal explants of Tobacco/ Datura/ Brassica etc.
2. Study of embryo and culture, micro propagation of Banana, somatic embryogenesis, artificial seeds through photographs.
3. Study of methods of gene transfer through photogaphs: Agrobacterium mediated , direct gene transfer by electroporation, microinjection and micro projectile bombardment
4. Different steps involved in genetic engineering for production of Bt cotton, golden rice, flavr savr tomato through photographs
5. Isolation of plasmid DNA
6. Field visit to a lab involved in tissue culture
7. Study project under supervision of lecturer – tissue culture/ genetic engineering

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
III B.Sc., BOTANY SEMESTER END EXAMINATION; Course-VII
(PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICALAPPLICATIONS)
Course Code : BOT7321B **Max. Marks: 60M**
Time: 3hrs **Pass Min : 24 M**

MODEL QUESTION PAPER

SECTION-A

Answer any five of the following **5X4=20M**

1. Embryo culture
2. Synthetic seeds
3. Cryopreservation
4. Ti Plasmid
5. Bt Cotton
6. Microinjection
7. YAC
8. Thawing

SECTION – B

Answer the following **5X8=40M**

9. a) Describe various physical and chemical methods of sterilization.

(OR)

b)Explain how virus free plants are produced through meristem culture.

10.a)What is embryo rescue technique? Describe embryo culture.

(OR)

(b) Give a brief account of Germplasm conservation.

11. a)What are cloning vectors? DescribeP_{BR322} and PUC_{18} vectors.

(OR)

b) What are restriction endonucleases? Explain its types.

12. a) Give an account of Agrobacterium mediated gene transfer method.

(OR)

b)Explain how transgenic are selected through selectable markers.

13. a)Write an essay on applications of genetic engineering.

(OR)

b) Give an account of flavrSavr tomato and Golden rice.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA

III. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-VII
(PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICAL APPLICATIONS)

Course Code:BOT 7321B **Max. Marks: 25M**
Time: 2hrs **Pass Min : 10M**

1. Project report (A)----------10M
2. Identify and write notes on B, C and D----------3x2=6M
   B- Tool/instrument/container used in sterilization
   C- Tool/instrument/container used in gene transfer
   D- GM crops (Photographs)
3. Isolation of Plasmid DNA----------04M
4. Record ---------- 05M

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PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICAL APPLICATIONS
COURSE CODE: BOT 7321B

QUESTION BANK

UNIT-I

Essays

1. Explain how virus free plants are produced through meristem culture.
2. Describe various physical and chemical methods of sterilization.
3. Give an account of composition of MS media and its preparation.

Short answers

1. Callus culture
2. Embryo culture
3. Role hormones in plant tissue culture
4. Synthetic seeds

UNIT-II

Essays

1. Explain the procedure for endosperm culture.
2. What is embryo rescue technique? Describe embryo culture.
3. Give a brief account of germplasm conservation.

Short answers

1. Applications of embryo culture
2. Cryopreservation
3. Triploid production through endosperm culture
4. Thawing

UNIT-III

Essays

1. What are restriction endonucleases? Explain its types.
2. What are cloning vectors? DescribeP^{BR322} and PUC^{18} vectors.
3. Give an account of PCR mediated gene cloning.

Short answers

1. Ti plasmid
2. Selection of recombinants
3. YAC
4. Bacterial transformation

UNIT-IV

Essay

1. Give an account of Agrobacterium mediated gene transfer method.
2. Describe Micro projectile bombardment.
3. Explain how transgenic are selected through selectable markers.

Short Answer

1. Electroporation
2. Microinjection
3. Selectable markers
4. Luciferase

UNIT-V

Essay

1. Give an account of transgenic plants.
2. Write an essay on applications of genetic engineering.
3. Give an account of flavr Savr tomato and Golden rice.

Short Answer

1. Bt Cotton
2. Roundup ready soy bean
3. Moon dust carnation
4. Virus resistant agronomic trait

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

III-BZC	BOTANY-VIII-B1	SEM-VI	Course code: BOT8321B1	2021-22	No. of Credits:3	No. of Hrs /Week:3

BIOLOGICAL INSTRUMENTATION AND METHODOLOGY

On successful completion of this course, the students will be able to:

CO1: Gain knowledge about imaging, principles and applications of microscopy

CO2: Comprehend about Principles, Working mechanism and types of PH meter and Centrifugation

CO3: Unravel and understand deeply the Principles and explore the applications of Spectrophotometry

CO4: Get knowledge about Chromatography, Electrophoresis and its Principles, techniques and can explore the applications

CO5: Get a clear understanding about Preparation of molar, molal and normal solutions, buffers, art of scientific writing, safety measures in handling toxic chemicals

Unit-I: Imaging and related techniques: **12 Hrs.**

Principles of microscopy; Light microscopy; Fluorescence microscopy; Electron Microscopy (a)Applications of fluorescence microscopy

Unit II: PH and Centrifugation: **12 Hrs.**

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

Unit- III: Spectrophotometry: **12 Hrs.**

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

Unit- IV: Chromatography: **12 Hrs**

Chromatographic techniques: Principle and applications -Column - thin layer –paper, affinity - Gel filtration - Ion exchange and High performance liquid chromatography techniques– Examples of

application for each chromatographic system - Basic principles of electrophoresis.

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

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

Suggested Readings

1. Bajpai, P.K. (2006). Biological Instrumentation and methodology. S. Chand & Co. Ltd.
2. Wilson, K. and Walker, J. Eds. 2005. Biochemistry and Molecular Biology. Cambridge University Press.
3. Dawson, C. (2002). Practical research methods.UBS Publishers, New Delhi.
4. Ruzin, S.E. (1999). Plant micro technique and microscopy. Oxford University Press, New York, U.S.A.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

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III-BZC	BOTANY-VIII-B1	SEM-VI	Course code: BOT8321B1P	2021-22	No. of Credits:2	No. of Hrs /Week:2

BIOLOGICAL INSTRUMENTATION AND METHODOLOGY

Practical syllabus

1. Microscopy – Light microscopy: principles, parts & function
2. Micrometry- principle and measurement of microscopic objects: Low power and high power.
3. Camera Lucida drawing with magnification and scale.
4. Principle and working of phase contrast microscope
5. Principle & operation of Centrifuge
6. Preparation of standard acid and alkali and their standardization. Preparation of various solutions (normal, molar, and percent) and ppm/ppb by serial dilutions
7. Study of principle and working of pH meter and Measurement of pH of Milk, Pepsi, Lemon juice etc. using pH paper and pH meter
8. Study of principle of Chromatography and separation of amino acids mixture By ascending Paper Chromatography
9. Principle & operation of Colorimeter
10. Principle & operation of Spectrophotometer
11. Chromosome banding, FISH, chromosome painting
12. Principle and technique of TLC (demonstration)
13. TLC separation of Amino acids from purified samples and biological materials (demonstration)
14. PCR - The Polymerase Chain Reaction (protocol) –demonstration
15. Study visit to an institute /laboratory

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
III B.Sc., BOTANY SEMESTER END EXAMINATION; Course-VIIIB1
(BIOLOGICAL INSTRUMENTATION AND METHODOLOGY)

Course Code : BOT8321B1 **Max. Marks: 60M**
Time: 3hrs **Pass Min : 24 M**

MODEL QUESTION PAPER

SECTION-A

Answer any five of the following **5X4=20M**

1. Principles of Microscopy
2. Sonication
3. Infrared spectrophotometer
4. Agarose gel electrophoresis
5. Percentage of solutions
6. Applications of fluorescent microscopy
7. Micropipettes
8. Applications of centrifuge

SECTION – B

Answer the following **5X8=40M**

9. a) Give an account of working principles of light microscopy.

(OR)

b) Write about working principle of Electron microscopy.

10. a)Describe various types of rotors.

(OR)

(b) Give a brief account of instrumentation and working of P^H meter.

11. a) Explain in detail about mass spectroscopy.

(OR)

b) Write an account of Ultraviolet visible spectrophotometer.

12. a) Write an account of HPLC and its application.

(OR)

b) Give an account of Gel filtration /size exclusion chromatography.

13. a)Give an account of preparations of solutions.

(OR)

b) Write an essay on some toxic chemicals that are used in laboratory.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
III. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-VIIIB1
(BIOLOGICAL INSTRUMENTATION AND METHODOLOGY)

Course Code: BOT8321B1P **Max. Marks: 25M**
Time: 2hrs **Pass Min : 10M**

1. Perform the experiment (A). Write the protocol of the experiment----**6M**
2. Measure the pH of given sample (B) using pH paper and pH meter. Write the procedure and observation.----------**5M**
3. Identify C, D, and E. Write the principle and use of them--------**3X3=9M**
4. Record ----------**05M**

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BIOLOGICAL INSTRUMENTATION AND METHODOLOGY
COURSE CODE:BOT8321B1

QUESTION BANK

UNIT-I

Essays

1. Give an account of working principle of Light microscopy.
2. Describe the various techniques for preparing tissues for electron microscopy.
3. Write about the working principle of electron microscopy.

Short answers

1. Applications of fluorescence microscopy
2. Principles of microscopy
3. Fluorescence microscopy

UNIT-II

Essays

1. Explain the working principle of centrifuge and its types.
2. Describe various types of rotors.
3. Give a brief account of instrumentation and working of P^H meter.

Short answers

1. Sonication
2. Freeze drying
3. Applications of centrifuge

UNIT-III

Essays

1. Explain in detail about Mass spectroscopy.
2. Write an account of Ultraviolet visible spectrophotometer.
3. Give an account of Luminometry and densitometry – principles and their applications.

Short answers

1. Infrared spectrometer
2. Luminometry
3. Advantage and disadvantage of UV visible spectroscopy

UNIT-IV

Essay

1. Write an account HPLC and its application.
2. Give an account of gel filtration/size exclusion chromatography.
3. Write about the working principle and applications of gas chromatography.

Short Answer

1. Thin Layer chromatography
2. Agarose gel electrophoresis
3. Polyacrylamide Gel Electrophoresis(PAGE)

UNIT-V

Essay

1. Give an account of preparation of solutions.
2. Write an essay on some toxic chemicals that are used in laboratory.
3. Explain about the technique of handling micropipettes.

Short Answer

1. Percentage of solutions
2. Normality and molarity of acids and bases
3. Micropipettes

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

III-BZC	BOTANY-VIII-B2	SEM-VI	Course code: BOT8321B2	2021-22	No. of Credits:3	No. of Hrs /Week:3

MUSHROOM CULTRUE AND TECHNOLOGY

On successful completion of this course, the students will be able to:

CO1: Gain knowledge about mushroom cultivation aspects and their medicinal and nutritional benefits

CO2: Understand about pure culture preparation , spawn preparation

CO3: Unravel about the cultivation and compost technology in mushroom production and infrastructure aspects.

CO4: Get knowledge about storage ,drying, Nutrition factors of mushrooms

CO5: Get a clear understanding about types of foods prepared from Mushrooms, Marketing , Export and Research in Mushroom Production.

Unit-I: Introduction, history 12 Hrs

Introduction - history - scope of edible mushroom cultivation, Types of edible mushrooms available in India –*Volvariella volvacea, Pleurotus citrinopileatus, Agaricus bisporus*. Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms.

Unit-II: Pure culture-spawn preparation 12Hrs

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

Unit-III: Cultivation Technology 12 Hrs

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

Unit-IV: Storage and nutrition 12 Hrs

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

Unit V: Food Preparation **12 Hrs**

Types of foods prepared from mushrooms; soup, cutlet omlette, samosa, pickles and curry

Research Centres - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value.

Suggested Readings:

1. Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R (1991) Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
2. Swaminathan, M. (1990) Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.
3. Tewari, Pankaj Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi.
4. Biswas, S., M. Datta and S.V. Ngachan. 2011. Mushrooms: A Manual For Cultivation.PHI learning private Ltd., New Delhi, India.
5. Chang, S. and P.G. Miles. 2004. Mushrooms: cultivation, nutritional value, medicinal effect, and environmental impact. CRC Press. USA.

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III-BZC	BOTANY-VIII-B2	SEM-VI	Course code: BOT8321B2P	2021-22	No. of Credits:3	No. of Hrs /Week:4

MUSHROOM CULTRUE AND TECHNOLOGY

PRACTRICAL SYLLABUS

1. Identification of different edible and poisonous mushrooms.

2. Microscopic and anatomical observations of different mushroom species.

3. Pure culture - preparation of medium (PDA and Oatmeal agar medium) sterilization.

4. Isolation and preparation of spawn under controlled conditions (preparation of mother in spawn saline bottle and polypropylene bag and their multiplication).

5. Types of Compost preparation and sterilization.

6. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves/waste.

7. Inoculation and spawning of compost.

6. Incubation and harvesting of mushrooms (collection, drying and preservation).

7. Diseases of mushrooms (photographs).

8. Post-harvest technology steps (photographs).

9. Study tour to mushroom cultivation farms

11. Project work – cultivation of paddy straw/ oyster/white button mushrooms.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
III B.Sc., BOTANY SEMESTER END EXAMINATION; Course-VIIIB2
(MUSHROOM CULTRUE AND TECHNOLOGY)

Course Code : BOT8321B2 **Max. Marks: 60M**
Time: 3hrs **Pass Min : 24 M**

MODEL QUESTION PAPER

SECTION-A

Answer any five of the following **5X4=20M**

1. Poisonous mushrooms
2. Potato dextrose agar medium
3. Mushroom unit
4. Mushroom pickle
5. Mushroom export value
6. Different types of mushroom toxins
7. Cold pasteurization
8. Pure cultures

SECTION – B

Answer the following **5X8=40M**

9. a) Give an account of cultivation of *Volvariella volvacea*

(OR)

b) Write an essay on cultivation of *Agaricus bisporus.*

10. a)Write an essay on industrial production of spawn.

(OR)

(b) Give an account of preparation of test tube slants to store mother culture.

11. a) What are the various substrata used for mushroom cultivation.

(OR)

b) Give an accounting of composting technology.

12. a) Write an essay on long term storage of mushrooms through drying

(OR)

b) Write an essay on proteins, amino acids, mineral elements and carbohydrates in mushrooms.

13. a) Explain about the cost benefit ratio of mushroom production.

(OR)

b) Write about mushroom marketing in India and abroad.

SRR & CVR GOVERNMENT DEGREE COLLEGE (A): VIJAYAWADA
III. B.Sc., BOTANY EXTERNAL PRACTICAL EXAMINATION; Course-VIIIB2
(MUSHROOM CULTURE AND TECHNOLOGY)

Course Code: BOT8321B2P **Max. Marks: 25M**
Time: 2hrs **Pass Min : 10M**

1.Prepare the culture medium for isolation of spawn and make the slants. Write the protocol for preparation of the medium (A)----------10M

2. Write the protocol for preparation of compost (B)---------- 04 M

3. Comment on given specimens C, D and E ----------3x2 = 06M

4. Record---------- 05M

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

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MUSHROOM CULTURE AND TECHNOLOGY

COURSE CODE:BOT 8321B2

QUESTION BANK

UNIT-I

Essays

1. Give a brief account of cultivation of *Volvariella volvacea.*
2. List out the medicinal and nutritional value of edible mushrooms.
3. Write an essay on cultivation of *Agaricus bisporus.*

Short answers

1. Poisonous mushrooms
2. Pleurotus citrinopileatus
3. Different types of mushroom toxins

UNIT-II

Essays

1. Write an essay on pure culture technique.
2. Write an essay on industrial production of spawn.
3. Give an account of preparation of test tube slants to store mother culture.

Short answers

1. Potato dextrose agar medium
2. Oat meal agar medium
3. Pure cultures

UNIT-III

Essays

1. What are the various substrata used in mushroom cultivation?
2. Describe how mushroom bed is prepared.
3. Give an account of composting technology.

Short answers

1. Mushroom bed preparation using paddy straw
2. Cold pasteurization
3. Mushroom unit

UNIT-IV

Essays

1. Write an essay on long term storage of mushrooms through drying.
2. Give an account of canning of mushrooms.
3. Write an essay on proteins, amino acids, mineral elements and carbohydrates in mushrooms.

Short answers

1. Crude fiber content
2. Mushroom pickle
3. Mushroom papds

UNIT-V

Essays

1. Explain about the cost benefit ratio of mushroom production.
2. Give recipe for Mushroom cutlet and Omlet.
3. Write about mushroom marketing in India and abroad.

Short answers

1. Mushroom somasa
2. Mushroom Export value
3. Mushroom curry

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

III-BZC	BOTANY-VIII-B3	SEM-VI	Course code: PWBOT-2321B3	2021-22	No. of Credits:3	No. of Hrs /Week:4

Project Work preferably either in an Institute or Industry

On successful completion of this course, the students will be able to

CO1: Get the opportunity to bridge the gap between traditional learning environment and the professional platform to exercise their skills .

CO2: Get the perfect working Platform for improving the skills in Mushroom culture and Biological Instrumentation .

CO3: Unravel about the Production , Marketing, Sales aspects in the real world.

CO4: Experience the onsite learning process and become skilled professionals which bolster their confidence in their study and also prepares them for Placements in Industries/Jobs.

CO5: Can be able to get training and encompass a wide array of skill sets from time Management, team collaboration, oral and presentation skills