**SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU**

**(Affiliated toAdikaviNannaya University, Rajahmundry)**

**(Accredited with NAAC "B$^{+}$" Grade with 2.67 CGPA points)**

# DEPARTMENT OF BOTANY

## BOTANY

# BOARD OF STUDIES

# 2023 - 24

# SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU

(Affiliated toAdikaviNannaya University, Rajahmundry)
(Accredited with NAAC "B$^{+}$" Grade with 2.67 CGPA points)

## DEPARTMENT OF BOTANY

## MEMBERS OF BOARD OF STUDIES -2023-24

| | |
|---|---|
| **Chair person** | **: Sri P.Srinivasa Rao**<br>Lecturer in Botany |
| **Member** | **: Kum V.Sai sree**<br>Lecturer in Botany |
| **University Nominee** | **: Dr.R.Venkatesh**<br>Lecturer in Botany,<br>Govt Arts College, Rajhamundry, E.G.Dt. |
| **Subject Expert** | **: Dr Ch.Srinevasa Reddy,**<br>Lecturer in Botany,<br>SRR &CVR Government College(A),<br>VIJAYAWADA, NTR Dt. |
| **Subject Expert** | **: Dr.N.Krishna**<br>Lecturer in Botany,<br>HINDU College<br>Guntur, Guntur Dt. |
| **Industrialist/Academician/Business man:** | **Mr.B.RagavendraSwamy**<br>GREENLAND NURSERY,<br>Palakol, W.G.Dt. |
| **Alumni Member** | **: Dr.Y.Vijay kumar** |
| **Student Representative** | **: G.Lillyjoyce**<br>Student<br>III CBZ, |

# SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU

**(Accredited with NAAC "B$^{+}$" Grade with 2.67 CGPA points)**

## DEPARTMENT OF BOTANY

## BOARD OF STUDIES -2023-24

After thorough discussion the following resolutions are made

## RESOLUTIONS

**Resolution No.** 1 :It is resolved to approve single major courses for the I B.Sc Botany students &minor courses for B.Sc Zoology Students w.e.f 2023-2024

**Resolution No.** 2 : It is resolved to adopt the Revised CBCS syllabus (both theory & practical's) & model papers suggested by APSCHE, with small modification for I, II, III, IV,V&VI semesters for the academic year 2023-24.

Resolved to approve the syllabi for the 5$^{th}$ and 6$^{TH}$ semester course in the Botany, for the papers I,II, III, IV,V,VI &VII for adoption and implementation under Revised Choice Based Credit System (RCBCS)for . the academic year 2023-24 onwards.

**Resolution No. 3**: Resolved to approve structure of the question paper, model question papers for Botany course of papers VI &VII with maximum marks 75 of 5$^{th}$ semester end theory examination and abstract of question paper for internal assessment test with maximum marks 25 for adoption and implementation under Revised Choice Based Credit System (RCBCS) for the academic year 2023-24 onwards.

Reveised to approve structure of the question paper, model question papers for Botany course of papers I & II,III,IV with maximum marks 60 of 1$^{st}$ , 2$^{nd}$ ,3$^{rd}$,4$^{th}$ semesters end theory examination and abstract of question paper for internal assessment test with maximum marks 40 for adoption and implementation under Revised Choice Based Credit System (RCBCS) w.e.f. the academic year 2022-23 onwards.

**Resolution No. 4**: It is Unanimously resolved to approve the syllabi, model question papers and split of practical marks 50 of 5th and 6th semester end practical examinations in Botany, Course(S) of papers VI &VII for adoption and implementation under Revised Choice Based Credit System (RCBCS) w.e.f. the academic year 2023-24 onwards.

1. Written -30M
2. Project / Field work -05/05
3. Record /Viva Voice -05/05

**Resolution No. 5** : It is Unanimously resolved to approve the split marks of the Internal assessment test 25 marks in 5$^{th}$ semester in Botany course(s), paper VI and VII as given below from the academic year 2023-24 for adoption and implementation under Revised CBCS . Written examination – 15

Marks (Two Mid Exams average will be considered), Assignment/ Seminar -5, Clean and green /Attendance– 5 Marks, seminar 5marks .

It is Unanimously resolved to approve the split marks of the Internal assessment test 40 marks across 1st , 2nd ,3rd,4th semester in Botany course(s), paper I and II,III,IV,V as given below from the academic year 2023-24 for adoption and implementation under Revised CBCS . Written examination – 35 Marks, Group discussion/Assignment -5, quiz/Seminar-5, Clean and green /Attendance– 5 Marks which will be scale down to 40 marks.

**Resolution No. 6** : Resolved that the pass marks for external examination is 26 Marks (35%) and Candidates should get total marks of 40, in both internal and external examinations put to gather for 2nd and 3rd BSc students which was approved in the previous year BOS meetings.

Resolved that the pass marks for external examination is 21 Marks (35%) and Candidates should get total marks of 40, in both internal and external examinations put together for 1st BSc students from the academic year 2023-24.

**Resolution No. 7**:It is resolved to conduct odd semester practical examinations with internal faculty members with subject teacher and another teacher in the department and even semester practical examination to be conducted involving external examiner.

**Resolution No.8**: The existing syllabi, model question papers of both theory and practical of I,II, III,IV,V and VI semester Botany Course in papers I,II,III,IV,V,VI,VII have been reviewed thoroughly.

**Resolution No. 9**: Resolved to approve the following list of paper setters and examiners for Botany course(s).

**Resolution No.10**: Resolved to approve the list of recommended text books and reference books which are listed at the end of the syllabi of papers I,II,III,IV V,VI,VII in Botany Course(s).

**Resolution No.11:** It is resolved to approve multidisciplinary courses i.e principles of Biological science for IB.Com &B.A Students w.e.f 2023-2024

**Resolution No.12**: Resolved to advise the entire Faculty to conduct Seminars/Workshops/Conferences, and to arrange field trips, Surveys, Society outreach programmes etc.

**Resolution No.13**: Resolved to conduct Guest Lectures and Student Seminars /Study Projects for all Semester students for the Academic Year 2023-24.

**Resolution No.14**: Resolved to approve the measures to discussed to be conduct online classes(Whenever

physical appearance of students is not possible) through , Google suit, in all courses of Botany for students of B.Sc programme during the academic year 2020-21 as improbable and unpredictable situation occurred due to prevailing viral disease(Covid-19) Pandemic.

**Subject No. 15:** Resolved to enter into MOUs with reputed Institutions, Organizations, Laboratories, Industries based upon the need of the curriculum, to facilitate faculty exchange programmes etc.,

**Resolution No.16**: Resolved to procure latest editions of text books, reference books ,journals , e- journals for department library and central library to upgrade laboratories by purchasing advanced equipments in need with practical curriculum to be ingenious for both students and faculty members.

**Resolution No. 17**: Resolved to procure advanced equipment for laboratories to grade up and procure latest editions of text books, reference books, Journals, e-journals for library to make it more resourceful for both students and faculty members.

**Resolution No. 18:** It is resolved to offer Certificate Course/Add on Course/Value added Courses for the II nd and III rd year students for the academic year 2023-24.

**Resolution No. 19**: Resolved to Any other with the permission of the chairperson.

Signatures of the Committee Members:-

1. 4.

2. 5.

3. 6. 7.

**SRI A S N M GOVERNMENT COLLEGE, PALAKOL, W.G. DT**

**(Affiliated toAdikaviNannaya University, Rajahmundry)**

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# Department of Botany

Members of the Board of Studies of Botany met on 11/09/2023 at 10 A.M. In the Department of Botany

**Members Present**

Board of studies chair person : P.Srinivasa rao

Member of the Department : Kum V.Sai Sree

University Representative : Dr.R.VENKATESH

Subject Experts : 1) Dr. Ch.Srinivasa Reddy

2) Dr.N.Krishna

Industrialist/Businessmen : Sri. Mr.B.RagavendraSwamy

Alumni : Dr.Y.Vijay kumar

Student Representative : G.Lilly joyce

## AGENDA

**Subject No. 1:** As per the instructions of apsche this year we are introducing the new education policy i.e single major courses and minor during this academic year

**Subject No. 1**: To approve the Revised CBCS syllabus (both theory & practicals) & model papers suggested by APSCHE, with small modification for I, II, III, IV&V semesters for the academic year 2023-24.

To approve the syllabi for 5 $^{th}$ Semester course of B.Sc (Botany) in papers VI &VII for adoption and implementation under Revised Choice Based Credit System (RCBCS) for the academic year 2023-24onwards.

**Subject No. 2**: To approve the structure of the question papers, model question papers for B.Sc Botany course of Paper VI &VII with maximum marks 75 of 5 $^{th}$ semester end theory examination and abstract of question paper for internal assessment test with maximum marks 25 for adoption and implementation under Revised Choice Based Credit System (RCBCS)for . the academic year 2023-24onwards.

**Subject No. 3:** To approve the syllabi, model question papers and break up of practical Marks 50 of 5 $^{th}$ semester end practical examinations in B.Sc Courses, of Papers VI &VII for adoption and implementation under revised Choice Based credit system (RCBCS). For the academic year 2023-2024 onwards.

**Subject No. 4:** To approve the break-up of the Internal assessment test marks 40 in 1$^{st}$ and 2$^{nd,}$ 3$^{rd}$,4$^{th}$ semester and 60 for external assessment B.Sc (Botany) courses of papers I, II,III&IV for adoption and Implementation under Revised Choice Based Credit system.

To approve the pass marks for external examination is 26 Marks (35%) and Candidates should get total marks of 40, in both internal and external examinations put to gather for

2nd and 3rd BSc students which were approved in the previous year BOS meetings.
To approve the pass marks for external examination is 21Marks (35%) and Candidates should get total marks of 40, in both internal and external examinations put together for 1st BSc students from the academic year 2023-24.

**Subject No.5:** To approve the qualifying marks in B.Sc Botany Course for papers VI &VII of 5TH semester end theory examination and practical examination for adoption and implementation under revised CBCS.

**Resolution No. 6**: To approve to conduct odd semester practical examinations with internal faculty members with subject teacher and another teacher in the department and even semester practical examination to be conducted involving external examiner.

S**ubject No.7:** To review the existing syllabi, model question papers of both theory and practicals of, I,II ,III,IV,V and VI semester B.Sc Botany course in papers I,II,III,IV V,VI,VII.

**Subject No. 8:** To approve the list of paper setters and examiners in botany for B.Sc courses.

**Subject No. 9:** To approve the list of recommended text books and reference books which are listed at the end of syllabi of papers I,II,III,IV V,VI,VII in botany for B.Sc course.

**Subject No.9:** In this year we are introducing multidisciplinary courses i.e principles of Biological science for IB.Com &B.A Students w.e.f 2023-2024

**Resolution No.10**: To advise the entire Faculty to conduct Seminars/Workshops/Conferences etc., and to arrange field trips, Surveys, Society outreach programmes etc.

**Resolution No.11**: To conduct Guest Lectures and Student Seminars /Study Projects for all Semester students for the Academic Year 2023-24.

**Subject No. 12:** To incorporate any additional inputs in to the curriculum where ever is necessary

**Subject No. 12:** To enter into MOUs with reputed Institutions, Organizations, Laboratories, Industries based upon the need of the curriculum, to facilitate faculty exchange programmes etc.

**Resolution No.13**: To approve the measures to discuss to be conduct online classes(Whenever physical appearance of students is not possible) through , Google suit, in all courses of Botany for students of B.Sc programme during the academic year 2020-21 as improbable and unpredictable situation occurred due to prevailing viral disease(Covid-19) Pandemic.

**Subject No. 14:**To procure latest editions of text books, reference books ,journals , e- journals for department library and central library to upgrade laboratories by purchasing advanced equipments in need with practical curriculum to be ingenious for both students and faculty members.

**Subject No 15:** To procure electronic gadgets for webcasting, webinars and virtual lecturers.

**Subject No . 16:** To approve Certificate Course/Add on Course/Value added Courses for the IInd and III rd year students for the academic year 2023-2024.

**Subject No 16:** Any other with the permission of the chairperson.

**Signatures of the committee members :**

**1.** **4.** **7.**

**2.** **5.**

**3** **6.**

## SRI A S N M GOVERNMENT COLLEGE, PALAKOL, W.G. DT

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**DEPARTMENT OF BOTANY**

P.Srinivasa rao, Lecturer in Botany requests the Academic Council to consider and approve the changes in the syllabi recommended by the Board of Studies for the Academic year 2023-24. The BOS meeting was held on 11-09-2023.

The resolutions were seconded by Kum V.Sai Sree members of the Board of Studies.

The academic council is also requested to accord permission to appoint examiners for theory/practical for the academic year 2023-24.

Chairman
Board of Studies.

Members presented

1. 13/9/2023
2. 13/9/23
3. 13/9/2023
4.
5.
6.
7.
8. G. Lilly Jayanthi

# SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU

**(Affiliated toAdikaviNannaya University, Rajahmundry)**

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## DEPARTMENT OF BOTANY

## LIST OF EXAMINERS & PAPER SETTERS

| | | | |
|---|---|---|---|
| 1 | Dr.BhupathiRayulu | Lecturer in Botany | Government Degree College, kovur, W.G.Dt. Cell:9705377344 |
| 2 | Nagendra Prasad | Lecturer in Botany | Government Arts College rajhamundry– E.G.Dt Cell: 8143288215 |
| 3 | N.Nageswar Rao | Lecturer in Botany | V.K.V.Govt Degree college, Kothapeta Cell: 9492122277 |
| 4 | AN.SUDHER BABU | Lecturer in Botany | DRGGovernment Degree College, TADEPALLI GUDEM, W.G.Dt. Cell: 9640308447 |
| 5 | Dr .Y .Vijay kumar | Lecturer in Botany | S.C.I.M Govt Degree & P.G College,Tanuku, W.G.Dt. Cell: 9398708355 |
| 6 | Smt. K.Sri Lakshmi | Lecturer in Botany | S.V.K.P. & Dr.K.S.Raju A&S College, Penugonda, W.G.Dt. Cell: 9492164689 |
| 7 | Smt D.SANDYA RANI | Lecturer in Botany | D.N.RCollege (A) BHIMAVARAM, W.G.Dt. Cell: 9704645858 |
| 8 | Dr.P.Prayaga Murthy | HOD in Botany | Govt Degree College Yeleswaram, E.G.Dt Cell: 9885852068 |
| 9 | Dr.K.MallikarjunaRao | Lecturer in Botany | Government Degree College kovur, W.G.Dt. Cell: 8985570508 |
| 10 | B.BUJJI BABU | Lecturer in Botany | Government Arts College rajhamundry– E.G.Dt Cell:9948807896 |

Signatures of the BOSCommittee Members:

1. 2. 3. 4.

5. 6. 7.

# SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU

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## DEPARTMENT OF BOTANY

### I , II,III,IV&V SEMESTERS

### BLUE PRINT MODEL FOR INTERNAL EXAMINATIONS: 2023-24

| S.NO | TYPE OF QUESTION | QUESTIONS TO BE GIVEN | | | TO BE ANSWERED | | |
|---|---|---|---|---|---|---|---|
| | | NO OF QUESTIONS | MARKS | TOTAL MARKS | NO OF QUESTIONS | MARKS | TOTAL MARKS |
| 1 | ESSAY QUESTIONS | 3 | 5 | 5 | 1 | 5 | 5 |
| 2 | SHORT QUESTIONS | 7 | 2 | 10 | 5 | 10 | 10 |
| 3 | MULTIPLE QUESTIONS | 10 | 1/2 | 5 | 10 | 5 | 5 |
| | **TOTAL** | | | **20** | | | **20** |

Percentage of choice = 0

Assignments = 5 marks
Field trip/Seminars = 5 marks
Clean and green / Attendance = 5 marks

**Total = 15 marks**

Signatures of the BOS Committee Members:-

1. 4.

2. 5.

3. 6.

7.

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## DEPARTMENT OF BOTANY

### I & II, III,IV and Minor SEMESTERS

### BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS: 2023-24

| | Short Questions | | | Essay Questions | | |
|---|---|---|---|---|---|---|
| | NO OF QUESTIONS | MARKS ALLOTED | TOTAL MARKS | NO OF QUESTIONS | MARKS ALLOTED | TOTAL MARKS |
| UNIT -I | 01 | 4 | 4 | 02 | 8 | 8 |
| UNIT-II | 02 | 4 | 4 | 02 | 8 | 8 |
| UNIT-III | 02 | 4 | 4 | 02 | 8 | 8 |
| UNIT-IV | 02 | 4 | 4 | 02 | 8 | 8 |
| UNIT-V | 01 | 4 | 4 | 02 | 8 | 8 |

Section –A: Out of 8 Questions 5 has to be answered.

Section –B: Internal Choice (either / or) and 1 Question in each unit, 5 Questions has to be answered.

1. Essay Questions : 5 x 8 = 40
2. Short Questions : 5 x 4 = 20

Total : 60 Marks

Signatures of the BOSCommittee Members:-

1. 4.

2. 5.

3. 6. 7.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A)
# PALAKOL

## B.Sc - BOTANY

## I & II ,III ,IV AND MINOR SEMESTERS

## THEORY MODEL PAPER

**Time: 3 Hours** **Max. Marks: 60**

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**SECTION-A (Short Answer Questions)**

***(Instructions to the paper setter: Set minimum ONE question from each unit,max Eight from all.)***

**Answer any *five* of the following questions** **5x4=20M**

1.
2.
3.
4.
5.
6.
7.
8.

**SECTION-B (Essay Questions)**

***(Instructions to the paper setter: Set minimum two questions from each unit, either or internal choice)***

**Answer *All* of the following questions** **5x8=40M**

9. a)

Or from unit I

b)

10.a)

Or

b)

11. a)

Or from unit III

b)

12. a)

Or from unit IV

b)

13. a)

Or from unit V

b)

**INTERNAL EXAMS** **- 40Marks 20** Marks for Mid term tests, 5 marks for Assignments , Field trip/Seminars-**5** marks**,** Attendance/ Clean and green-**5** marks .

# SRI A.S.N.M.GOVERNMENT COLLEGE(A),PALAKOLLU

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## DEPARTMENT OF BOTANY

### V SEMISTER

### BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS: 2023-24

| | Short Questions | | | Essay Questions | | |
|---|---|---|---|---|---|---|
| | NO OF QUESTIONS | MARKS ALLOTED | TOTAL MARKS | NO OF QUESTIONS | MARKS ALLOTED | TOTAL MARKS |
| UNIT -I | 01 | 5 | 5 | 02 | 10 | 10 |
| UNIT-II | 02 | 5 | 10 | 02 | 10 | 10 |
| UNIT-III | 02 | 5 | 10 | 02 | 10 | 10 |
| UNIT-IV | 02 | 5 | 10 | 02 | 10 | 10 |
| UNIT-V | 01 | 5 | 5 | 02 | 10 | 10 |

Section –A: Out of 8 Questions 5 has to be answered.

Section –B: Internal Choice (either / or) and 1 Question in each unit, 5 Questions has to be answered.

1. Essay Questions : 5 x 10 = 50
2. Short Questions : 5 x 5 = 25

Total : 75 Marks

Signatures of the BOSCommittee Members:-

1. 4.

2. 5.

3. 6.

7.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A)
# PALAKOL

## B.Sc - BOTANY
## V,VI SEMISTERS
## THEORY MODEL PAPER

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

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**SECTION-A (Short Answer Questions)**

***(Instructions to the paper setter: Set minimum ONE question from each unit,max Eight from all.)***

**Answer any *five* of the following questions** **5x5=25M**

1.
2.
3.
4.
5.
6.
7.
8.

**SECTION-B (Essay Questions)**

***(Instructions to the paper setter: Set minimum two questions from each unit, either or internal choice)***

**Answer *All* of the following questions** **5x10=50M**

9. a) Or from unit I
b)

10.a) Or from unit II
b)

11. a) Or from unit III
b)

12. a) Or from unit IV
b)

13. a) Or from unit V
b)

**INTERNAL EXAMS** **- 25Marks**

**15** Marks for Midterm tests, 5 marks for Assignments and remaining **5** marks for Seminar etc.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

# SEMESTER- I

## Paper-1

## Theory

| SRI A.S.N.M. GOVERNMENT COLLEGE (AUTONOMOUS), PALAKOL | | | | | |
|---|---|---|---|---|---|
| **Course Code** | **INTRODUCTION TO CLASSICAL BIOLOGY** | **Programme & Semester I B.Sc Botany Paper-1** | | | |
| Teaching | Hours Allocated: 60 (Theory and Activities ) (5 hrs per week) | **L** | **T** | **P** | **C** |
| Pre-requisites | systematics, taxonomy and ecology, Essentials of Botany, Zoology, Chemistry, Cell biology, Genetics and Evolution | **3** | **1** | **-** | **4** |

| **COx** | **Course Outcome** | **Knowledge Level** |
|---|---|---|
| CO1 | Demonstrate the principles of classification and preservation of biodiversity | K3 |
| CO2 | Compare the plant anatomical, physiological and reproductive processes | K4 |
| CO3 | Compare the animal classification, physiology, embryonic development and their economic importance. | K4 |
| CO4 | Examine the cell components, cell processes like cell division, heredity and molecular processes | K4 |
| CO5 | Examine the chemical principles in shaping and driving the macromolecules and life processes. | K4 |

## CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High], 4: No Correlation)

| **COx** | **PO 1** | **PO 2** | **PO 3** | **PO 4** | **PO 5** | **PO 6** | **PO 7** | **PO 8** | **PO 9** |
|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | |
| CO2 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | |
| CO3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | |
| CO4 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | |
| CO5 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | |

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## I B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-I; SEMESTER- I

(W.e.f. 2023-24 Admitted Batch)

***Paper-I:*** INTRODUCTION TO CLASSICAL BIOLOGY

**Total hours of teaching 60 hrs @ 5 hrs per week**

**Hours/Week: 5 Credits: 4**

**COURSE OBJECTIVES :**

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

**COURSE OUT COMES :**

1. Demonstrate the principles of classification and preservation of biodiversity ($k_3$)
2. Compare the plant anatomical, physiological and reproductive processes. ($k_4$)
3. Compare the animal classification, physiology, embryonic development and their economic importance. ($k_4$)
4. Examine the cell components, cell processes like cell division, heredity and molecular processes. ($k_4$)
5. Examine the chemical principles in shaping and driving the macromolecules and life processes. ($k_4$)

**Unit 1: Introduction to systematics, taxonomy and ecology.**

1.1. Systematics – Definition and concept, Taxonomy – Definition and hierarchy.

1.2. Nomenclature – ICBN and ICZN, Binomial and trinomial nomenclature.

1.3. Ecology – Concept of ecosystem, Biodiversity and conservation.

1.4. Pollution and climate change.

**Unit 2: Essentials of Botany.**

2.1. The classification of plant kingdom.

2.2. Plant physiological processes (Photosynthesis, Respiration, Transpiration, phytohormones). (Out line )

2.3. Structure of flower – Micro and macro sporogenesis, pollination, fertilization and structure of mono and dicot embryos.

2.4 Mushroom cultivation, floriculture and landscaping. (Basic concepts )

**Unit 3: Essentials of Zoology**

3.1. The classification of Kingdom Animalia and Chordata.

3.2 Animal Physiology – Basics of Organ Systems & their functions, Hormones and Disorders

3.3 Developmental Biology – Basic process of development (Gametogenesis, Fertilization, Cleavage and Organogenesis)

3.4 Economic Zoology – Sericulture, Apiculture,Aquaculture

**Unit 4: Cell biology, Genetics and Evolution**

4.1. Cell theory, Ultrastructure of prokaryotic and eukaryotic cell, cell cycle.

4.2. Chromosomes and heredity – Structure of chromosomes, concept of gene.

4.3. Central Dogma of Molecular Biology.

4.4. Origin of life

**Unit 5: Essentials of chemistry**

5.1. Definition and scope of chemistry, applications of chemistry in daily life.
5.2. Branches of chemistry
5.3. Chemical bonds – ionic, covalent, noncovalent – Vander Waals, hydrophobic, hydrogen bonds.
5.4. Green chemistry

**References**

1. Sharma O.P., 1993. Plant taxonomy. 2nd Edition. McGraw Hill publishers.
2. Pandey B.P., 2001. The textbook of botany Angiosperms. 4th edition. S. Chand publishers, New Delhi, India.
3. Jordan E.L., Verma P.S., 2018. Chordate Zoology. S. Chand publishers, New Delhi, India.
4. Rastogi, S.C., 2019. Essentials of animal physiology. 4th Edition. New Age International Publishers.
5. Verma P.S., Agarwal V.K., 2006. Cell biology, genetics, Molecular Biology, Evolution and Ecology. S. Chand publishers, New Delhi, India.
6. Satyanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.
7. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamentals of Biochemistry. S. Chand publishers, New Delhi, India.
8. Karen Timberlake, William Timberlake, 2019. Basic chemistry. 5th Edition. Pearson publishers.
9. Subrata Sen Gupta, 2014. Organic chemistry. 1st Edition. Oxford publishers.

**ACTIVITIES:**

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

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

# SEMESTER- I

## Paper-2

## Theory

| SRI A.S.N.M. GOVERNMENT COLLEGE (AUTONOMOUS), PALAKOL | | | | | |
|---|---|---|---|---|---|
| **Course Code** | **INTRODUCTION TO APPLIED BIOLOGY** | **Programme & Semester I B.Sc Botany Paper-2** | | | |
| Teaching | Hours Allocated: 60 (Theory and Activities ) (5 hrs per week) | **L** | **T** | **P** | **C** |
| Pre-requisites | Essentials of Microbiology and Immunology, Biochemistry, Biotechnology, Analytical Tools and techniques in biology – Applications, Biostatistics and Bioinformatics | **3** | **1** | **-** | **4** |

| **COx** | **Course Outcome** | **Knowledge Level** |
|---|---|---|
| CO1 | Illustrate the history, ultra structure, diversity and importance of microorganisms | K3 |
| CO2 | Analyze the structure and functions of macromolecules | K4 |
| CO3 | Illustrate the biotechnology principles and its applications in food and medicine. | K3 |
| CO4 | Demonstrate the techniques, tools and their uses in diagnosis and therapy | K3 |
| CO5 | Categorize the bioinformatics and statistical tools in comprehending the complex biological data. | K4 |

## CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High], 4: No Correlation)

| **COx** | **PO 1** | **PO 2** | **PO 3** | **PO 4** | **PO 5** | **PO 6** | **PO 7** | **PO 8** | **PO 9** |
|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | |
| CO2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | |
| CO3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | |
| CO4 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | |
| CO5 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | |

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## I B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-II; SEMESTER- I

(W.e.f. 2023-24 Admitted Batch)

***Paper-II:*** INTRODUCTION TO APPLIED BIOLOGY

**Total hours of teaching 60 hrs @ 5 hrs per week**

**COURSE OBJECTIVES**

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

**COURSE OUT COMES**

1. Illustrate the history, ultrastructure, diversity and importance of microorganisms.($k_3$)
2. Analyze the structure and functions of macromolecules.($k_4$)
3. Illustrate the biotechnology principles and its applications in food and medicine. .($k_3$)
4. Demonstrate the techniques, tools and their uses in diagnosis and therapy. ($k_3$)
5. Categorize the bioinformatics and statistical tools in comprehending the complex biological data. ($k_4$)

**Unit 1: Essentials of Microbiology and Immunology**

1.1. History and Major Milestones of Microbiology; Contributions of Edward Jenner, Louis Pasteur, Robert Koch and Joseph Lister.

1.2. Groups of Microorganisms – Structure and characteristics of Bacteria, Fungi, Archaea and Virus.

1.3. Applications of microorganisms in – Food, Agriculture, Environment, and Industry.

1.4. Immune system – Immunity, types of immunity, cells and organs of immune system.

**Unit 2: Essentials of Biochemistry**

2.1. Biomolecules I – Carbohydrates, Lipids.

2.2. Biomolecules II – Amino acids & Proteins.

2.3. Biomolecules III – Nucleic acids -DNA and RNA.

2.4. Basics of Metabolism – Anabolism and catabolism.

**Unit 3**: **Essentials of Biotechnology**

3.1. History, scope, and significance of biotechnology. Applications of biotechnology in Plant, Animal, Industrial and Pharmaceutical sciences.

3.2. Environmental Biotechnology – Bioremediation and Biofuels, Biofertilizers and Biopesticides.

3.3. Genetic engineering – Gene manipulation using restriction enzymes and cloning

3.4. vectors; Physical, chemical, and biological methods of gene transfer.

3.5. Transgenic plants – Stress tolerant plants (biotic stress – BT cotton, abiotic stress – salt tolerance). Transgenic animals – Animal and diseasemodels.

**Unit 4: Analytical Tools and techniques in biology – Applications**

4.1. Applications in forensics – PCR and DNA fingerprinting

4.2. Immunological techniques – Immunoblotting and ELISA.

4.3. Monoclonal antibodies – Applications in diagnosis and therapy.

4.4. Eugenics and Gene therapy

**Unit 5: Biostatistics and Bioinformatics**

5.1. Data collection and sampling. Measures of central tendency – Mean, Median, Mode.

5.2. Measures of dispersion – range, standard deviation and variance. Probability and tests of significance.

5.3. Introduction, Genomics, Proteomics, types of Biological data, biological databases- NCBI, EBI, Gen Bank; Protein 3D structures, Sequence alignment

5.4. Accessing Nucleic Acid and Protein databases, NCBI Genome Workbench

REFERENCES

1. Gerard J., Tortora, Berdell R. Funke, Christine L. Case., 2016. Microbiology: An Introduction. 11th Edition. Pearson publications, London, England.

2. Micale, J. Pelczar Jr., E.C.S. Chan., Noel R. Kraig., 2002. Pelczar Microbiology. 5 th Edition.
McGraw Education, New York, USA.

3. Sathyanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.

4. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamentals of Biochemistry. S. Chand publishers, New Delhi, India.

5. R.C. Dubey, 2014. Advanced Biotechnology. S. Chand Publishers, New Delhi, India.

6. Colin Ratledge, Bjorn, Kristiansen, 2008. Basic Biotechnology. 3rd Edition. Cambridge Publishers.

7. U. Sathyanarayana, 2005. Biotechnology. 1st Edition. Books and Allied Publishers pvt. ltd., Kolkata.

8. Upadhyay, Upadhyay and Nath. 2016. Biophysical Chemistry, Principles and Techniques. Himalaya Publishing House.

9. Arthur M. Lesk. Introduction to Bioinformatics. 5th Edition. Oxford publishers.

10. AP Kulkarni, 2020. Basics of Biostatistics. 2nd Edition. CBS publishers.

**ACTIVITIES**

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

[NOTE: In the colleges where there is availability of faculty for microbiology and biotechnology, those chapters need to be handled by microbiology and biotechnology faculty.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## I B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-III; SEMESTER- II

(W.e.f. 2023-24 Admitted Batch)

***Paper-III:*** **Non-Vascular Plants (Algae, Fungi, Lichens and Bryophytes)**

**Total hours of teaching 60 hrs @ 5 hrs per week**

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**I. COURSE OBJECTIVES :** By the end of this course the learner has:

1. To realize the characteristics and diversity of non-vascular plants.
2. To recognize the ecological and economic value of algae, fungi, lichens and bryophytes.
3. To inquire the habit, habitat, morphological features and life cycles of selected genera of non-vascular plants.

**IICOURSE OUT COMES :** On completion of this course students will be able to**:**

1. Compile the general characteristics of algae and their significance in nature. (K5)
2. Compare and contrast the characteristics of different groups of algae. (K4)
3. Summarise the important features of fungi and their economic value. (K2)
4. Distinguish the characteristics of different groups of fungi. (K2)
5. Elaborate the features and significance of amphibians of plant kingdom. (K2)
6. Explain the diversity among non-vascular plants.

III. Syllabus of Theory:

**Unit-1: Introduction to Algae** **8Hrs**.

1. General Characteristics of algae: Occurrence and distribution, cell structure, pigments, flagella and reserve food material.
2. Classification of algae: F.E.Fritsch (1935) and Lee (2008)
3. Thallus organization and life cycles in algae.
4. Ecological and economic importance of algae.

**Unit-2: Biology of selected Algae** **10Hrs**.

1. Occurrence, structure, reproduction and life cycle of:

(a) Chlorophyceae: Spirogyra (b) Phaeophyceae: Ectocarpus

(c) Xanthophyceae: Vaucheria (d) Rhodophyceae:Polysiphonia

2. A brief account of Bacillariophyceae
3. Culture and cultivation of Chlorella

**Unit-3: Introduction to Fungi** **8Hrs.**

1. General characteristics of fungi and Ainsworth (1973) classification.
2. Thallus organization and nutrition in fungi.
3. Reproduction in fungi (asexual and sexual); Heterothallism and parasexuality.
4. Ecological and economic importance of fungi.

**Unit-4: Biology of selected Fungi** **10Hrs**.

1. Occurrence, structure, reproduction and life cycle of:

(a) Mastigomycotina: Phytophthora (b) Zygomycotina: Rhizopus

(c) Ascomycotina: Penicillium (d) Basidiomycotina: Puccinia

2. Occurrence, structure and reproduction of lichens; ecological and economic importance of lichens.

**Unit-5: Biology of Bryophytes** **9Hrs**.

1. General characteristics of Bryophytes; Rothmaler (1951) classification.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life cycle of
(a) Hepaticopsida: Marchantia (b) Anthoceratopsida: Anthoceros
(c) Bryopsida: Funaria
3. General account on evolution of sporophytes in Bryophyta.

IV. Text Books:

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

V. Reference Books:

1. Fritsch, F.E. (1945) The Structure & Reproduction of Algae (Vol. I & Vol. II) Cambridge University Press Cambridge, U.K.
2. Bold, H.C.& M. J. Wynne (1984) Introduction to the Algae, Prentice-Hall Inc., New Jersey
3. Robert Edward Lee (2008) Phycology. Cambridge University Press, New York
4. Van Den Hoek, C., D.G.Mann & H.M.Jahns (1996)Algae : An Introduction to Phycology. Cambridge University Press, New York.
5. Alexopoulos, C.J., C.W.Mims & M.Blackwell (2007) Introductory Mycology, Wiley& Sons, Inc., New York
6. Mehrotra, R.S.& K. R. Aneja (1990) An Introduction to Mycology. New Age International Publishers, New Delhi.
7. Kevin Kavanagh (2005) Fungi; Biology and Applications John Wiley& Sons, Ltd., West Sussex, England.
8. John Webster & R. W. S. Weber (2007) Introduction to Fungi, Cambridge University Press, New York.
9. Shaw, A.J.& B.Goffinet (2000) Bryophyte Biology .Cambridge University Press, New York.

**VI. Suggested activities and evaluation methods**:

Unit-1: Activity: Algae specimen collection from any water bodies in their locality, recording the characteristics, identification and classifying them according to Fritsch system.
Evaluation method: Evaluating the presentation or report summarizing findings.
Unit-2: Activity: Microscopic observations and recording distinguishing characters of any six algal forms excluding the genera in the syllabus.
Evaluation method: Conducting a Quiz or an exam/ evaluating the chart or drawings or summarized data on similarities and differences.
Unit-3: Activity: Collection or laboratory culture of fungi and reporting the important features.
Evaluation method: Evaluating the report/conducting JAM/Quiz/Group discussion.
Unit-4: Activity: Microscopic observations and summarizing the salient features of the fungal genera and lichen forms in the syllabus.
Evaluation method: Conducting a Quiz or an exam/ evaluating the chart or drawings or

concise data on similarities and differences.
Unit-5: Collection, characterization, identification and classification of any four bryophytes from their native locality or college campus.
Evaluation method: Assessment of observations and documentation accuracy/presentation or report summarizing findings based on a rubric.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## I B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-III; SEMESTER- II

(W.e.f. 2023-24 Admitted Batch)

***Paper-III:*** Non-Vascular Plants (Algae, Fungi, Lichens and Bryophytes)

**Total practical hours of teaching 2hrs per week**

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

1. Identify some algal and fungal species based on the structure of thalli and reproductive organs. (K4)
2. Describe the lichens and Bryophytes based on morphological, anatomical and reproductive features. (K2)

**II. Laboratory/field exercises:**

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

1. Algae: Spirogyra, Ectocarpus, Vaucheria and Polysiphonia; a centric and a pennate diatom.
2. Demonstration of culture and cultivation of Chlorella
3. Identification of some algal products available in local market.
4. Fungi: Phytophthora, Rhizopus, Penicillium and Puccinia
5. Identification of some fungal products available in the local market.
6. Lichens: Crustose, foliose and fruiticose
7. Bryophyta: Marchantia, Anthoceros and Funaria.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## I B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-IV; SEMESTER- II

(W.e.f. 2023-24 Admitted Batch)

***Paper-IV:*** **Origin of Life and Diversity of Microbes**

**Total hours of teaching 60 hrs @ 3 hrs per week**

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**I. COURSE OBJECTIVES** : By the end of this course the learner has:

1. To get awareness on origin and evolution of life.
2. To understand the diversity of microbial organisms.
3. To get awareness on importance of microbes in nature and agriculture.

**IICOURSE OUT COMES** : On completion of this course students will be able to:

1. Illustrate diversity of viruses, multiplication and economic value.(K3)
2. Discuss the general characteristics, classification and economic importance of special groups of bacteria.(K2)
3. Explain the structure, nutrition, reproduction and significance of eubacteria.(K2)
4. Evaluate the interactions among soil microbes.(K6)
5. Compile the value and applications of microbes in agriculture.(K5)

III. Syllabus of Theory:

**Unit-1: Origin of life and Viruses** **10 Hrs**.

1. Origin of life, concept of primary Abiogenesis; Miller and Urey experiment.; discovery of microorganisms, Pasteur experiments, germ theory of diseases.
2. Five kingdom classification of R.H. Whittaker
3. Shape and symmetry of viruses; structure of TMV and Gemini virus.
4. Multiplication of TMV; A brief account of prions, viroids and virusoids; Transmission of plant viruses and their control.
5. Significance of viruses in vaccine production, bio-pesticides and as cloning vectors.

**Unit-2: Special groups of Bacteria** **7 Hrs.**

1. General characteristics, outline classification and economic importance of following special groups of bacteria:

a) Archaebacteria b) Chlamydiae c) Actinomycetes

d) Mycoplasma e) Phytoplasma f) Cyanobacteria

2. Culture and cultivation of Spirulina

**Unit-3: Eubacteria** **8 Hrs**.

1. Occurrence, distribution and cell structure of eubacteria.
2. Classification of Eubacteria based on nutrition.
3. Reproduction- Asexual (Binary fission and endospores) and bacterial recombination (Conjugation, Transformation, Transduction).
4. Economic importance of Eu-bacteria with reference to their role in Agriculture and industry (fermentation and medicine).

**Unit-4: Soil microbes – interactions** **10Hrs.**

1. Distribution of soil microorganisms in soil.
2. Factors influencing the soil microflora - Role of microorganisms in soil fertility.
3. Interactions among microorganisms, mutualism, comensalism, competition, amensalism,

parasitism, predation.

4. Microorganisms of rhizosphere, phyllosphere and spermophere; microbial interactions and their effect on plant growth.

**Unit-5: Microbes in agriculture** **10 Hrs.**

1. Mass production, mode of applications, advantages and limitations of bacterial inoculants (Rhizobium, Azotobacter, Azospirillum, Cyanobacteria).

2. Role of Frankia and VAM in soil fertility.

3. Microbial biopesticides: mode of action, factors influencing, target pests; microbial herbicides.

IV. Text Books:

1. Bhattacharjee, R.N., (2017) Introduction to Microbiology and Microbial Diversity, Kalyani Publishers, New Delhi.

2. Dubey, R.C. & D. K. Maheswari (2013) A Text Book of Microbiology, S.Chand & Company Ltd., New Delhi

3. Toshniwal, R.L. (2007) Agricultural Microbiology, Agrobios (India), Jodhpur

V. Reference Books:

1. Pelczar Jr., M.J., E.C.N. Chan & N. R. Krieg (2001) Microbiology, Tata McGraw- Hill Co, New Delhi

2. Presscott, L. Harley, J. and Klein, D. (2005) Microbiology, Tata McGraw –Hill Co. New Delhi.

3. Gyaneshwar, A.D., G.J. Parekh, and V.S. Reddy (2004) Agricultural Microbiology: Plant-Soil Interactions, Research Signpost, Kerala, India

4. Zaki A. Shuler and Zainul Abid (2014) Agricultural Microbiology: Principles and Applications, CRC Press, Boca Raton, Florida, USA

**VI. Suggested activities and evaluation methods:**

Unit-1: Activity: Collecting scientific literature on historical developments in microbiology.

Evaluation method: Evaluating the report based on a rubric.

Unit-2: Activity: Group discussion on various groups of special bacteria.

Evaluation method: Assessment of active participation, soft skills, communication skills, collaborative skills, time management etc., of a group or a student based on a rubric .Unit-3: Activity: Presentation or poster summarizing the classification of Eu-bacteria based on nutrition.

Evaluation method: Assessment based on accuracy and understanding.

Unit-4: Activity: Microscopic observation of bacterial samples from soil/ phylloplane in their native place/ college campus.

Evaluation method: Evaluating the report on characteristics and classification of eubacteria.

Unit-5: Activity: Culture and mass production of bioinoculants.

Evaluation method: Skills performed in establishing the culture and mass production.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## I B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-IV; SEMESTER- II

(W.e.f. 2023-24 Admitted Batch)

***Paper-IV:*** **Origin of Life and Diversity of Microbes**

**Total Practical hours of teaching 60 hrs @ 2 hrs per week**

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

1. Explore all necessary precautions in the microbiology laboratory (K3)
2. Handle the instruments and prepare media for laboratory work. (K2)
3. Identify various microbes through microscopic observations. (K4)

**II. Laboratory/Field exercises:**

1. Microbiology good laboratory practices and biosafety.
2. Study the principle and applications of important instruments (autoclave, hot air oven, incubator, Inoculation loop, Inoculation needle, membrane filter, laminar air flow system, colony counter. biological safety cabinets, BOD incubator, pH meter) used in the microbiology laboratory.
3. Study of Viruses (Gemini and TMV) using electron micrographs/ models.
4. Gram staining technique of Bacteria.
5. Microscopic study of Cyanobacteria using temporary/permanent slides.
6. Microscopic study of Eubacteria using temporary/permanent slides.
7. Study of Archaebacteria and Actinomycetes using permanent slides/ electron micrographs/diagrams

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-III; SEMESTER- III

(W.e.f. 2020-21 Admitted Batch)

***Paper-III:*** **Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity**

| B.Sc. | Semester - III | Credits: 4 |
|---|---|---|
| Course: 3 | Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity | Hrs/Wk: 4 |

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

**CO1:** Analyze on the organization of tissues and tissue systems in plants. ($k_4$)

**CO2:** Illustrate and interpret various aspects of embryology.($k_3$)

**CO3:** Discuss the basic concepts of plant ecology, and evaluate the effects of environmental and biotic factors on plant communities ($k_2$).

**CO4:** Appraise various qualitative and quantitative parameters to study the population and community ecology.($k_5$)

**CO5:** Correlate the importance of biodiversity and consequences due to its loss.

**UNIT I: Anatomy of Angiosperms** **12 Hrs.**

1. Organization of apical meristems: Tunica-carpus theory and Histogen theory.
2. Tissue systems–Epidermal, ground and vascular.
3. Anomalous secondary growth in *Boerhaavia* and *Dracaena.*
4. Study of timbers of economic importance - Teak, Red sanders and Rosewood.

**UNIT II: Embryology of Angiosperms** **12 Hrs.**

1. Structure of anther, anther wall, types of tapetum. Microsporogensis and development of male gametophyte.
2. Structure of ovule, megasporogenesis; monosporic (*Polygonum*), bisporic (*Allium*) and tetrasporic (*Peperomia*) types of embryo sacs.
3. Outlines of pollination, Self incompatability and fertilization.
4. Endosperm - Types and biological importance - Free nuclear, cellular, helobial and ruminate.
5. Development of Dicot (*Capsella bursa-pastoris*) embryo.

**UNIT III: Basics of Ecology** **12 Hrs.**

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

**UNIT IV: Population, Community and Production Ecology** **12 Hrs.**

1. Population ecology: Natality, mortality, growth curves, ecotypes, ecads
2. Community ecology: Frequency, density, cover, life forms, biological spectrum
3. Concepts of productivity: GPP, NPP and Community Respiration
4. Secondary production, P/R ratio and Ecosystems.

**UNIT V: Basics of Biodiversity** **12 Hrs.**

1. Biodiversity: Basic concepts, Convention on Biodiversity - Earth Summit.
2. Value of Biodiversity; types and levels of biodiversity and Threats to biodiversity
3. Biodiversity Hot spots in India.Biodiversity in North Eastern Himalayas and Western Ghats.
4. Principles of conservation: IUCN threat-categories, RED data book
5. 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
3. Pandey, B.P. (2013) *College Botany, Volume-II,* S. Chand Publishing, New Delhi
4. Pandey, B.P. (2013) *College Botany, Volume-III,* S. Chand Publishing, New Delhi
5. Bhattacharya, K., G. Hait&Ghosh, A. K., (2011) *A Text Book of Botany, Volume- II,* New Central Book Agency Pvt. Ltd., Kolkata

**REFERENCE BOOKS:**


1. Esau, K. (1971)*Anatomy of Seed Plants.* John Wiley and Son, USA.
2. Fahn, A. (1990)*Plant Anatomy,* Pergamon Press, Oxford.
3. Cutler, D.F., T. Botha & D. Wm. Stevenson (2008)*Plant Anatomy : An Applied Approach,* Wiley, USA.
4. Paula Rudall (1987)*Anatomy of Flowering Plants : An Introduction to Structure and Development.* Cambridge University Press, London
5. Bhojwani, S. S. and S. P. Bhatnagar (2000)*The Embryology of Angiosperms (4thEd.),*Vikas Publishing House, Delhi.
6. Pandey, A. K. (2000) *Introduction to Embryology of Angiosperms*. CBS Publishers & Distributors Pvt. Ltd. , New Delhi
7. Maheswari, P. (1971)*An Introduction to Embryology of Angiosperms*. McGraw Hill Book Co., London.
8. Johri, B.M. (2011)*Embryology of Angiosperms.* Springer-Verlag, Berlin
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10. Bhattacharya, K., A. K. Ghosh, & G. Hait (2011) *A Text Book of Botany, Volume- IV,* New Central Book Agency Pvt. Ltd., Kolkata
11. Kormondy, Edward J. (1996) *Concepts of Ecology,*Prentice-Hall of India Private Limited, New Delhi
12. Begon, M., J.L. Harper & C.R. Townsend (2003) *Ecology,* Blackwell Science Ltd., U.S.A
13. Eugene P. Odum (1996)*Fundamentals of Ecology,*Natraj Publishers, Dehradun
14. Sharma, P.D. (2012) *Ecology and Environment*. Rastogi Publications, Meerut, India.
15. N.S.Subrahmanyam& A.V.S.S. Sambamurty (2008)*Ecology*Narosa Publishing House, New Delhi
16. A. K. Agrawal& P.P. Deo (2010) *Plant Ecology,*Agrobios (India), Jodhpur
17. Kumar, H.D. (1992) *Modern Concepts of Ecology (7th Edn.,)*Vikas Publishing Co., New Delhi.
18. Newman, E.I. (2000): *Applied Ecology*Blackwell Scientific Publisher, U.K.
19. Chapman, J.L&M.J. Reiss (1992): *Ecology - Principles & Applications.*Cambridge University Press, U.K.
20. Kumar H.D. (2000)*Biodiversity & Sustainable Conservation* Oxford & IBH Publishing Co Ltd. New Delhi.
21. U. Kumar (2007) *Biodiversity : Principles & Conservation,*Agrobios (India), Jodhpur

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-III; SEMESTER- III

(W.e.f. 2020-21 Admitted Batch)

***Paper-III:*** **Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity**

| B.Sc. | Semester - III | Credits: 1 |
|---|---|---|
| Course: 3(L) | Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity Lab | Hrs/Wk: 2 |

**Course Outcomes:** On successful completion of this practical course students shall be able to :

- Examine with techniques of section making, staining and microscopic study of vegetative, anatomical and reproductive structure of plants.($K_4$)
- Observe externally and under microscope, identify and draw exact diagrams of the material in the lab.(K3)
- Demonstrate application of methods in plant ecology and conservation of bio diversity and qualitative and quantitative aspects related to populations and communities of plants.(K3)

**Practical Syllabus**

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. Dissection and observation of Embryo sac haustoria in *Santalum* or *Argemone.*
6. Structure of endosperm (nuclear and cellular) using permanent slides / Photographs.
7. Dissection and observation of Endosperm haustoria in *Crotalaria* or *Coccinia*.
8. Developmental stages of dicot and monocot embryos using permanent slides / photographs.
9. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, rain gauze, and lux meter. (visit to the nearest/local meteorology station where the data is being collected regularly and record the field visit summary for the submission in the practical).
10. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (02 each).
11. Quantitative analysis of herbaceous vegetation in the college campus for frequency, density and abundance.
12. Identification of vegetation/various plants in college campus and comparison with Raunkiaer's frequency distribution law.
13. Find out the alpha-diversity of plants in the area
14. Mapping of biodiversity hotspots of the world and India.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

**II B.Sc - (CBCS) Model paper for Practical Examination**

**PAPER-III; SEMESTER- III**

(W.e.f. 2020-21 Admitted Batch)

***Paper-III:*** **Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity**

**MAX TIME :3Hrs** **MAX Marks:50**

1. Take T.S. of the material 'A' (Anatomy), prepare a temporary slide and justify the identification with specific reasons. 10 M
2. Write the procedure for the experiment 'B' (Embryology) and demonstrate the same. 10 M
3. Take T.S. of the material 'C', prepare a temporary slide and justify the identification with specific reasons. 10 M
4. Identify the following with specific reasons. 4 x 3 = 12 M
   a. Anatomy/Embryology
   b. Ecology instrument
   c. Mapping of Biodiversity hot spot
   d. Endemic/endangered plant/animal
5. Record + Viva-voce 5 + 3 = 8 M

**Suggested co-curricular activities for Botany CoreCourse-3 in Semester-III :**

**A. Measurable :**

**a. Student seminars :**

1. Anatomy in relation to taxonomy of Angiosperms.
2. Nodal anatomy
3. Floral anatomy
4. Embryology in relation to taxonomy of Angiosperms.
5. Apomictics and polyembryony.
6. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.
7. Deforestation and Afforestation.
8. Green house effect and ocean acidification.
9. The Montreal protocol and the Kyoto protocol.
10. Productivity of aquatic ecosystems.
11. Mangrove ecosystems in India.
12. Kollerulake – Ramsar site.
13. Biodiversity hotspots of the world.
14. Origin of Crop plants - Vavilov centers
15. Agrobiodiversity
16. International organizations working on conservation of Biodiversity
17. Nagoya protocol – ABS system.
18. Endemic and endangered plants in Andhra Pradesh.

**b. Student Study Projects :**

1. Stomata structure in plants from college campus/ their native place.
2. Report on xylem elements in plants using maceration technique.
3. Collection of information on famous herbaria in the world and preparation of a report.
4. Microscopic observations on pollen morphology from plants in college campus/ their native locality.
5. Study report on germination and viability of pollen in different plants.
6. Observation of anthesis time in different plants and their pollinators.
7. A report on autecology and synecology of some plants in college campus or their native place.
8. Collection of photos of endemic/endangered plant and animal species to makean album.

9. Biodiversity of the college or their own residential/ native area.
10. Collection of seeds/vegetative organs of rare plant species from their localities and to raise/grow in college garden

**c. Assignments**: Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

**B. General :**

1. Visit to an arboretum/silviculture station/Forest research institute to see the live timber yielding plants or to visit a local timber depot. to observe various woods.
2. Field visit to a nearby ecosystem to observe the abiotic-biotic relationships.
3. Visit to National park/Sanctuary/Biosphere reserve etc., to observe in-situ conservation of plants and animals.
4. Visit to a Botanical garden or Zoo to learn about ex-situ conservation of rare plants or animals.
5. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-IV; SEMESTER- IV

(W.e.f. 2020-21 Admitted Batch)

**Plant Physiology and Metabolism**

| B.Sc. | Semester - IV | Credits: 4 |
|---|---|---|
| Course: 4 | Plant Physiology and Metabolism | Hrs/Wk: 4 |

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

**CO1:** Analyze the importance of water in plant life and mechanisms for transport of water and solutes in plants.(k4)

**CO2:** Evaluate the role of minerals in plant nutrition and their deficiency symptoms. .(k5)

**CO3:** Demonstrate the light reactions and carbon assimilation processes responsible for synthesis of food in plants. .(k3)

**CO4:** Analyze the biochemical reactions in relation to Nitrogen and lipid metabolisms. .(k4)

**CO5:** Evaluate the physiological factors that regulate growth and development in plants. .(k5)

**UNIT I: 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 II**: **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, Pentose Phosphate Pathway (HMP shunt).

**UNIT III: 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 IV: Nitrogen and lipid metabolism** **12 Hrs.**

1. Nitrogen metabolism: Biological nitrogen fixation – asymbiotic and symbiotic nitrogen fixing organisms. Nitrogenase enzyme system.
2. Lipid metabolism :Classification of Plant lipids, saturated and unsaturated fatty acids.
3. Protein synthesis , β-oxidation of fatty acids, Glyoxylate cycle.

**UNIT V: Plant growth - development and stress physiology** **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.
5. Physiological changes during water stress.

**TEXT BOOKS :**


1. Botany – IV (Vrukshasastram-II) : Telugu Akademi, Hyderabad
2. Pandey, B.P. (2013) *College Botany, Volume-III,* S. Chand Publishing, New Delhi
3. Ghosh, A. K., K. Bhattacharya &G. Hait (2011) *A Text Book of Botany, Volume- III,* New Central Book Agency Pvt. Ltd., Kolkata


**REFERENCE BOOKS:**


1. Aravind Kumar & S.S. Purohit (1998) *Plant Physiology – Fundamentals and Applications,* AgroBotanica, Bikaner
2. Datta, S.C. (2007) *Plant Physiology,*New Age International (P) Ltd., Publishers, New Delhi
3. Hans Mohr & P. Schopfer (2006)*Plant Physiology,* Springer (India) Pvt. Ltd., New Delhi
4. Hans-Walter heldt (2005) *Plant Biochemistry,*Academic Press, U.S.A.
5. Hopkins, W.G. & N.P.A. Huner (2014)*Introduction to Plant Physiology,* Wiley India Pvt. Ltd., New Delhi
6. Noggle Ray & J. Fritz (2013)*Introductory Plant Physiology*, Prentice Hall (India), New Delhi
7. Pandey, S.M. &B.K.Sinha (2006)*Plant Physiology*, Vikas Publishing House, New Delhi
8. Salisbury, Frank B. & Cleon W. Ross (2007)*Plant Physiology*, Thomsen & Wadsworth, Austalia&U.S.A
9. Sinha, R.K. (2014) *Modern Plant Physiology,* Narosa Publishing House,New Delhi
10. Taiz, L.&E. Zeiger (2003)*Plant Physiology*, Panima Publishers, New Delhi
11. Verma, V.(2007)*Text Book of Plant Physiology,*Ane Books India, New Delhi

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) BOTANY PRACTICAL SYLLABUS

## PAPER-IV; SEMESTER- IV

(W.e.f. 2020-21 Admitted Batch)

**Plant Physiology and Metabolism**

| B.Sc. | Semester - IV | Credits: 1 |
|---|---|---|
| Course: 4(L) | Plant Physiology and Metabolism Lab | Hrs/Wk: 3 |

**Course outcomes:** On successful completion of this practical course, students shall be able to:

- Organize lab and field experiments pertaining to Plant Physiology, that is, biophysical and biochemical processes using related glassware, equipment, chemicals and plant material. .(k3)
- Assess the quantities and qualitative expressions using experimental results and calculations.(k5)
- Demonstrate the factors responsible for growth and development in plants. .(k3)

**Practical Syllabus**

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. Demonstration of amylase enzyme activity and study the effect of substrate and Enzyme concentration.
7. Separation of chloroplast pigments using paper chromatography technique.
8. Demonstration of Polyphenol oxidase enzyme activity (Potato tuber or Apple fruit)
9. Anatomy of C3, C4 and CAM leaves
10. Estimation of protein by biuret method/Lowry method
11. Minor experiments – Osmosis, Arc-auxonometer, ascent of sap through xylem, cytoplasmic streaming.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

**II B.Sc - (CBCS) Model paper for Practical Examination**

**PAPER-IV; SEMESTER- IV**

(W.e.f. 2020-21 Admitted Batch)

***Paper-IV:*** **Plant Physiology and Metabolism**

**MAX TIME :3Hrs** **MAX Marks:50**

1. Conduct the experiment 'A' (Major experiment), write aim, principle, material and apparatus/equipment, procedure, tabulate results and make conclusion. 20 M
2. Demonstrate the experiment 'B' (Minor experiment) , write the principle, procedure and give inference. 10 M
3. Identify the following with apt reasons. 3 x 4 = 12 M

   **C.** Plant water relations / Mineral nutrition

   **D.** Plant metabolism

   **E.** Plant growth and development
4. Record + Viva-voce 5 + 3 = 8 M

**Suggested co-curricular activities for Botany Core Course-4 in Semester-IV:**

**A. Measurable :**

**a. Student seminars :**

1. Antitranspirants and their significance in crop physiology and horticulture.
2. Natural chelating agents in plants.
3. Criteria of essentiality of elements and beneficial elements.
4. Hydroponics, aquaponics and aeroponics.
5. Mycorrhizal association and mineral nutrition in plants.
6. Non-proteinaceous enzymes.
7. Respiratory inhibitors.
8. Structure of ATPase and Chemiosmotic hypothesis.
9. Transpiration and photosynthesis – a compromise.
10. Amphibolic pathways and bypass pathways in plants.
11. Non-biological nitrogen fixation.
12. Role of Hydrogenase in nitrogen fixation.
13. Plant lectins – their role in plants and use in medicine and medical research.

**b. Student Study Projects :**

1. Stomatal densities among different groups of plants.
2. Various treatments (salt, cold, high temperature, heavy metals) and their effects on seed germination.
3. Effects of plant hormones (IAA, Gibberellin and Kinetin) on Seed Germination.
4. Diurnal variation of stomatal behavior in CAM and C3 plants found in local area.
5. Effects of nitrogen fertilizer on plant growth.
6. Enumeration of C3, C4 and CAM plants in the local area.
7. Effect of different light wavelengths (red light, green light, blue light) on apparent photosynthesis in terms of growth.

8. Light effects on leaf growth and leaf orientation.
9. Artificial Fruit Ripening Process by various treatments (carbide and ethylene).
10. Study of relative water content and water retention by leaves under different environments.
11. Study of soil nutrients in local agricultural fields.
12. Study of mineral deficiency symptoms of various crops of local area.
13. Study of local weeds in crop fields.
14. Studies on seed storage proteins, oils and starch in local millets and pulse crops.
15. Making a report on LDPs, SDPs and DNPs in their locality.

**c. Assignments**: Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

**B. General :**

1. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.
2. Visit to a Plant Physiology laboratory in a University or Physiology division in a Agriculture/Horticulture University/Research station.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-V; SEMESTER- IV

(W.e.f. 2020-21 Admitted Batch)

***Paper-V:*** **Cell Biology, Genetics and Plant Breeding**

| B.Sc. | Semester - IV | Credits: 4 |
|---|---|---|
| Course: 5 | Cell Biology, Genetics and Plant Breeding | Hrs/Wk: 4 |

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

**CO1:** Distinguish prokaryotic and eukaryotic cells and design the model of a cell. .(k4)

**CO2**: Demonstrate techniques to observe the cell and its componentsunder a microscope. .(k3)

**CO3:** Analyze the basics of Mendelian genetics, its variations and interpret inheritance of traits in living beings. .(k4)

**CO4:** Evaluate the structure, function and regulation of genetic material. .(k5)

**CO5:** Analyze the application of principles and modern techniques inplant breeding. .(k4)

**UNIT I: The Cell** **12 Hrs.**

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

**UNIT II: Chromosomes** **12 Hrs.**

1. Prokaryotic vs eukaryotic chromosome. Morphology of a eukayotic chromosome.
2. Euchromatin and Heterochromatin; Karyotype and ideogram.
3. Brief account of chromosomal aberrations - structural and numerical changes
4. Organization of DNA in a chromosome (solenoid and nucleosome models).

**UNIT III: Mendelian and Non-Mendelian genetics** **14Hrs.**

1. Mendel's laws of inheritance. Incomplete dominance and co-dominance; 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 IV: 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. Gene concept and genetic code and Translation.
3. Regulation of gene expression in prokaryotes - Lac Operon.

**UNIT V: Plant Breeding** **12 Hrs.**

1. Plant Breeding and its scope; Genetic basis for plant breeding. 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 – schemes, and technique; Heterosis(hybrid vigour).
4. 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
3. Ghosh, A.K., K.Bhattacharya&G. Hait (2011) *A Text Book of Botany, Volume-III,* New Central Book Agency Pvt. Ltd., Kolkata
4. Chaudhary, R. C. (1996) *Introduction to Plant Breeding,* Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi


**REFERENCE BOOKS:**


1. S. C. Rastogi (2008)*Cell Biology,*New Age International (P) Ltd. Publishers, New Delhi
2. P. K. Gupta (2002)*Cell and Molecular biology,*Rastogi Publications, New Delhi
3. B. D. Singh (2008) *Genetics,*Kalyani Publishers, Ludhiana
4. A.V.S.S. Sambamurty (2007) *Molecular Genetics,*Narosa Publishing House,New Delhi
5. Cooper, G.M. & R.E. Hausman (2009)*The Cell – A Molecular Approach,* A.S.M. Press, Washington
6. Becker, W.M., L.J. Kleinsmith& J. Hardin (2007)*The World of Cell,* Pearson Education, Inc., New York
7. De Robertis, E.D.P. & E.M.F. De Robertis Jr. (2002)*Cell and Molecular Biology,* Lippincott Williams & Wilkins Publ., Philadelphia
8. Robert H. Tamarin (2002)*Principles of Genetics,*Tata McGraw –Hill Publishing Company Limited, New Delhi.
9. Gardner, E.J., M. J. Simmons & D.P. Snustad (2004)*Principles of Genetics,* John Wiley & Sons Inc., New York
10. Micklos, D.A., G.A. Freyer& D.A. Cotty (2005) *DNA Science: A First Course,* I.K. International Pvt. Ltd., New Delhi
11. Chaudhari, H.K.(1983)*Elementary Principles of Plant Breeding*, TMHpublishers Co., New Delhi
12. Sharma, J.R. (1994)*Principles and Practice of Plant Breeding*, Tata McGraw- Hill Publishers, New Delhi
13. Singh,B.D. (2001)*Plant Breeding : Principles and Methods* ,Kalyani Publishers, Ludhiana
14. Pundhan Singh (2015) *Plant Breeding for Undergraduate Students,* Kalyani Publishers, Ludhiana
15. upta, S.K. (2010)*Plant Breeding : Theory and Techniques,* Agrobios (India), Jodhpur
16. Hayes, H.K., F.R. Immer& D.C. Smith (2009) *Methods of* Biotech Books, Delhi

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) BOTANY PRACTICAL SYLLABUS

## PAPER-V; SEMESTER- IV

(W.e.f. 2020-21 Admitted Batch)

***Paper-IV:*** **Cell Biology, Genetics and Plant Breeding**

| B.Sc. | Semester - IV | Credits: 1 |
|---|---|---|
| Course: 5(L) | Cell Biology, Genetics and Plant Breeding Lab | Hrs/Wk: 2 |

**Course Outcomes:** After successful completion of this practical course the student shall be able to:

- Analyze the techniques of demonstrating Mitosis and Meiosis in the laboratory and identify differentstages of cell division. .(k4)
- Detect the cellular parts of a cell from a model or picture and prepare models.(k4)
- Solve the problems related to crosses and gene interactions. .(k3)
- Demonstrate plant breeding techniques such as emasculation and bagging.(k3)

**Practical Syllabus:**

1. Study of ultra structure of plant cell and its organelles using Electron microscopic Photographs/models.
2. Demonstration of Mitosis in *Allium cepa*/*Aloe vera* roots using squashtechnique; 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, hybrid, back and test crosses.
6. Solving problems on gene interactions (atleast 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.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

**II B.Sc - (CBCS) Model paper for Practical Examination**

**PAPER-V; SEMESTER- IV**

(W.e.f. 2020-21 Admitted Batch)

***Paper-V:*** **Cell Biology, Genetics and Plant Breeding**

**MAX YIME :3Hrs** **MAX Marks:50**

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. 15 M
2. Solve the given Genetic problem (Dihybrid cross/ Interaction of genes/ 3-point test cross) 'B' and write the conclusions. 15 M
3. Identify the following and justify with apt reasons. 3 x 4 = 12 M
   **C.** Cell Biology (Cell organelle)

   **D.** Genetics (DNA/RNA)

   **E.** Plant Breeding
4. Record + Viva-voce 5 + 3 = 8 M

**Suggested co-curricular activities for Botany Core Course- 5 in Semester-IV :**

**A. Measurable :**

**a. Student seminars :**

1. Light microscopy : bright field and dark field microscopy.
2. Scanning Electron Microscopy (SEM).
3. Transmission Electron Microscopy (TEM).
4. Mitosis and Meiosis
5. Cell cycle and its regulation.
6. Cell organelles bounded by single membrane.
7. Prokaryotic chromosomes
8. Special types of chromosomes :Polytene, Lampbrush and B-chromosomes.
9. Different forms of DNA.
10. Gene mutations.
11. DNA damage and repair mechanisms.
12. Reverse transcription.
13. Protein structure.
14. Modes of reproduction in plants.
15. Modes of pollination in plants

**b. Student Study Projects :**

1. Study of mitoticcell cycle in roots of *Aliumcepa*
2. tudy of mitoticcell cycle in roots of *Aloe vera*
3. Observation of chromosomal aberrations in *Allium cepa* root cells exposed toindustrial effluent(s).
4. Observation of chromosomal aberrations in *Allium cepa* root cells exposed toheavy metal(s).
5. Observation of polyembryony in *Citrus* spp.and *Mangiferaindica.*

**c. Assignments**: Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

**B. General :**

- Field visit to Agriculture/Horticulture University/ Research station to observe Plant breeding methods.
- Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.

**RECOMMENDED ASSESSMENT OF STUDENTS:**

**Recommended continuous assessment methods for all courses:**

Some of the following suggested assessment methodologies could be adopted. Formal assessment for awarding marks for Internal Assessment in theory.

**(a) Formal:**

1. The oral and written examinations (Scheduled and surprise tests),

2. Simple, medium and Critical Assignments and Problem-solving exercises,

3. Practical assignments and laboratory reports,

4. Assessment of practical skills,

5. Individual and group project reports,

6. Seminar presentations,

7. Viva voce interviews.

**(b) Informal:**

1. Computerized adaptive testing, literature surveys and evaluations,

2. Peers and self-assessment, outputs form individual and collaborative work

Closed-book and open-book tests,

# SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU

**(Accredited with NAAC "B$^{+}$" Grade with 2.67 CGPA points)**

# DEPARTMENT OF BOTANY

## BOARD OF STUDIES -2023-24

REVISED UG SYLLABUS UNDER CBCS

(Implemented from Academic Year 2021-22)PROGRAMME: Third YEAR B.Sc.

Domain Subject**: BOTANY**

***Skill Enhancement Courses (SECs) for Semester V, from 2023-24*** *(Syllabus with LearningOutcomes, References, Co-curricular Activities & Model Q.P. Pattern)*

**Structure of SECs for Semester – V**

*(To choose One pair from the Four alternate pairs of SECs)*

| Univ. Code | Course NO. 6 & 7 | Name of Course | Th. Hrs. / Week | IE Mar-ks | EE Mar-ks | Credits | Prac. Hrs./ Wk | Mar-ks | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | 6A | Plant Propagation | **3** | **25** | **75** | **3** | **3** | **50** | **2** |
| | 7A | Seed Technology | **3** | **25** | **75** | **3** | **3** | **50** | **2** |
| | | OR | | | | | | | |
| | 6B | Vegetable Crops – Cultivation Practices | **3** | **25** | **75** | **3** | **3** | **50** | **2** |
| | 7B | Vegetable Crops – Post Harvest Practices | **3** | **25** | **75** | **3** | **3** | **50** | **2** |
| | | OR | | | | | | | |
| | 6C | Plant Tissue Culture | **3** | **25** | **75** | **3** | **3** | **50** | **2** |
| | 7C | Mushroom Cultivation | **3** | **25** | **75** | **3** | **3** | **50** | **2** |
| | | OR | | | | | | | |
| | 6D | Gardening and Landscaping | **3** | **25** | **75** | **3** | **3** | **50** | **2** |
| | 7D | Agroforestry | **3** | **25** | **75** | **3** | **3** | **50** | **2** |

**Note-1:** For Semester–V, for the domain subject Botany, any one of the four pairs of SECs shall bechosen as courses 6 and 7, i.e., 6A & 7A or 6B & 7B or 6C & 7C or 6D & 7D. The pair shall notbe broken (ABCD allotment is random, not on any priority basis).

***Note-2:*** *One of the main objectives of Skill Enhancement Courses (SEC) is to inculcate skills related to the domain subject in students. The syllabus of SEC will be partially skill oriented. Hence, teachers shall also impart practical training to students on the skills embedded in syllabus citing related real field situations.*

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## III B.Sc - (CBCS) BOTANY SYLLABUS

## SEMESTER- V

(W.e.f. 2020-21 Admitted Batch)

***Paper-V : Plant propagation***

| B.Sc. | Semester - V | Credits: 4 |
|---|---|---|
| Course: 6 | Plant propagation | Hrs/Wk: 3 |

(Skill Enhancement Course (Elective), Credits: 05)

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

**CO1:** Explain various plant propagation structures and their utilization. (K4)

**CO2:** Understand advantages and disadvantages of vegetative, asexual and sexual plant propagation methods. (K2)

**CO3:** Assess the benefits of asexual propagation of certain economically valuable plants using apomictics and adventive polyembryony. (K6)

**CO4:** Demonstrate skills related to vegetative plant propagation techniques such as cuttings, layering, grafting and budding. (K3)

**CO5:** Apply a specific macro-propagation technique for a given plant species. (K3)

**I. Syllabus:** (Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05)

(*Syllabi of theory, practical and lab (skills) training together shall be completed in 80 hours*)

**Unit – 1: Basic concepts of propagation** (10h)

1. Propagation: Definition, need and potentialities for plant multiplication; asexual and sexual methods of propagation - advantages and disadvantages.
2. Propagation facilities: Mist chamber, humidifiers, greenhouses, glasshouses, cold frames, hot beds, poly-houses, phytotrons nursery - tools and implements.
3. Identification and propagation by division and separation: Bulbs, pseudobulbs, corms, tubers and rhizomes; runners, stolons, suckers and offsets.

**Unit – 2: Apomictics in plant propagation** (10h)

1. Apomixis: Definition, facultative and obligate; types – recurrent, non-recurrent, adventitious and vegetative; advantages and disadvantages.
2. Polyembryony: Definition, classification, horticultural significance; chimera and bud sport.
3. Propagation of mango, *Citrus* and *Allium* using apomictic embryos.

**Unit – 3: Propagation by cuttings** (10h)

1. Cuttings: Definition, different methods of cuttings; root and leaf cuttings.

2. Stem cuttings: Definition of stem tip and section cuttings; plant propagation by herbaceous, soft wood, semi hard wood, hard wood and coniferous stem cuttings.
3. Physiological and bio chemical basis of rooting; factors influencing rooting of cuttings; Use of plant growth regulators in rooting of cuttings.

**Unit – 4: Propagation by layering** (10h)

1. Layering: Definition, principle and factors influencing layering.
2. Plant propagation by layering: Ground layering – tip layering, simple layering, trench layering, mound (stool) layering and compound (serpentine layering).
3. Air layering technique – application in woody trees.

**Unit – 5: Propagation by grafting and budding** (10h)

1. Grafting: Definition, principle, types, graft incompatibility, collection of scion wood stick, scion-stock relationship, and their influences, bud wood certification; micrografting.
2. Propagation by veneer, whip, cleft, side and bark grafting techniques.
3. Budding: Definition; techniques of 'T', inverted 'T', patch and chip budding.

**II. References:**


1. Sharma RR and Manish Srivastav.2004. Plant Propagation and Nursery Management International Book Distributing Co. Lucknow.
2. Hartman, HT and Kester, D.E.1976. Plant Propagation: Principles and Practices, Prentice Hall of India Pvt. Ltd. Bombay.
3. Sadhu, M.K. 1996. Plant Propagation. New Age International Publishers, New Delhi.
4. Web resources suggested by the teacher concerned and college librarian including reading material.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## III B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-V; SEMESTER- V

(W.e.f. 2020-21 Admitted Batch)

***Paper-V I: Plant propagation lab***

| B.Sc. | Semester - V | Credits: 4 |
|---|---|---|
| Course: 6 | Plant propagation (L ) | Hrs/Wk: 3 |

**Course -6A: Plant Propagation - Practical syllabus**

**III. Learning Outcomes:** On successful completion of this practical course, student will be able to:

1. Make use of different plant propagation structures for plant multiplication. (K4)
2. Explore the specialized organs or asexual propagules in some plants for their proliferation. (K4)
3. Demonstrate skills on micropropagation of plants through vegetative propagation techniques. (K3)
4. Evaluate and use a suitable propagation technique for a given plant species. (K6)

**IV. Practical (Laboratory) syllabus:** (30hrs): The following experiments/practices shall beconducted by students in the lab.

1. Preparation of nursery beds – flat, raised and sunken beds.
2. Propagation through apomictic.
3. Propagation by separation and division technique.
4. Propagation by cuttings.
5. Propagation by layering
6. Propagation by grafting.
7. Propagation by budding.
8. Preparation of potting mixture, potting and repotting.

**V. Lab References:**


1. Prasad, V. M. and Balaji Vikram, 2018. Practical Manual on Fundamentals of Horticulture and Plant Propagation, Write & Print Publications, New Delhi
2. Upadhyay S. K. (Ed.) 2013. Practical Manual Basic Horticulture-I, Akashdeep Printers, New Delhi
3. Web sources suggested by the teacher concerned.


**VI. Co-Curricular Activities:**

***a)*** **Mandatory:** (*Lab/field training of students by teacher: (Lab: 10 + field: 05 hours):*

1. **For Teacher**: Training of students by the teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of different plant propagation structures, containers, preparation of soil, plant propagation through separation and division,

apomictics, cuttings, layering, grafting and budding.

2. **For Student**: Students shall (individually) visit horticulture nurseries in a University/, research institute /private nursery and observe propagation structures, propagation techniques etc., write their observations and submit a hand-written Fieldwork/Project work/Project work Report not exceeding 10 pages in the given format to the teacher.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.
5. Unit tests (IE).

**b) Suggested Co-Curricular Activities:**

1. Training of students by experts in plant vegetative propagation methods.
2. Assignments (including technical assignments like identifying propagation structures and their operational techniques for a specific plant species.
3. Seminars, Group discussions, Quiz, Debates etc. (suggested topics):
4. Preparation of videos on plant propagation techniques in relation to different economically useful plants.
5. Collection of material/figures/photos related to plant propagation methods, writing and organizing them in a systematic way in a file.
6. Visits to Horticulture/Agriculture/Forest nurseries, research organizations, universities etc.
7. Invited lectures and presentations on related topics by experts in the specified area.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-III; SEMESTER- III

(W.e.f. 2020-21 Admitted Batch)

***Paper-V I: Plant propagation Practical model paper***

1. Demonstration plant propagation using separation and division /apomictics 'A' 10
2. Demonstration plant propagation using cuttings/layering technique 'B' 10
3. Demonstration of plant propagation using grafting/budding technique 'C' 10
4. Scientific observation and data analysis 4 x 3 = 12
   - D. Plant propagation structure model/photograph
   - E. Plant Growth Regulator
   - F. Nursery bed model /photograph
   - G. Asexual propagule/container/pot mixture for propagation
5. Record + Viva-voce 5+3 = 8

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-III; SEMESTER- III

(W.e.f. 2020-21 Admitted Batch)

***Paper-VII: Seed technology***

| B.Sc. | Semester - III | Credits: 5 |
|---|---|---|
| Course: 7 | *Seed technology* | Hrs/Wk: 3 |

**I.Learning outcomes:**

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

CO1: Explain the causes for seed dormancy and methods to break dormancy. (K4)

CO2: Understand critical concepts of seed processing and seed storage procedures. (K2)

CO3: Acquire skills related to various seed testing methods. (K3)

CO4: Identify seed borne pathogens and prescribe methods to control them (K1)

CO5: Understand the legislations on seed production and procedure of seed certification. (K2)

**I. Syllabus:** (Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05)

(S*yllabi of theory, practical and lab (skills) training together shall be completed in 80 hours*)

**Unit - 1: Seed dormancy** (10h)

1. Seed and grain: Definitions, importance of seed; structure of Dicot and Monocot seed.
2. Role and goals of seed technology; characteristics of quality seed material.
3. Dormancy: Definition, causes for seed dormancy; methods to break seed dormancy.

**Unit – 2: Seed processing and storage** (10h)

1. Principles of seed processing: seed pre-cleaning, precuring, drying, seed extraction; cleaning, grading, pre-storage treatments; bagging and labelling, safety precautions during processing.
2. Seed storage; orthodox and recalcitrant seeds, natural longevity of seeds.
3. Factors affecting longevity in storage; storage conditions, methods and containers.

**Unit – 3: Seed testing** (10h)

1. Definition of seed vigour, viability and longevity; seed sampling and equipment; physical purity analysis.
2. Seed moisture – importance – methods of moisture determination.
3. Seed germination tests using paper, sand or soil – standard germination test; TZ test to determine seed viability; seed health testing.

**Unit – 4: Seed borne diseases** (10h)

1. A brief account of different seed borne diseases and their transmission.
2. Different seed health testing methods for detecting microorganisms.
3. Management of seed borne diseases; seed treatment methods: spraying and dusting.

**Unit – 5: Seed certification** (10h)

1. Objectives - Indian seed Act; seed rules and seed order; new seed policy (1988).
2. Seed Inspector: Duties and responsibilities; classes of seeds, phases of certification standards (i.e., Land requirement, isolation distance) etc.
3. Issue of certificates, tags and sealing; pre and post control check: Genetic purity verification, certification, records and reporting.

**Additional inputs :**

**II. References:**


1. Umarani R, Jerlin R, Natarajan N, Masilamani P, Ponnuswamy AS 2006. Experimental Seed Science and Technology, Agrobios, Jodhpur
2. Agrawal, 2005. Seed Technology. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi
3. Desai B D 2004. Seeds Hand Book: Processing and Storage, CRC Press
4. Agarwal V K and J B Sinclair 1996, Principles of Seed Pathology, CRC Press
5. Tunwar NS and Singh SN. 1988. Indian Minimum Seed Certification Standards. CSCB, Ministry of Agriculture, New Delhi.
6. McDonald, M.B. and L.O. Copland. 1999. Seed Science and Technology Laboratory Manual. Scientific Publishers, Jodhpur
7. Web resources suggested by the teacher concerned and the college librarian including reading material.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-III; SEMESTER- III

(W.e.f. 2020-21 Admitted Batch)

***Paper-VII: Seed technology Lab***

| B.Sc. | Semester - III | Credits: 5 |
|---|---|---|
| Course: 7 | *Seed technology Lab* | Hrs/Wk: 3 |

**Course -7A: Seed Technology Practical syllabus**

**III. Learning Outcomes:** On successful completion of this practical course, student will be able to:

1. Demonstrate skills on various methods to break the seed dormancy. (K3)
2. Determine seed moisture, seed germination percentage, seed viability and vigour. (K3)
3. Identify the seed borne pathogens and prescribe methods to prevent or control them. (K1)
4. Evaluate various methods to produce healthy seeds. (K6)

**IV Practical (Laboratory) syllabus:** (30hrs)

1. Determination of physical properties of seeds of 3 select local crops (1 each from cereals, millets, pulses and oil seeds).
2. Breaking seed dormancy in 3 select local crops.
3. Measurement of seed moisture content by O S W A or moisture meter or oven drying method.
4. Seed germination tests and evaluation.
5. Seed vigour - conductivity test.
6. Accelerated ageing tests.
7. Tetrazolium test.
8. Priming and invigoration treatments for improving germination and vigour
9. Techniques of seed health testing - visual examination of seeds, washing test, incubation methods, embryo count method, seed soak method for the detection of certain seed borne pathogens.
10. Using various types of tools for dusting and spraying pesticides/insecticides

.

**Lab References:**

10. Sanjeev Kumar, 2019. Practical Manual Seed Technology of Vegetable Crops, M/s Asian Printery, Ahmedabad
11. Divakara Sastry, E.V., Dhirendra Singh and S.S.Rajput, 2013. Seed Technology: Practical Manual, Swami Keshwanand Rajasthan Agricultural University, Jobner
12. Web sources suggested by the teacher concerned.

## II. Co-Curricular Activities:

**Mandatory:** (*Lab/field training of students by teacher: (Lab: 10 + field: 05 hours)*

1. **For Teacher**: Training of students by the teacher in the laboratory/field for a total of not less than15 hours on the field techniques/skills of identifying and drawing seed structure, methods of breaking seed dormancy, seed cleaning, seed storage, identification of seed borne diseases, seed certification procedure.
2. **For Student**: Students shall (individually) visit horticulture/agriculture/ forest nursery/commercial seed production firms/ seed testing laboratories in government or private sector, observe seed production techniques, processing and storage, seed testing and certification procedures etc., write their observations and submit a hand-written Fieldwork/Project work Report not exceeding 10 pages in the given format to the teacher.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.
5. Unit tests (IE).

**a) Suggested Co-Curricular Activities:**

1. Training of students by experts in seed technology.
2. Assignments (including technical assignments like seed processing and storage techniques, seed testing, seed certification, seed borne diseases- prevention and control).
3. Seminars, Group discussions, Quiz, Debates etc. (suggested topics):
4. Preparation of videos on various aspects related to seed technology.
5. Collection of material/figures/photos related to seed technology, writing and organizing them in a systematic way in a file.
6. Visits to seed production units in Industries/Horticulture/Agriculture/Forest universities/colleges; research organizations, seed testing laboratories etc.
7. Invited lectures and presentations on related topics by experts in the specified area.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) BOTANY SYLLABUS

## PAPER-III; SEMESTER- III

(W.e.f. 2020-21 Admitted Batch)

***Paper-VII: Seed technology Lab model paper***

Max. Time: 3 Hrs. Max. Marks: 50

| | |
|---|---|
| 1. Demonstration of a method to break seed dormancy 'A' | 10 |
| 2. Determination of seed moisture content/ seed germination test 'B' | 10 |
| 3. Demonstration of test for seed viability/ seed vigour 'C' | 10 |
| 4. Scientific observation and data analysis | 4 x 3 = 12 |

D. Monocot / Dicot seed

E. Seed sampling equipment

F. Seed borne pathogen specimen/photograph

G. Seed certification agency/procedure

4. Record + Viva-voce 5+3 = 8

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

**Affiliated toAdikaviNannaya University, Rajahmundry)**

## DEPARTMENT OF BOTANY

## Certificate course 2023-2024

## Fruits and vegetable preservation

Learning Outcomes:

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

1. Identify various types of fruits and vegetables and explain their nutritive value. (K1)
2. Understand the fragile nature of fruits and vegetables and causes for their damage. (K2)
3. Explain various methods of preservation for fresh fruits and vegetables. (K4)
4. Get to Understand the value-added products made from fruits and vegetables. (K2)

Syllabus:

**Unit – 1** : Introduction to fruits and vegetables 06 Hrs.

1. Fruits: Definition, elementary knowledge on types of fruits (fleshy and dry) with local
2. Importance of fruits and vegetables in human nutrition.
3. Concept of perishable plant products – maturation and spoilage, shelf life; preservation – definition and need for preservation of fruits and vegetables.

**Unit – 2** :Preservation of Fruit 09 Hrs.

1. Fruits – ripening and biological aging; storage and preservation concerns.
2. Preservation of fresh fruits at room temperature and in cold storage.
3. Fruit preservation at room temperatue as juices, squashes and syrups.
4. Preservation of fruits by application of heat; making of fruit products (jams, jellies and fruit slices in processing factories).

**Unit – 3** :Preservation of vegetables 09 Hrs.

1. Vegetables – losses after harvesting and causes; problems in handling and storage.
2. Modern methods of packaging and storage to reduce losses.
3. Making of vegetable products (flakes/chips of potato and onion; garlic powder).
4. Frozen vegetables – Carrots, Cauliflower, Okra and Spinach.

**Suggested Co-curricular activities (6 Hrs.)**

1. Assignments/Group discussion/Quiz/Model Exam.
2. Invited lecture and demonstration by local expert
3. Exhibition of various types of locally available fruits and vegetables.
4. Hands on training on handling and packaging methods of fresh fruits and vegetables.
5. Hands on training on making fruit juices.
6. Display of various preserved fruit products available in local markets.
7. Hands on training on making of potato, yam, onion chips.
8. Display of various preserved vegetable products available in local markets.
9. Watching videos on preservation of fruits and vegetables.
10. Visit to Horticulture University or research station to learn about value added products of fruits and vegetables.

Suggested text books/reference books :

1. Giridharilal, G. S. Siddappa and G.L.Tandon(2007) Preservation of Fruits and Vegetables, Indian Council of Agri. Res., New Delhi
2. Srivastava, R.P., and Sanjeev Kumar (2019) Fruit and Vegetable Preservation : Principles and Practices, CBS Publishers & Distributors Pvt., Ltd., New Delhi
3. Thompson, A.K. (1995) Post Harvest Technology of Fruits and Vegetables. Blackwell Sci.,U.K.
4. Verma, L.R. and V.K. Joshi (2000) Post Harvest Technology of Fruits and Vegetables. Indus Publ., New Delhi

# SRI A.S.N.M.GOVERNMENT COLLEGE (A)
# PALAKOL

## II B.Sc - BOTANY

Botany EXAMINATIONS - MODEL PAPER

(W.e.f. 2022-23 Admitted Batch)

PAPER –IIISEMESTER –III

***Paper*-III : Anatomy and embryology of angiosperms ,plant Ecology and Biodiversity**

Time: 3Hrs. Max. Marks: 60

**SECTION - A**

**I .Answer any FIVE questions. Each question carries 5 marks** **5 x 4 =20M**

1. (a) Xylem tracheids (b) Xylem vessels
2. (a) Periplasmodial tapetum (b) Glandular tapetum
3. (a) Helobial endosperm (b) Ruminate endosperm
4. Pyramids of numbers
5. (a) Ecotypes (b) Ecads
6. P/R ratio
7. Earth Summit.
8. Role of NBPGR in conservation of Biodiversity

**SECTION - B**

**II. Answer ALL the questions. Each question carries 10 marks** 5X8 =40M

9. a)Write an essay on organization of apical meristems with theories proposed.

(OR)

b)Discuss the anomalous secondary growth in stem of Boerhaavia with the help of a neat labeled diagram.

10. a)Explain monosporic and bisporic types of embryosac development in angiosperms.

(OR)

b) Describe the embryogeny in a dicot plant with neat labeled diagrams.

11. a) Explain various effects of light factor plants and their communities?

(OR)

b) Define ecological succession. Discuss hydrosere with suitable diagrams and examples.

12. a) Describe Raunkiaer's life forms with suitable examples.

(OR)

b) Write an essay on primary productivity.

13.a)Write an essay on value of biodiversity with appropriate examples.

(OR)

b)Define biodiversity hotspot. Discuss the biodiversity in Western Ghats of India.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A)
# PALAKOL

## II B.Sc - BOTANY

Botany EXAMINATIONS - MODEL PAPER

(W.e.f. 2022-23 Admitted Batch)

PAPER –IV SEMESTER -IV

***Paper*-1 : Plant physiology and Metabolism**

Time: 3Hrs. Max. Marks: 60

**SECTION – A**

**I .Answer all the questions. Each question carries 5 marks** **5 x 4 =20 M**

1. (a) Diffusion (b) Imbibition
2. (a) Macro nutrients (b) Micro nutrients
3. (a) Anaerobic respiration (b) Aerobic respiration
4. (a) Absorption spectrum (b) Action spectrum
5. C2 pathway
6. Fatty acids
7. Physiological effects of Brassinisteroids
8. Sigmoid growth curve

**SECTION - B**

**II .Answer any five questions. Each question carries 8 marks** **5X8=40M**

9. a) Explain how ascent of sap occur in plants with suitable theory.

(OR)

b) Discuss the phloem transport in plants. Add a note on source-sink relationship.

10.a) Write an essay on classification of enzymes.

(OR)

b) Describe the Krebs cycle with the help of schematic diagram.

11. a) Define photophosphorylation. Explain the non-cyclic photophosphorylation with the help of a schematic diagram.

(OR)

b) Discuss the carbon assimilation in CAM plants.

12. a) Write an essay on biological nitrogen fixation.

(OR)

b) Describe the Glyoxylate cycle with the help of a schematic diagram.

13. a) Define photoperiodism. Write an essay on role of phytochrome in photoperiodic responses of plants.

(OR)

b) Discuss the physiological changes in plants during water stress.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A)
# PALAKOL

## II B.Sc - BOTANY

Botany EXAMINATIONS - MODEL PAPER

(W.e.f. 2022-23 Admitted Batch)

PAPER –V SEMESTER -IV

***Paper*-V : Cell biology ,Genetics and plant Breeding**

**Time: 3Hrs.** **Max. Marks: 60**

**SECTION - A**

**I. Answer all the questions. Each question carries 8 marks** **5 x 8 =40 M**

1. Differences between prokaryotic and eukaryotic cells.
2. (a) Karyotype (b) Ideogram
3. (a) Incomplete dominance (b) Co-dominance
4. Maternal inheritance
5. Double helical structure of DNA
6. Genetic code
7. Objectives and scope of plant breeding
8. Plant introduction

**SECTION - B**

**II .Answer any five questions. Each question carries 10 marks** **5X4 =20M**

9. a) Describe the ultrastructure of cell wall.

(OR)

b) Write an essay on plastid DNA with a well labeled diagram.

10. a) Discuss the structure of a eukaryotic chromosome with a neat labeled diagram.

(OR)

b) Explain the organization of DNA in chromosomes with suitable theories.

11.a) Discuss complementary and duplicate gene interactions with suitable examples.

(OR)

b) Explain mapping of genes with the help of 3-point test cross.

12. a) Describe the semi-conservative mode of DNA replication.

(OR)

b) Define an operon. Explain the regulation of Lac-operon.

13.a) Write an essay on procedure; applications and uses; advantages and limitations mass selection.

(OR)

b) Give an account of utilization of RFLP and RAPD in molecular plant breeding.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## III B.Sc - BOTANY

## SEMESTER- V

(W.e.f. 2021-22 Admitted Batch)

*Paper-:* **6A: Plant Propagation**

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

## SECTION – A

**I .Answer all the questions. Each question carries 10 marks** **5 x 10 =50M**

**1. (a) Define Plant Propagation? Explain the Sexual method of Plant propagation? Add a note on its advantages and disadvantages.**

**(OR)**

**(b) Write in detail about the Plant Propagation by means of Bulbs, Tubers and Rhizomes**

**2. (a) Define Apomixis and Explain the types of Apomixis**

**(OR)**

**(b) Describe the propagation of Mango and Citrus using Apomictic Embryos**

**3. (a) What are Cuttings? Write about different methods of Cuttings?**

**(OR)**

**(b) Write an account on the role of Plant Growth regulators in rooting of Cuttings**

**4. (a) Define Layering? Explain the Principle and Factors influencing Layering**

**(OR)**

**(b) Explain in detail about the Air Layering and its application in Woody Trees**

**5. (a) Write an essay on different Grafting Techniques**

**(OR)**

**(b) What is budding. Describe the various techniques of Budding**

## SECTION - B

**II. Answer any FIVE questions. Each question carries 5 marks** **5 x 5 =25M**

**6. Mist Chamber**
**7. Polyhouse**
**8. Polyembryony**
**9. Stem tip Cutting**
**10. Serpentine Layering**
**11. Trench Layering**
**12. Bud Wood Certification**
**13. Micrografting**

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

**III B.Sc - BOTANY**

**SEMESTER- V**

(W.e.f. 2021-22 Admitted Batch)

*Paper-:* 7A: Seed Technology

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

## SECTION - A

**I .Answer any FIVE questions. Each question carries 10 marks** **5 x 10 =50M**

**1. (a) What is Seed? Describe the Structure of Monocot Seed.**

**(OR)**

**(b) What is Seed Dormancy? Discuss the causes of Seed Dormancy and write any two methods to break it**

**2. (a) Explain Various steps in Seed Processing**

**(OR)**

**(b) What are the Factors affecting the longevity in seed storage**

**3. (a) Write about the importance of Seed moisture and the methods to determine it**

**(OR)**

**(b) Explain the Standard Seed germination Tests**

**4. (a) Write a brief account of Seed Borne Diseases and their transmission**

**(OR)**

**(b) What are the different Seed health testing methods for detecting Microorganisms?**

**5. (a) What is Seed Certification? Write its Objectives**

**(OR)**

**(b) What are different classes of Seeds. Explain the phases of certification Standards**

## SECTION - B

**II. Answer any FIVE questions. Each question carries 5 marks** **5 x 5 =25M**

**6. Monocot Seed**
**7. Characteristics of Quality Seed Material**
**8. Recalcitrant Seeds**
**9. Seed Viability**
**10. TZ test**
**11. Seed Treatment Methods**
**12. Genetic Purity Verification**
**13. Seed Inspector**

**SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU**

**(Affiliated toAdikaviNannaya University, Rajahmundry)**

**(Accredited with NAAC "$B^{+}$" Grade with 2.67 CGPA points)**

# DEPARTMENT OF BOTANY

## HORTICULTURE

# BOARD OF STUDIES

# 2023 - 24

# SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU

(Affiliated to Adikavi Nannaya University, Rajahmundry)
(Accredited with NAAC "B" Grade with 2.67 CGPA points)

## DEPARTMENT OF HORTICULTURE

## MEMBERS OF BOARD OF STUDIES -2023-24

**Chair person** : **Sri P.Srinivasa Rao**
Lecturer in Botany

**Member** : **V.Sai sree**
Lecturer in Botany

**University Nominee** : **Dr.R.Venkatesh**
Lecturer in Botany,
Govt Arts College, Rajhamundry, E.G.Dt.

**Subject Expert** : **Dr Ch.Srinevasa Reddy,**
Lecturer in Botany,
SRR &CVR Government College(A),
VIJAYAWADA, NTR Dt.

**Subject Expert** : **Dr.N.Krishna**
Lecturer in Botany,
HINDU College
Guntur, Guntur Dt.

**Industrialist/Academician/Business man:** **Mr.B.RagavendraSwamy**
GREENLAND NURSERY,
Palakol, W.G.Dt.

**Alumni Member** : **Dr.Y.Vijay kumar**
Lecturer in Botany

**Student Representative** : **K.Mounika**
III HBC,

# SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU

**(Accredited with NAAC "B$^{+}$" Grade with 2.67 CGPA points)**

# DEPARTMENT OF HORTICULTURE

## BOARD OF STUDIES -2023-24

After thorough discussion the following resolutions are made

## RESOLUTIONS

**Resolution No. 1**: It is resolved to adopt the Revised CBCS syllabus (both theory & practical's) & model papers suggested by APSCHE, with small modification for I, II, III, IV&V semesters for the academic year 2023-24.

Resolved to approve the syllabi for the 3rd and 4th semester course of the HORTICULTURE, In papers III,IV&V for adoption and implementation under Revised Choice Based Credit System (RCBCS) w.e.f. the academic year 2023-24 onwards.

**Resolution No. 2**: Resolved to approve structure of the question paper, model question papers for HORTICULTURE course of paper VI,VII with maximum marks 75 of 3rd and 4th semester end theory examination and abstract of question paper for internal assessment test with maximum marks 40 for adoption and implementation under Revised Choice Based Credit System (RCBCS) w.e.f. the academic year 2023-24 onwards.

Reveised to approve structure of the question paper, model question papers for Horticulture course of papers III & IV,V with maximum marks 60 of III and IV semester end theory examination and abstract of question paper for internal assessment test with maximum marks 40 for adoption and implementation under Revised Choice Based Credit System (RCBCS) w.e.f. the academic year 2023-24 onwards.

**Resolution No. 3**: It is Unanimously resolved to approve the syllabi, model question papers and break up of practical marks 50 of 3rd and 4th semester end practical examinations in HORTICULTURE, Course(S) of papers III , IV&V for adoption and implementation under Revised Choice Based Credit System (RCBCS) w.e.f. the academic year 2023-24 onwards.

1. Written -30M
2. Record / Field work -05/05
3. Viva Voice/Project -05/05

**Resolution No. 4** : It is Unanimously resolved to approve the break-up of marks of the Internal assessment test 40 marks in 3rd and 4th semester in HORTICULTURE course(s), paper III , IV&V as given below from the academic year 2023-24 for adoption and implementation under Revised CBCS . Written examination – 15 Marks, Assignment 5, Seminar -5,attendance – 5 Marks.

It is Unanimously resolved to approve the split marks of the Internal assessment test 40 marks across 3rdand 4th semester in Horticulture course(s), paper III&IV,V as given below from the academic year 2023-24 for adoption and implementation under Revised CBCS . Written examination – 35 Marks, Group discussion/Assignment -5, quiz/Seminar-5, Clean and green /Attendance– 5 Marks which will be scale down to 40 marks.

**Resolution No. 5**: It is unanimously resolved to approve the qualifying marks in HORTICULTURE course(s), papers III , IV&V of 3rd and 4th Semesters end examinations. (Theory examination 40 marks including mid exam marks and practical examination 20 marks).

Resolved that the pass marks for external examination is 26 Marks (35%) and Candidates should get total marks of 40, in both internal and external examinations put together for II BSc students from the academic year 2023-24.

**Resolution No. 6**: It is resolved to conduct odd semester practical examinations with internal faculty members with subject teacher and another teacher in the department and even semester practical examination to be conducted involving external examiner.

**Resolution No.7**: Resolved to approve the following list of paper setters and examiners for HORTICULTURE course(s).

**Resolution No. 8**: Resolved to approve the list of recommended text books and reference books which are listed at the end of the syllabi of papers III and IV&V in HORTICULTURE Course(s).

**Resolution No.9**: Resolved to conduct Guest Lectures and Student Seminars /Study Projects for 3rd and 4th Semester students for the Academic Year 2023-24.

**Resolution No.10**: Resolved to approve the measures to discussed to be conduct online classes(Whenever physical appearance of students is not possible) through , Google suit, in all courses of HORTICULTURE for students of B.Sc programme during the academic year 2020-21 as improbable and unpredictable situation occurred due to prevailing Carona virus disease(Covid-19) Pandemic

**Resolution No.11**: Resolved to enter into MOUs with reputed Institutions, Organizations, Laboratories, Industries based upon the need of the curriculum, to facilitate faculty exchange programmes etc.,

**Resolution No.12**: Resolved to any other with the permission of the chairperson.

Signatures of the Committee Members:-

1. 13/9/23
2. 13/9/23
3. 13/9/2023
4.
5.
6.
7.
8. K. Mounika

**SRI A S N M GOVERNMENT COLLEGE, PALAKOL, W.G. DT**

**(Affiliated toAdikaviNannaya University, Rajahmundry)**

**(Accredited with NAAC "B$^{+}$" Grade with 2.67 CGPA points)**

# Department of HORTICULTURE

Members of the Board of Studies of HORTICULTURE met on 11/09/2023at 10 A.M. In the Department of HORTICULTURE

**Members Present**

Board of studies chair person : Sri P.Srinivasa Rao

Member of the Department : Kum V.Sai Sree

University Representative : Dr.R.VENKATESH

Subject Experts : 1) Dr Ch.Srinevasa Reddy

2) Dr.N.KRISHNA

Industrialist/Businessmen : Sri. Mr.B.RagavendraSwamy

Alumni : Dr.Y.Vijay kumar

Student Representative : K.Mounika

## AGENDA

**Subject No. 1**: To approve the Revised CBCS syllabus (both theory & practicals) & model papers suggested by APSCHE, with small modification for I, II, III, IV,V semesters for the academic year 2023-24.

To approve the syllabi for the 3rd and 4th semester course of the HORTICULTURE, In papers III&IV,V for adoption and implementation under Revised Choice Based Credit System (RCBCS) w.e.f. the academic year 2023-24 onwards

**Subject No. 2**: To approve structure of the question paper, model question papers for HORTICULTURE course of papers V with maximum marks 75 of semester end theory examination and abstract of question paper for internal assessment test with maximum marks 25 for adoption and implementation under Revised Choice Based Credit System (RCBCS) w.e.f. the academic year 2023-24 onwards.

To approve structure of the question paper, model question papers for Horticulture course of papers III & IV,V with maximum marks 60 of 3rd and 4th semester end theory examination and abstract of question paper for internal assessment test with maximum marks 40 for adoption and implementation under Revised Choice Based Credit System (RCBCS) w.e.f. the academic year 2023-24 onwards.

**Subject No. 3:** To approve the syllabi, model question papers and break up of practical marks 50 of 3rd and 4th semester end practical examinations in B.Sc Courses, of Papers III,IV&V for adoption and implementation under revised Choice Based credit system (RCBCS).w.e.f. the academic year 2023-2024 onwards.

**Subject No. 4:** To approve the break-up of the Internal assessment test marks 25 in V semester B.Sc(HORTICULTURE) course of papers VI&VII for adoption and Implementation under Revised Choice Based Credit system. Written examination – 15 Marks, Assignment / Seminar -5, Extra Curricular Activities – 5 Marks.

To approve the split marks of the Internal assessment test 40 marks across 3rd &4th semester in Horticulture course(s), paper III and IV,V as given below from the academic year 2023-24 for adoption and implementation under Revised CBCS . Written examination – 35 Marks, Group discussion/Assignment -5, quiz/Seminar-5, Clean and green /Attendance– 5 Marks which will be scale down to 40 marks.

**Subject No.5:** To approve the qualifying marks in B.Sc HORTICULTURE Course for papers III , IV&V of 3rd and 4th semester end theory examination and practical examination for adoption and implementation under revised CBCS.

To approve the pass marks for external examination is 26 Marks (35%) and Candidates should get total marks of 40, in both internal and external examinations put to gather for 2nd and 3rd BSc students which was approved in the previous year BOS meetings.

To approve the pass marks for external examination is 26 Marks (35%) and Candidates should get total marks of 40, in both internal and external examinations put together for 2nd BSc students from the academic year 2023-24

**Resolution No. 6**: To approve to conduct odd semester practical examinations with internal faculty members with subject teacher and another teacher in the department and even semester practical examination to be conducted involving external examiner.

S**ubject No.7:** To approve the list of paper setters and examiners in HORTICULTURE for B.Sc courses.

**Subject No. 8:** To approve the list of recommended text books and reference books which are listed at the end of syllabi of papers III & IV in HORTICULTURE for B.Sc course.

**Subject No. 9:** To conduct Guest Lectures and Student Seminars /Study Projects for III & IV Semester students for the Academic Year 2023-24.

**Resolution No.10**: To approve the measures to discuss to be conduct online classes(Whenever physical appearance of students is not possible) through , Google suit, in all courses of HORTICULTURE for students of B.Sc programme during the academic year 2020-21 as improbable and unpredictable situation occurred due to prevailing Carona virus disease(Covid-19) Pandemic.

**Resolution No.11**: To procure latest editions of text books, reference books ,journals , e- journals for departmental library and central library to upgrade laboratories by purchasing advanced equipments in need with practical curriculum to be ingenious for both students and faculty members

**Subject No. 12:** Any other with the permission of the chairperson.

**SRI A S N M GOVERNMENT COLLEGE, PALAKOL, W.G. DT**

**(Affiliated toAdikaviNannaya University, Rajahmundry)**

**(Accredited with NAAC "B+" Grade with 2.67 CGPA points)**

**DEPARTMENT OF HORTICULTURE**

Sri P.Srinivasa Rao, In charge of the Department HORTICULTURE requests the Academic Council to consider and approve the changes in the syllabi recommended by the Board of Studies for the Academic year 2021-22. The BOS meeting was held on11-09-2023.

The resolutions were seconded by Kum V.Sai Sree members of the Board of Studies.

The academic council is also requested to accord permission to appoint examiners for theory/practical for the academic year 2021-22.

Chairman 13/9/23
Board of Studies.

Members presented

1. 13/9/23
2. 13/9/23
3. 13/9/2023
4.
5.
6.
7.
8. K. Mounika

# SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU

**(Affiliated toAdikaviNannaya University, Rajahmundry)**

**(Accredited with NAAC "B$^{+}$" Grade with 2.67 CGPA points)**

## DEPARTMENT OF HORTICULTURE

## LIST OF EXAMINERS & PAPER SETTERS

| | | | |
|---|---|---|---|
| 1 | Dr.BhupathiRayulu | Lecturer in HORTICULTURE | Government Degree College, kovur, W.G.Dt. Cell:9705377344 |
| 2 | Dr.A.SrinivasaRao | Lecturer in HORTICULTURE | Government Arts College rajhamundry– E.G.Dt Cell: 9985076306 |
| 3 | N.Nageswar Rao | Lecturer in HORTICULTURE | V.K.V.Govt Degree college, Kothapeta Cell: 9492122277 |
| 4 | AN.SUDHER BABU | Lecturer in HORTICULTURE | DRGGovernment Degree College, TADEPALLI GUDEM, W.G.Dt. Cell: 9640308447 |
| 5 | Dr.Y.Vijay kumar | Lecturer in HORTICULTURE | S.C.I.M Govt Degree & P.G College,Tanuku, W.G.Dt. Cell: 9398708355 |
| 6 | Smt. P.Sri Lakshmi | Lecturer in HORTICULTURE | S.V.K.P. & Dr.K.S.Raju A&S College, Penugonda, W.G.Dt. Cell: 9492164689 |
| 7 | Smt D.SANDYA RANI | Lecturer in HORTICULTURE | D.N.RCollege (A) BHIMAVARAM, W.G.Dt. Cell: 9704645858 |
| 8 | Dr.P.Prayaga Murthy | HOD in HORTICULTURE | Govt Degree College Yeleswaram, E.G.Dt Cell: 9885852068 |
| 9 | Dr.K.MallikarjunaRao | Lecturer in HORTICULTURE | Government Degree College kovur, W.G.Dt. Cell: 8985570508 |
| 10 | B.BUJJI BABU | Lecturer in HORTICULTURE | Government Arts College rajhamundry– E.G.Dt Cell:9948807896 |

Signatures of the BOS Committee Members:-

1. 4.

2. 5.

3. 6. 7.

# SRI A.S.N.M.GOVERNMENT COLLEGE(A),PALAKOLLU

(Affiliated toAdikaviNannaya University, Rajahmundry)
(Accredited with NAAC "B" Grade with 2.67 CGPA points)

## DEPARTMENT OF HORTICULTURE

### V SEMESTER

### BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS: 2021-22

| | Short Questions | | | Essay Questions | | |
|---|---|---|---|---|---|---|
| | NO OF QUESTIONS | MARKS ALLOTED | TOTAL MARKS | NO OF QUESTIONS | MARKS ALLOTED | TOTAL MARKS |
| UNIT -I | 01 | 5 | 5 | 02 | 10 | 10 |
| UNIT-II | 02 | 5 | 10 | 02 | 10 | 10 |
| UNIT-III | 02 | 5 | 10 | 02 | 10 | 10 |
| UNIT-IV | 02 | 5 | 10 | 02 | 10 | 10 |
| UNIT-V | 01 | 5 | 5 | 02 | 10 | 10 |

Section –A: Out of 8 Questions 5 has to be answered.

Section –B: Internal Choice (either / or) and 1 Question in each unit, 5 Questions has to be answered.

1. Essay Questions : 5 x 10 = 50
2. Short Questions : 5 x 5 = 25

Total : 75 Marks

Signatures of the BOS Committee Members:-

1. 13/9/23
2. 13/9/23
3. 13/9/2023
4.
5.
6.
7.
8. K. Mounika

# SRI A.S.N.M.GOVERNMENT COLLEGE (A)
# PALAKOL

## B.Sc - HORTICULTURE

## V SEMESTERS

## THEORY MODEL PAPER

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

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**SECTION-A (Short Answer Questions)**

***(Instructions to the paper setter: Set minimum ONE question from each unit,max Eight from all.)***

**Answer any *five* of the following questions** **5x5=25M**

1.
2.
3.
4.
5.
6.
7.
8.

**SECTION-B (Essay Questions)**

***(Instructions to the paper setter: Set minimum two questions from each unit, either or internal choice)***

**Answer *All* of the following questions** **5x10=50M**

9. a)

Or from unit I

b)

10.a)

Or from unit II

b)

11. a)

Or from unit III

b)

12. a)

Or from unit IV

b)

13. a)

Or from unit V

b)

**INTERNAL EXAMS** **- 25Marks**

**15** Marks for Midterm tests, 5 marks for Assignments and remaining **5** marks for Seminar etc.

# SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU

(Affiliated toAdikavi Nannaya University, Rajahmundry)
(Accredited with NAAC "B" Grade with 2.67 CGPA points)

## DEPARTMENT OF HORTICULTURE

## III&IV ,V SEMESTERS

### BLUE PRINT MODEL FOR INTERNAL EXAMINATIONS: 2023-24

| S.NO | TYPE OF QUESTION | QUESTIONS TO BE GIVEN | | | TO BE ANSWERED | | |
|---|---|---|---|---|---|---|---|
| | | NO OF QUESTIONS | MARKS | TOTAL MARKS | NO OF QUESTIONS | MARKS | TOTAL MARKS |
| 1 | ESSAY QUESTIONS | 3 | 5 | 5 | 1 | 5 | 5 |
| 2 | SHORT QUESTIONS | 7 | 2 | 10 | 5 | 10 | 10 |
| 3 | MULTIPLE QUESTIONS | 10 | 1/2 | 5 | 10 | 5 | 5 |
| | TOTAL | | | 20 | | | 20 |

Percentage of choice = 0

Assignments = 5 marks

Field trip/Seminars = 5 marks
Attendance /Clean and green = 5 marks

**Total = 15 marks**

Signatures of the BOS Committee Members:-

1. 13/9/23
2. 13/9/23
3. 13/9/2023
4.
5.
6.
7.
8. K. Mounika

# SRI A.S.N.M.GOVERNMENT COLLEGE(A),PALAKOLLU

**(Affiliated toAdikavi Nannaya University, Rajahmundry)**

**(Accredited with NAAC "B$^{+}$" Grade with 2.67 CGPA points)**

## DEPARTMENT OF HORTICULTURE

## III&IV SEMESTERS

### BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS: 2023-24

| | Short Questions | | | Essay Questions | | |
|---|---|---|---|---|---|---|
| | NO OF QUESTIONS | MARKS ALLOTED | TOTAL MARKS | NO OF QUESTIONS | MARKS ALLOTED | TOTAL MARKS |
| UNIT -I | 01 | 4 | 4 | 02 | 8 | 8 |
| UNIT-II | 02 | 4 | 4 | 02 | 8 | 8 |
| UNIT-III | 02 | 4 | 4 | 02 | 8 | 8 |
| UNIT-IV | 02 | 4 | 4 | 02 | 8 | 8 |
| UNIT-V | 01 | 4 | 4 | 02 | 8 | 8 |

Section –A: Out of 8 Questions 5 has to be answered.

Section –B: Internal Choice (either / or) and 1 Question in each unit, 5 Questions has to be answered.

1. Essay Questions : 5 x 8 = 40
2. Short Questions : 5 x 4 20

Total : 60 Marks

Signatures of the BOS Committee Members:-

1. 4.

2. 5.

3. 6.

7.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) HORTICULTURE SYLLABUS

## PAPER-III; SEMESTER- III

(W.e.f. 2021-22 Admitted Batch)

***Paper-III:*** **Basics of Vegetable Science (Olericulture)**

| B.Sc. | Semester - III | Credits: 4 |
|---|---|---|
| Course: 3 | Basics of Vegetable Science (Olericulture) | Hrs/Wk:04 |

**Learning Outcomes** On successful completion of this course, the students will be ableto

- Distinguish the growing of vegetables according to season and climate(k4)
- Apparise the on cultivation aspects of different vegetables(k5)
- Analyze the and explain the special intercultural operations done in vegetable crops(k4)
- Examine the morphology and taxonomy of different vegetable crops(k4)
- Examine the different varieties of vegetable crops(k4)
- Detect the diseases and pests of vegetable crops and their management(k4)

**Unit – 1 Introduction to Vegetable crops** **12 Hrs**.

1. Importance of vegetable cultivation in India and Andhra Pradesh.
2. Classification and Nutritive value of vegetables.
3. Area and production of vegetables in India and Andhra Pradesh.
4. Export and import potential of vegetables in India. Constraints in vegetable production and remedies to overcome them.

**Unit – 2 Solanaceous and Leafy vegetables** **12 Hrs**.

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops

Cultivation of (a) Brinjal (b) Tomato (c) Capsicum (d) Spinach (c) Coriander and (d) Mentha

**Unit – 3 Root and Tuber crops** **16 Hrs**.

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops

Cultivation of (a) Carrot (b) Beet root (c) Tapioca and (d) Colocasia

**Unit – 4 Cole crops** **08 Hrs**.

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops

Cultivation of (a) Cabbage and (b) Brocolli

**Unit – 5 Leguminous vegetables** **12 Hrs**.

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops

Cultivation of (a) Cluster bean (b) Cow pea and (d) Dolichos

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) HORTICULTURE SYLLABUS

## PAPER-III; SEMESTER- III

(W.e.f. 2021-22 Admitted Batch)

***Paper-I:*** **Basics of Vegetable Science (Olericulture)**

| B.Sc. | Semester - III | Credits: 1 |
|---|---|---|
| Course: 3(L) | Basics of Vegetable Science (Olericulture) | Hrs/Wk: 02 |

**Course outcomes** On successful completion of this course, the students shall be able to

- Practice various tests for seed germination, viability and vigour.(k3)
- Make observations and record data on various growth stages of a given vegetable plant. .(k6)
- Detect the pathogens and suggest control measures for diseases of vegetable crops. .(k4)
- Practice suitable irrigation and fertigation methods for various horticulture crops. .(k3)

1. Demonstration of seed germination test for a vegetable seed.
2. Demonstration of seed viability test.
3. Identification of vegetable seeds and vegetable crops at different growth stages.
4. Preparing vegetable nursery beds.
5. Raising vegetable seedlings in nursery bed and portrays.
6. Identification of major diseases and insect pests of vegetables.
7. Land preparation for sowing transplanting of vegetable crops.
8. Sowing transplanting of vegetables in main field.
9. Fertilizer application for vegetable growing.
10. Irrigation practices in a vegetable crop field.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) HORTICULTURE SYLLABUS (w.e.f: 2020-21 A.Y)

## PAPER-III; SEMESTER- III

**Model Question Paper for Practical Examination**

**III Semester /Horticulture Core Course – 3**

**Basics of Vegetable Science (Olericulture)**

Max. Time 3 Hrs. Max. Marks 50

1. Demonstration of seed germination viability test (A). 10 M
2. Demonstration of preparing nursery bed cultivation practice for a vegetable crop (B). 10 M
3. Identification of material (C & D -Vegetable plants) and writing scientific name, family and uses. 2 x 4 = 8 M
4. Identification of a disease on vegetable plant (E) 4 M
5. Identification and comment on a cultivation practice (F) 4 M
6. Record + Viva Voice 10 + 4 = 14 M

**Text books**


- **Bose T K et al. (2003)** Vegetable crops, Naya Udhyog Publishers, Kolkata.
- **Singh D K (2007**) Modern vegetable varieties and production, IBN Publisher Technologies, International Book Distributing Co, Lucknow.
- Premnath, Sundari Velayudhan and D P Sing (1987) Vegetables for the tropical region, ICAR, New Delhi


**Suggested co-curricular activities for Horticulture Core Course -3 in Semester- III**

**A. Measurable**

**a. Student seminars**

1. Production technology of solanaceous crops.
2. Production technology of leafy vegetables.
3. Production technology of root and tuber crops.
4. Production technology of cole crops.
5. Production technology of leguminous crops.
6. Special intercultural operations in vegetable crops.
7. Major pests and diseases of vegetable crops and their management.
8. Morphological characters of vegetable crops.
9. Maturity and harvesting indices of vegetable crops.
10. Nutritional aspects of vegetable crops.

**b. Student Study Projects**

1. A report on vegetable crops in a locality.
2. Collection and preparation of herbarium of vegetable crops in their locality.
3. A report on various inter-culture practices for a vegetable crop.
4. Study report on nutritional disorders of vegetable crops in a locality.
5. Study report on diseases of vegetable crops in a locality.
6. A report on harvest to marketing for a vegetable crop.
7. A report on use of fertilizers, pesticides and herbicides in a local vegetable crop field.
8. Report on economics of a vegetable crop in their locality.
9. A study report on irrigation practices for vegetable crops in an area.

c. Assignments Written assignment at home during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

**B. General**

1. Group Discussion (GD) Quiz Just A Minute (JAM) on different modules in syllabus of the course.

1. Visit to Horticulture University Research Station to learn about various vegetable crops.

3. Visit to a vegetable nursery and vegetable crop field.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) HORTICULTURE SYLLABUS

## PAPER-IV; SEMESTER- IV

(W.e.f. 2021-22 Admitted Batch)

***Paper-IV :*** **Basics of Fruit Science (Pomology)**

| B.Sc. | Semester - IV | Credits: 4 |
|---|---|---|
| Course: 4 | Basics of Fruit Science (Pomology) | Hrs/Wk:04 |

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

- Evaluate the value of fruits in terms of human nutrition and economy of nation. (k5)
- Categorize the fruiting plants based on temperature requirements. (k4)
- Demonstrate the special intercultural operations done in fruit crops .(k3)
- Examine the pests and diseases of fruit crops and develop skills to manage the same .(k4)
- Develop knowledge on various entrepreneurial skills related to fruit science. (k6)

**Unit – 1 Introduction to Fruit crops** **12 Hrs.**

1. Importance of fruit growing in India and Andhra Pradesh.
2. Nutritive value of fruits.
3. Area and production of India and Andhra Pradesh.
4. Export and import potential of fruits in India. Constraints in fruit production and remedies to overcome them.

**Unit – 2 Tropical Fruit Crops** **12 Hrs.**

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield, diseases and pests of the following tropical fruit crops

(a) Mango (b) Guava and (c) Papaya

**Unit – 3 Sub-tropical and temperate fruit crops** **12 Hrs**.

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield, diseases and pests of the following sub-tropical and temperate fruit crops

(a) Grapes (b) Pomegranate (c) Citrus and (d) Apple

**Unit – 4 Arid and minor fruit crops** **12 Hrs.**

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, inter cropping, harvesting and yield, diseases and pests of the following arid fruit crops

(a) Amla (b) Dates and (c) Wood apple

**Unit – 5 Management practices for fruit crops** **12 Hrs.**

1. Sustainable Production Practices for Local Fruit Production.
2. Integrated Orchard ManagementPrinciples of IPM.
3. Harvesting and Labor Concerns
4. Grading, packing, storage and marketing of fruits.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) HORTICULTURE SYLLABUS

## PAPER-IV; SEMESTER- IV

(W.e.f. 2021-22 Admitted Batch)

***Paper-I:*** **Basics of Fruit Science (Pomology)**

| B.Sc. | Semester - IV | Credits: 1 |
|---|---|---|
| Course: 4(L) | **Basics of Fruit Science (Pomology) Lab** | Hrs/Wk:02 |

**Course Outcomes** On successful completion of this course, the students shall be able to .(k4)

- Detect different varieties of tropical, sub-tropical and temperate fruit crops. (k5)
- Assess and apply required dosage of fertilizermanurebiofertilizer for a fruit crop. (k3)
- Use required PGR to check the leaf fall, flower fall and fruit fall in a crop species. (k3)
- Detect pest and diseases of various fruit crops and suggest control measures. (k4)

1. Study of varieties of Mango, Papaya and Guava.
2. Study of varieties of Grape, Pomegranate, Citrus and Apple.
3. Study of varieties of Amla, Dates and Wood apple.
4. Manure and fertilizer application including biofertilizers in different fruit crops.
5. Methods of application, calculation of the required quantity of manure and fertilizers based on the nutrient content.
6. Use of growth regulators in fruit crops.
7. Identification and collection of important pests in fruit crops.
8. Identification and collection of important diseases in fruit crops and herbarium preparation.
9. Visit to a local fruit marketcommercial orchard.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) HORTICULTURE SYLLABUS (w.e.f: 2020-21 A.Y)

## PAPER-IV; SEMESTER- IV

**Model Question Paper for Practical Examination**

**IV Semester /Horticulture Core Course – 4**

**Basics of Fruit Science (Pomology)**

Max. Time 3 Hrs. Max. Marks 50

1. Describing cultivation practice for a fruit crop. 10 M
2. Identification with remarks on Mango GuavaPapaya variety. 5 M
3. Identification with remarks GrapePomegranateCitrusApple variety. 5 M
4. Identification with remarks Amla, Dates and Wood apple. 5 M
5. Identify the disease and pest symptoms and write its causal organism. 2 x 5 = 10 M
6. Record + Viva Voice 10 + 5 = 15 M

**Text books**


- **Chattopadhyay, T.K.** 1997. Text book on Pomology (Fundamentals of fruit growing), Kalyani Publishers, Hyderabad.
- **Chundawat**, B.S. 1990. Arid Fruit Culture, Oxford and IBH, New Delhi.
- **Gourley J H 2009**. Text book of Pomology, Read Books Publ., Canada


**Suggested co-curricular activities for Horticulture Core Course - 4 in Semester- IV**

**A. Measurable**

**a. Student seminars**

1. Nutritional value of fruits growing in India and Andhra Pradesh
2. Production technology of major tropical fruit crops
3. Production technology of major tubtropical and temperate fruit crops
4. Production technology of major arid and minor fruit crops
5. Special intercultural operations in fruit crops
6. Intercropping in fruit crops.
7. Methods of irrigation of fruit crops.
8. Methods of fertilizer application of fruit crops.
9. Major pests and diseases of fruit crops and their management.
10. Maturity and harvesting indices of fruit crops.
11. Principles of Integrated Orchard Management (IOM).

**b. Student Study Projects**

1. A report on vegetable crops in a locality.
2. Collection and preparation of herbarium of fruit crops in their area.
3. A report on various inter-culture practices for a fruit crop.
4. Study report on nutritional disorders of fruit crops in a locality.
5. Study report on diseases of fruit crops in a locality.
6. A report on use of fertilizers, pesticides, herbicides and PGRs for local fruit crops.
7. A report on harvest to marketing for a fruit crop.
8. Report on economics of a fruit crop in their locality.
9. A study report on different methods of irrigation of fruit crops in a locality.

c. Assignments Written assignment at home during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

**B. General**

1. Group Discussion (GD) Quiz Just A Minute (JAM) on different modules in syllabus of the course.
2. Visit to Horticulture University Research Station Commercial Orchard.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) HORTICULTURE SYLLABUS

## PAPER-V; SEMESTER- IV

(W.e.f. 2021-22 Admitted Batch)

***Paper-V :*** **Pests and diseases of Horticulture plants and their Management**

| B.Sc. | Semester - IV | Credits: 4 |
|---|---|---|
| Course: 5 | Pests and Diseases of Horticulture Plants and their Management | Hrs/Wk:04 |

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

- Develop a critical understanding of insect pests and plant disease symptoms. (k6)
- Examine and identify the pests and diseases of Vegetable , ornamental crops and their management(k4)
- Examine and identify the pests and diseases of fruit crops and their management(k4)
- Detect and classify various insect pests on horticulture plants. (k4)
- Categorize the pesticides based on use, chemical nature, formulation, toxicity and action. (k4)

**Unit – 1 Basics of Entomology and Plant Pathology** **12 Hrs.**

1. Classification of Insects up to orders and families of economic importance; Study of insect pests (Distribution, host range, biology, nature of damage and management) in horticultural crops.
2. Disease triangle and disease pyramid; Plant Pathology Definition
3. A general account on symptoms of plant diseases caused by Viruses and Bacteria.
4. A general account on symptoms of plant diseases caused by Fungi.

**Unit – 2 Pests and diseases of Vegetables crops** **12 Hrs.**

1. Bhendi Spotted boll worms, Red cotton bug, Yellow vein mosaic.
2. Cucurbits Fruit flies, Pumpkin beetles; Downy and powdery mildews.
3. Potato Potato tuber moth, Golden cyst nematode; Late blight.
4. Sweet Potato Sweet potato weevil, Vine borer; Mottled necrosis.

**Unit – 3 Pests and diseases of Fruit crops** **12 Hrs.**

1. Coconut .Rhinoceros beetle, Burrowing nematode; Ganoderma root rot, Grey blight
2. Banana Banana weevil, banana aphids; Panama wilt. Bunchy top
3. Cashew Tea mosquito bug. Cashew stem borer; Anthracnose, 2.Pink disease
4. Custard apple Mealy bug, Fruit boring caterpillar; Anthracnose, Glomerella fruit rots.

**Unit – 4 Pests and diseases of Commercial Flower crops** **12 Hrs.**

1. Rose Rose aphid,Dieback, and black spot
2. Marigold Aphids, leaf spot, and bud rot
3. Gerbera Thrips, white flies and Blossom blight
4. Gladiolus Cut worms, leaf eating caterpillar and corm rot.

**Unit – 5 Management of Pests and Diseases** **12 Hrs**.

1. Principles and methods of plant disease management.
2. Integrated Plant disease management.
3. Fungicides classification based on chemical nature; commonly used insecticides, fungicides, bactericides and nematicides.
4. Preparation of fungicidal solutions, slurries, pastes and their application.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) HORTICULTURE SYLLABUS

## PAPER-V; SEMESTER- IV

(W.e.f. 2021-22 Admitted Batch)

***Paper-I:*** **Pests and diseases of Horticulture plants and their Management**

| B.Sc. | Semester - IV | Credits: 1 |
|---|---|---|
| Course: 5(L) | Pests and Diseases of Horticulture Plants and their Management lab | Hrs/Wk:02 |

**Course Outcomes** On successful completion this course, the students shall be able to

- Detect the insect pests and microbial pathogens on various horticulture plants. (k4)
- Detect the disease symptoms and attribute them to a pest or a microbe. (k4)
- Rate of application of a pesticide fungicide to control the diseases in horticulture plants. (k5)

1. Study of characteristics of insect pests, microbial pathogens, nematodes causing diseases on different plants given in the theory syllabus.
2. Identification of disease symptoms on different plants given in the theory syllabus.
3. Observing and acquiring knowledge on pesticides, fungicides etc.,
4. Acquaintance with methods of application of common fungicides.
5. Field visit and acquaintance with disease of crops

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) HORTICULTURE SYLLABUS (w.e.f: 2020-21 A.Y)

## PAPER-V; SEMESTER- IV

**Model Question Paper for Practical Examination**
**IV Semester /Horticulture Core Course – 5**
**Pests and diseases of Horticulture plants and their Management**

1. Identify and comment on insect diseases A & B 2 x 5 = 10 M
2. Identify and comment on microbial diseases C & D 2 x 5 = 10 M
3. Identify and comment on nematodal diseases E & F 2 x 5 = 10 M
4. Identify and comment on Pesticide/ Fungicides G & H2 × 4 = 6 M
5. Record + Herbarium + Viva Voice 10 + 4= 14 M

Text books :


- Verma L R and R C Sharma 1999. Diseases of Horticultural Crops – Fruits, Indus Publishing, New Delhi.
- Diseses of Horticulture Crops and their management, TNAU Publ. Agrimoon.Com
- Jagatap G P, D N Dhutraj and Utpal Dey. 2001. Diseases of Horticultural crops and their management, Agrobios Publication


**Suggested co-curricular activities for Semester- V :**

**A. Measurable :**

**a. Student seminars :**

1. Disease symptoms and their management of vegetable crops
2. Disease symptoms and their management of ornamental crops
3. Disease symptoms and their management of fruit crops
4. Disease symptoms of nematode and their management in horticultural crops
5. Role of Integrated Pest Management (IPM) in horticultural crops
6. Role of Integrated Disease Management (IDM) in horticultural crops
7. Classification of insecticides
8. Classification of fungicides

**b. Student Study Projects:**

1. Identification and herbarium preparation of disease symptoms of vegetable crops
2. Identification and herbarium preparation of disease symptoms of ornamental Crops
3. Identification and herbarium preparation of disease symptoms of fruit crops
4. Preparation of laminated photos of major diseases of horticultural crops
5. Preparation of laminated photos of major fungicides used in horticultural crops
6. Preparation of laminated photos of major insecticides used in horticultural crops

c. Assignments: Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

**B. General :**

1. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.
2. Visit to Horticulture University/ Research Station/Horticultural fields.
3. Visit to Pesticide industries/shops

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## III B.Sc - (CBCS) HORTICULTURE SYLLABUS

## PAPER-VI; SEMESTER- V

(W.e.f. 2021-22 Admitted Batch)

***Paper-VI:*** Dryland Horticulture

| B.Sc. | **Semester - V**(Skill Enhancement Course- Elective) | **Credits: 4** |
|---|---|---|
| **Course: 6** | Dryland Horticulture | **Hrs/Wk:04** |

**Learning Outcomes:**

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

1. Understand the basic concepts of dryland horticulture and its prospects.
2. Acquire skills in relation to management of soil and water in dryland farming.
3. Demonstrate skills on various methods to check the water loss during farming.
4. Understand the cultivation practices of certain crops suitable for dryland farming.

Syllabus: (Hours: Teaching: 50, Lab: 30, Training: 05, Others incl. unit tests: 05)

(Syllabi of theory and practical together shall be completed in 80 hours)

**UNIT I: Introduction to Dryland horticulture (10h)**

1. Definition, importance and limitation of dry land horticulture.
2. Present status and future scope. Constraints encounter in dry lands.
3. Agro-climatic features in rain shadow areas, scares water resources, high temperature, soil erosion, run-off losses etc.

**UNIT II: Soil and water management (10h)**

1. Techniques and management of dry land horticulture: watershed development, soil and water conservation methods-terraces, contour bunds, etc.
2. Methods of control and impounding of run-off water-farm ponds, trenches, macro catch pits,etc.
3. in-situ water harvesting methods, micro catchment, different types of tree basins etc.

**UNIT III: Methods for efficient water use (10h)**

1. Methods of reducing evapotranspiration, use of shelter belts, mulches, antitranspirants, growth regulators, etc.
2. Water use efficiency-need based, economic and conjunctive use of water, Micro systems of irrigation etc. IFS concept and alternate land use systems.
3. in-situ water harvesting methods, micro catchment, different types of tree basins etc.

**UNIT IV: Modern methods of irrigation (10h**)

1. Characters, special adaptation and cultivation practices of following horticultural crops:

(a) Ber (b) Annona (c) Pomegranate (d) Tamarind

**UNIT V: Water management (10h)**

1. Characters, special adaptation and cultivation practices of following horticultural crops:

Fig (b) Wood apple (c) Marking nut (d) Carambola

REFERENCES:

1. Chadha, K. L. (ICAR)2002, 2001.Hand book of Horticulture. ICAR, New Delhi
2. Chundawat, B.S. 1990. Arid Fruit Culture. Oxford and IBH, New Delhi.
3. P.L. Taroj, B.B. Vashishtha, D.G.Dhandar. 2004. Advances in Arid Horticulture. Internal Book Distributing Co., Lucknow.
4. T. Pradeep Kumar, B. Suma, Jyothi Bhaskarand K.N.Sathesan. 2008. Management of

Horticultural Crops. New India Publishing Agency.

Co-Curricular Activities (student field training by teacher: 05 hours):

a) Mandatory:

1. For Teacher: Training of students by the teacher in the classroom or in the laboratory for a total of not less than 10 hours on watershed development, soil and water conservation methods, Micro systems of irrigation etc.
2. For Student: Individual laboratory work and visit to a Horticulture University/ college, sites of dryland farming, studying the water management, characteristics of plants grown in dryland areas, cultivation practices; culminating writing and submission of a hand-written Field Work Report (various crop plants, yield, economics) not exceeding 10 pages in the given method or format.
3. Max marks for Field Work Report: 05
4. Suggested Format for Field work Report (not exceeding 10 pages): Title page with student details, index page, objective, stepwise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like water management practices in dryland areas, methods of controlling evapotranspiration, cultivation practices for plants grown in drylands etc.,).
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on methods and management practices for horticulture crops in INM and IPNM.
5. Collection of material/figures/photos related to dryland horticulture crops in India and abroad, writing and organizing them in a systematic way in a file.
6. Visits to irrigation facilities in a Horticulture University or college and/or dryland crop fields.
7. Invited lectures and presentations on related topics by field/industrial experts.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## III B.Sc - (CBCS) HORTICULTURE SYLLABUS

## PAPER-VI; SEMESTER- V

(W.e.f. 2021-22 Admitted Batch)

***Paper-VI:*** Dryland Horticulture

| B.Sc. | **Semester - V**(Skill Enhancement Course- Elective) | **Credits: 1** |
|---|---|---|
| **Course: 6** | Dryland Horticulture Lab | **Hrs/Wk:03** |

**Learning Outcomes:**

On successful completion of this practical course, student will be able to:

1. Study the rainfall pattern and water deficit conditions in an area.
2. Perform skills on harvesting and conservation of rain water.
3. Identify the adaptation of plants to dryland areas.
4. Perform skills related to irrigation methods suitable to dryland areas.
5. Perform skills on checking evapo-transpiration.

**Practical (Laboratory) Syllabus: (30 hrs)**

1. Study of rainfall patterns.
2. Practicing contour bunding and trenching.
3. Studying micro catchments.
4. Studying soil erosion and its control in a dryland area.
5. Study of evapotranspiration and methods to control.
6. Practicing mulching methods.
7. Irrigation systems - Surface, Sub-surface; micro irrigation methods.
8. Study of special techniques of planting and aftercare in dry lands.
9. Study special horticultural practices in dry land plants.
10. Training and pruning in dry land plants.
11. Study of morphological and anatomical features of drought tolerant fruit crops.
12. Study of morphological and anatomical features of salinity tolerant fruit crops.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## II B.Sc - (CBCS) HORTICULTURE SYLLABUS (w.e.f: 2020-21 A.Y)

## PAPER-VI ; SEMESTER- V

**Model Question Paper for Practical Examination**

**V Semester /Horticulture Core Course – 6**

**Dryland Horticulture**

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

1. Demonstration of skills on studying rain fall/ contour bunding or trenching ' A' 8
2. Demonstration of methods of controlling evapotranspiration/ layout of micro-irrigation systems 'B' 10
3. Anatomical features of a drought or salinity tolerant plant 'C' 12
4. Scientific observation and data analysis 4 x 3 = 12

D. Water harvesting method

E. Soil erosion/control method

F. Irrigation practice in dryland area.

G. Morphological features of a plant adapted to dryland farming

5. Record + Viva-voce 5 + 3 = 8

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## III B.Sc - (CBCS) HORTICULTURE SYLLABUS

## PAPER-VII; SEMESTER- V

(W.e.f. 2021-22 Admitted Batch)

***Paper-VII:*** **Plantation crops**

| B.Sc. | **Semester - V**(Skill Enhancement Course- Elective) | Credits: 04 |
|---|---|---|
| Course: 7 | **Plantation crops** | Hrs/Wk:03 |

**Learning Outcomes:**

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

1. Examine the characteristics of plantation crops. (K4)
2. Evaluate the contribution of plantation crops in national economy. .(K5)
3. Illustrate the soil and climatic requirements of some important plantation crops in India. (K3)
4. Demonstrate managerial skills on farming, reaping the products and post-harvest practices in relation to plantation crops. (K3)
5. Detect the physiological disorders, pests and diseases of plantation crops. (K4)

**Syllabus:** (Hours: Teaching: 50, Lab: 30, Training: 05, Others incl. unit tests: 05)

(Syllabi of theory and practical together shall be completed in 80 hours)

**UNIT I: Introduction to Plantation crops** **(10h)**

1. Plantation crops: Definition, history and development, scope and importance; Differences between plantation and fruit crops
2. Area and production, export and import potential, role in national and state economy.
3. Important research stations on plantation and beverage crops and their role.

**UNIT II: Oil yielding crops** **(10h)**

1. Soil, climate requirements, varieties, propagation methods, cultivation practices, physiological disorders, pests, diseases and their management, post-harvest technology, yield and economics of:

(a) Coconut (b) Oil palm

**UNIT III: Masticatory crops** **(10h)**

1. Soil, climate requirements, varieties, propagation methods, cultivation practices, physiological disorders, pests, diseases and their management, post-harvest technology, yield and economics of:

(a) Areca nut (b) Betel vine

**UNIT IV: Beverage crops** **(10h)**

1. Soil, climate requirements, varieties, propagation methods, cultivation practices, physiological disorders, pests, diseases and their management, post-harvest technology, yield and economics of:

(a) Coffee (b) Cacao

**UNIT V: Nut and Industrial crops** **(10h)**

1. Soil, climate requirements, varieties, propagation methods, cultivation practices, physiological disorders, pests, diseases and their management, post-harvest technology, yield and economics of:

(a) Cashew nut (b) Rubber

**REFERENCES:**

1. Chadha,K.L. (ICAR)2002,2001.Hand book of Horticulture. ICAR, New Delhi
2. Kumar, N.J.B. M. Md. Abdul Khaddar, RangaSwamy, P. and Irrulappan, I. 1997. Introduction to spices, Plantation crops and Aromatic plants. Oxford & IBH, New Delhi.
3. Meena, S.R. 2020. Production technology for fruit and plantation crops. TNAU, Coimbatore,

**Co-Curricular Activities (student field training by teacher: 05 hours):**

**a) Mandatory**:

**1. For Teacher**: Training of students by the teacher in the classroom or in the laboratory for a total of not less than 10 hours on identification of varieties, propagation methods, physiological disorders, pests and diseases of plantation crops etc.

**2. For Student**: Individual laboratory work and visit to a Horticulture University/ college, fields of plantation crops, studying the cultivation practices; post-harvest methods, study of economics etc., culminating writing and submission of a hand-written Field Work Report (various crop plants, yield, economics) not exceeding 10 pages in the given method or format.

3. Max marks for Field Work Report: 05

4. Suggested Format for Field work Report (not exceeding 10 pages): Title page with student details, index page, objective, stepwise work done, findings, conclusions and acknowledgements.

5. Unit tests (IE).

**b) Suggested Co-Curricular Activities**

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like traditional and modern methods of cultivation, water management, weed management, disease management etc., for important plantation crops in India).
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on methods and management practices for plantation crops in INM and IPNM.
5. Collection of material/figures/photos related to plantation crops in India and abroad, writing and organizing them in a systematic way in a file.
6. Visits to irrigation facilities in a Horticulture University or college and/or plantation crop fields.
7. Invited lectures and presentations on related topics by field/industrial experts.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## III B.Sc - (CBCS) HORTICULTURE SYLLABUS

## PAPER-VII; SEMESTER- V

(W.e.f. 2021-22 Admitted Batch)

***Paper-VII:*** **Plantation crops Lab**

| B.Sc. | **Semester - V**(Skill Enhancement Course- Elective) | **Credits: 1** |
|---|---|---|
| **Course: 7** | **Plantation crops Lab** | **Hrs/Wk:03** |

**Learning Outcomes:**

On successful completion of this practical course, student will be able to:

1. Detect the plantation crops and their varieties.(k4)
2. Make layout of orchards of plantation crops. .(k6)
3. Practice skills on propagation technics of plantation crops. .(k3)
4. Detect the physiological disorders of plantation crops. .(k4)
5. Detect the pests and diseases of plantation crops. .(k4)

**Practical (Laboratory) Syllabus: (30 hrs**)

1. Identification and description of plantation crops and their varieties.
2. Designing and making layout of orchards.
3. Propagation methods and nursery techniques of plantation crops.
4. Studying physiological disorders of plantation crops.
5. Studying pests of plantation crops.
6. Study of diseases of plantation crops
7. Preparation of plant bio regulators and their uses.
8. Tapping and processing of latex in rubber.
9. Study special horticultural practices in dry land plants.
10. Training and pruning in Plantation crops.
11. Study of morphological and anatomical features of plantation crops.
12. Study of morphological and anatomical features of planattion crops.

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

## III B.Sc - (CBCS) HORTICULTURE SYLLABUS (w.e.f: 2020-21 A.Y)

## PAPER-VII ; SEMESTER- V

**Model Question Paper for Practical Examination**

**V Semester /Horticulture Core Course – 7**

**Plantation crops**

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

| | |
|---|---|
| 1. Making a layout of an orchard for a plantation crop 'A' | 8 |
| 2. Demonstration of a propagation technic of a given plantation crop 'B' | 10 |
| 3. Identification of Pests/diseases of a plantation crop 'C' | 12 |
| 4. Scientific observation and data analysis | 4 x 3 = 12 |
| D. Identification of variety of a plantation crop | |
| E. Propagation technique | |
| F. Physiological disorder/pest/disease | |
| G. Morphological/anatomical features of a plantation crop | |
| 5. Record + Viva-voce | 5 + 3 = 8 |

# SRI A.S.N.M.GOVERNMENT COLLEGE (A) PALAKOL

**I B.Com,B.A - (CBCS) Multidisciplinary Courses**

**PAPER-I; SEMESTER- I**

(W.e.f. 2023-24 Admitted Batch)

PRINCIPLES OF BIOLOGICAL SCIENCES

Credits: 2

2 hrs/week

**COURSE OBJECTIVES :**

By the end of this course the learner can:

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

**COURSE OUT COMES :**

On completion of this course students will be able to:

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

**UNIT-I Diversity of Life :**

1.1 Introduction to Biology, Branches of Biology, Basic Principles of Biology

1.2 Biological Classification-Two kingdom and Five kingdom classification, Viruses, Viroid's and Lichens

1.3 Diversity in the living world, Taxonomic categories, Taxonomic aids

1.4 Plant organization-The form, structure and function of plant vegetative and reproductive organs, Classification of Plant Kingdom,

1.5 Basis of Animal Classification, Classification of Animal Kingdom

**UNIT-II Biomolecules and metabolisim :**

2.1 Ultra structure of cell and Cell organelles (Structure and Functions), Plant cell vs Animal cell

2.2 Plant Physiology: Photosynthesis, Respiration, Transportation, Mechanisms of Nitrogen fixation.

2.3 Plant growth and development, physiology of flowering.

2.4 Human Physiology: Digestion, Respiration, Circulation

2.5 Male and female reproductive organs, gametogenesis, fertilization.

**UNIT-III Principles of Biology:**

3.1 Genetics: Mendel's laws of inheritance, Genetic disorders- Colour blindness, Sickle cell anaemia.

3.2 Evolution: Geological time scale for evolution of plants and vertebrates, Origin and evolution of plants and man

3.3 Common Human Diseases: causing organism, prevention and treatment- malaria, dengue, AIDS, cancer, corona.
3.4 Common Plant Diseases: causing organism, prevention and treatment- Black spot, Leaf spots, Powdery mildew, Blight, Canker.
3.5 Biotechnology: Tools and process of recombinant DNA technology, Applications of biotechnology in agriculture, food industry, medicine and transgenic animals

**Text Books:**

1. Pandey, B.P. (2013) College Botany, Volume-I, S. Chand Publishing, New Delhi.

2. Kotpal, R.L.2022. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut).

3. Verma P.S., Agarwal V.K., 2006. Cell biology, genetics, Molecular Biology, Evolution and Ecology. S. Chand publishers, New Delhi, India.

**Reference Books:**

1. Sreekrishna V. 2005. Biotechnology –I, Cell Biology and Genetics. New Age International Publ. New Delhi, India.

2. Rastogi, S.C., 2019. Essentials of animal physiology. 4th Edition. New Age International Publishers

# SRI A.S.N.M.GOVERNMENT COLLEGE (A)
# PALAKOL

## II B.Sc – HORTICULTURE

Botany EXAMINATIONS - MODEL PAPER

(W.e.f. 2022-23 Admitted Batch)

PAPER –IIISEMESTER –III

***Paper*-III : Basics of Vegetable Science (Olericulture)**

Time: 3Hrs. Max. Marks: 60

**SECTION – A**

**I . Answer any FIVE of the following questions. Each question carries 4 marks. (5 X 4M = 20M)**

1. Nutritive value of vegetables
2. Constraints in vegetable production
3. Morphology and taxonomy of Brinjal
4. Climate and soil for carrot
5. Intercultural operations in Tapioca
6. Diseases of Cabbage and their control
7. Morphology and taxonomy of Cluster bean
8. Climate and soil for Cluster bean

**SECTION – B**

**II. Answer ALL the questions. Each question carries 10 marks. (5 X 10M = 50M)**

9. A)Discuss the importance of vegetable cultivation in India and Andhra Pradesh.

(OR)

B)Explain the export and import potential of vegetables in India.

10. A)Describe the cultivation practices for Tomato.

(OR)

B)Describe the cultivation practices for Mentha.

11. A) (a) Varieties of Carrot (b) Varieties of Tapioca

(OR)

B)Write an essay on cultivation practices for Colocasia.

12. A) (a) Morphology and taxonomy of Cabbage (b) Varieties of Cauliflower

(OR)

B)Discuss the cultivation practices for Cabbage.

13. A) (a) Morphology and taxonomy of Dolichos (b) Diseases of Dolichos and their control

(OR)

B) Discuss the cultivation practices for Cowpea

# SRI A.S.N.M.GOVERNMENT COLLEGE (A)
# PALAKOL

## II B.Sc – HORTICULTURE

Botany EXAMINATIONS - MODEL PAPER

(W.e.f. 2022-23 Admitted Batch)

PAPER –IV SEMESTER –IV

***Paper*-IV : Basics of Fruit Science (Pomology)**

Time: 3Hrs. Max. Marks: 60

**SECTION – A**

**I .Answer any FIVE of the following questions. Each question carries 4 marks. (5 X 4M = 20M)**

1. Importance of fruit growing in India
2. Constraints in fruit production and remedies to overcome them.
3. (a) Varieties of Mango (b) Varieties of Papaya
4. (a) Soil for Grapes (b) Soil for Apple
5. (a) Climate for Pomegranate (b) Climatic requirements for Citrus
6. (a) Propagation of Amla (b) Propagation of Wood apple
7. Principles of IPM
8. Storage of fruits

SECTION – B

Answer ALL the questions. Each question carries 10 marks. (5 X 10M = 50M)

9. A)Describe the nutritive value of fruits.

(OR)

B) Give an account on area and production of fruit crops in India and Andhra Pradesh.

10. A)Discuss the cultivation practices of Mango.

(OR)

B) (a) Soil and climate for Guava (b) Diseases and pests of Guava

11. A) (a) Soil and climate for Apple (b) Diseases and pests of Apple

(OR)

B) Discuss the cultivation practices of Grapes.

12. A) (a) Soil and climate for Dates (b) Diseases and pests of Dates

(OR)

B)Discuss the cultivation practices of Amla.

13. A) Write an essay on sustainable production practices for local fruit production.

(OR)

B)Discuss about Integrated Orchard Management

# SRI A.S.N.M.GOVERNMENT COLLEGE (A)
# PALAKOL

## II B.Sc – HORTICULTURE

Botany EXAMINATIONS - MODEL PAPER

(W.e.f. 2022-23 Admitted Batch)

PAPER –V SEMESTER –IV

***Paper*-V: Pests and diseases of Horticulture plants and their Management**

Time: 3Hrs. Max. Marks: 60

**SECTION – A**

**I .Answer any FIVE of the following questions. Each question carries 4 marks. (5 X 4M = 20M)**

1. (a) Disease triangle (b) Disease pyramid
2. Any two symptoms of Bacterial diseases in plants
3. Yellow vein mosaic of Bhendi
4. Late blight of Potato
5. Ganoderma root rot
6. Cashew stem borer
7. Rose aphid
8. Nematicides

**SECTION – B**

Answer ALL the questions. Each question carries 10 marks. (5 X 10M = 50M)

9. A)Give a general account on symptoms of plant diseases caused by Viruses.

(OR)

B)Write an essay on classification of Insects up to orders and families of economic importance.

10. A)Discuss the pests and disease of Cucurbits.

(OR)

B)Discuss the pests and disease of Sweet potato.

11. A)Describe the pests and disease of Banana.

(OR)

B)Describe the pests and disease of Custard apple.

12. A)Write an essay on pests and disease of Marigold.

(OR)

B)Write an essay on pests and disease of Gladiolus.

13. A)Discuss the principles and methods of plant disease management.

(OR)

B)Describe the preparation of fungicidal solutions, slurries, pastes and their application

**SRI A.S.N.M. GOVERNMENT COLLEGE(A), PALAKOL, W.G. DT**
**(Affiliated to Adikavi Nannaya University, Rajahmundry)**
**DRYLAND HORTICULTURE THEORY MODEL PAPER**
**B.Sc. (W.E.F 2021-22 Batch)**

# V.SEMISTER

**Time : 3 hrs** **Max. Marks : 60**

## SECTION –A(Short answer Questions)

**(Instructions to the Paper setters: set minimum ONE question from each unit, Eight from all)**

**Answer any FIVE of the following 5x4 = 20 Marks**

1. Soil erosion
2. Run off lossers
3. Trenches
4. In-situ water harvesting method
5. Growth Regulators
6. Micro catchments
7. Annona
8. Carambolla

## SECTION – B(Essay questions)

**(Instructions to the Paper setters: set minimum TWO question from each unit, either or internal choice)**

**Answer ALL the questions each question carries 10 marks 5x8=40 Marks**

**9. a)**Defined, importance limitations of dry land horticulture

(OR)

**b)** Present status and future scope. constraints encounter in dry lands

**10. a)**Techniques and management of dry lands horticulture: watershed development , soil and water conservation methods – terrace, contour bunds etc.

(OR)

**b)** In-situ water harvesting methods, micro catchments, different types of tree basins etc.

**11. a)**Methods of reducing evapotranspiration, use of shelter belts, mulvhes, anti transparent, growth regulators etc.

(OR)

**b)** In-situ water harvesting methods, micro catchments, different type of tree basins etc.

**12. a)**characters ,special adaptations and cultivation practices of the Ber crop.

(OR)

**b)** Characters, special adaptations and cultivation practices of the Promogranate crop

**13.** Characters, special adaptations and cultivation practice of the Wood Apple crop.

(OR)

**b)** Characters, special adaptations and cultivation practices of the Fig crop.