



SRI KRISHNADEVARAYA UNIVERSITY:: ANANTAPURAMU

UG CBCS SYLLABUS

VI Semester

(2017-2018)

B.Sc., BOTANY

VI SEMESTER- SYLLABUS

**THEORY, PRACTICALS AND MODEL QUESTION PAPERS
(AS PER CBCS AND SEMESTER SYSTEM)**

III YEARS

w.e.f. 2017-2018



**AP STATE COUNCIL OF HIGHER EDUCATION
CBCS - PATTERN FOR BOTANY**

Structure of B.Sc Botany under CBCS

w.e.f. 2015-16 (Revised in April, 2016)

<i>Year</i>	<i>Semester</i>	<i>Paper</i>	<i>Title</i>	<i>Hours</i>	<i>Marks</i>	<i>Credits</i>	
I	I	I	Microbial Diversity , Algae and Fungi	4	100	03	
			Practical –I	2	50	02	
	II	II	Diversity Of Archaeogoniates & Anatomy	4	100	03	
			Practical –II	2	50	02	
II	III	III	Plant taxonomy & Embryology	4	100	03	
			Practical –III	2	50	02	
	IV	IV	Plant physiology & Metabolism	4	100	03	
			Practical –IV	2	50	02	
III	V	V	Cell Biology, Genetics & Plant breeding	3	100	03	
			Practical –V	2	50	02	
		VI	Plant Ecology & Phytogeography	3	100	03	
			Practical –VI	2	50	02	
	Any one paper from (A), (B) and (C) can be selected	VII (A)	Elective	3	100	03	
			Lab	2	50	02	
		VII (B)*	Elective				
			Lab				
		VII (C)*	Elective				
			Lab				
		VI	** VIII-A	Cluster Elective-A	3	100	03
				VIII-A-1	3	100	03
				VIII-A-2	3	100	03
				VIII-A-3	2	50	02
				Or	2	50	02
				Or	2	50	02
** VIII-B	Cluster Elective-B						
	VIII-B-1						
	VIII-B-2						
		VIII-B-3					

SRI KRISHNADEVARAYA UNIVERSITY:: ANANTAPURAMU
UG CBCS SYLLABUS

SEMESTER-VI: Electives

Andhra Pradesh State Council of Higher Education

w.e.f. 2015-16 (Revised in April 2016)

III B. Sc - BOTANY SYLLABUS SEMESTER- VI

PAPER – VII – ELECTIVE [(A) or (B) or (C)]

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

Total hours of teaching 60hrs @ 3hrs per week

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

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

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

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

Unit-III: Organic plant protection: (12hrs)

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

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

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

Unit- V: Organic Certification (12hrs)

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

Books for Reference:

1. Palaniappan SP & Anandurai K. 1999. Organic Farming–Theory and Practice. Scientific Publishers, Jodhpur
2. Joshi, M. 2014. New Vistas of Organic Farming 2nd Ed. Scientific Publishers, Jodhpur.
3. Farming system : Theory and Practice - S.A.Solaimalai
4. Organic Farming: Theory and Practice- S.P.Palaniappan and K.A. Annadurai
5. A hand book of Organic Farming by A.K.Sharma

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

Paper-VII-A : Practical
Semester – VI, Paper-VII-A : Organic Farming and Sustainable Agriculture
Total hours of teaching 30 hrs @ 2 hrs per week

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

Expected domain skills to be achieved: Performing Soil analysis, soil enrichment methods, composting procedure, recycling of wastes, use of waste materials in mushroom cultivation, understanding nutrient requirement of various crops, identifying various methods of keeping soil health

PRACTICAL MODEL PAPER

Paper-VII-(A) : Organic Farming and Sustainable Agriculture

Q1. Project report (A)	- 15 marks
Viva-voce on study project	-05 marks
Q2. Identify and write notes on B, C, D, and E (4x5)	-20 marks
B- inorganic manures/bio-weedicides/bio-pesticides (photograph/ specimen)	
C- Compost preparation method (photograph/instrument)	
D- Green manure type (plant specimen/photograph)	
E- Waste recycling method (photograph/live specimen/institute/organization)	
Q4. Field report	- 05 marks
Q5. Record	- 05 marks
TOTAL:	50 marks

SRI KRISHNADEVARAYA UNIVERSITY:: ANANTAPURAMU
UG CBCS SYLLABUS

Andhra Pradesh State Council of Higher Education

III B.Sc.: BOTANY SYLLABUS SEMESTER- VI

Cluster Electives, CLUSTER-B

CLUSTER ELECTIVE, PAPER-VIII-B-1

Paper VIII-B-1: Biological instrumentation and Methodology

Total hours of teaching 60hrs @ 3hrs per week

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

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

Unit- II: pH and Centrifugation: (12 hrs)

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

Unit- III: Spectrophotometry: (12hrs)

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

Unit- IV: Chromatography: (12hrs)

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

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

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

The art of scientific writing and presentation of scientific matter. Scientific writing and ethics. Writing references. Powerpoint presentation. Poster presentation. Introduction to copyright-academic misconduct/plagiarism in scientific writing.

Suggested Readings:

1. Bajpai, P.K. 2006. Biological Instrumentation and methodology. S. Chand & Co. Ltd.
2. K. Wilson and J. Walker Eds. 2005. Biochemistry and Molecular Biology. Cambridge University Press.
3. K. Wilson and KH Goulding. 1986. Principles and techniques of Practical Biochemistry. (3 edn) Edward Arnold, London.
4. Dawson, C. (2002). Practical research methods. UBS Publishers, New Delhi.
5. Stapleton, P., Yondewei, A., Mukanyange, J., Houten, H. (1995). Scientific writing for agricultural research scientists – a training reference manual. West Africa Rice Development Association, Hong Kong.
6. Ruzin, S.E. (1999). Plant micro technique and microscopy. Oxford University Press, New York, U.S.A.

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

Paper VIII-B-1: PRACTICAL SYLLABUS

1. Microscopy – Light microscopy: principles, parts & function
2. Micrometry- principle and measurement of microscopic objects: Low power and high power.
3. Camera Lucida drawing with magnification and scale.
4. Principle and working of phase contrast microscope
5. Principle & operation of Centrifuge
6. Preparation of standard acid and alkali and their standardization.
b) Preparation of various solutions (normal, molar, and percent) and ppm/ppb by serial dilutions
7. Study of principle and working of pH meter and Measurement of pH of Milk, Pepsi, Lemon juice etc. using pH paper and pH meter
8. Study of principle of Chromatography and separation of amino acids mixture
By ascending Paper Chromatography
7. Principle & operation of Colorimeter
8. Principle & operation of Spectrophotometer
9. Chromosome banding, FISH, chromosome painting
9. Principle and technique of TLC (demonstration)

10. TLC separation of Amino acids from purified samples and biological materials (demonstration)
- 11 PCR - The Polymerase Chain Reaction (protocol) -demonstration
13. Study visit to an institute /laboratory

Domain skills expected to achieve:

Skill in operating laboratory equipment, their upkeep, and adept at various biological techniques. Ability to prepare molar, molal, normal solutions and solutions of different dilutions. Interpreting scientific results, and ability to present results in a scientific way through graphs, photographs, poster presentations and power point presentations.

Paper VIII-B-1: Theory: Biological instrumentation and Methodology
PRACTICAL MODEL PAPER

- | | |
|---|---------------|
| 1. Perform the experiment (A). Write the protocol of the experiment - | 15 marks |
| 2. Measure the pH of given sample (B) using pH paper and pH meter. Write the procedure and observation. | 10 marks |
| 3. Identify C, D, and E. Write the principle and use of them. | 3X5 -15 marks |
| 4. Viva voce on Field visit | 05 marks |
| 5. Record | 05 marks |

Key

- A. Amino acid separation by paper chromatography
- B. Milk, Pepsi, Lemon juice etc
- C. Camera Lucida/ Micrometer/phase contrast microscope
- D. Colorimeter/ Spectrophotometer
- E. Chromosome banding, FISH, chromosome painting
-

SRI KRISHNADEVARAYA UNIVERSITY:: ANANTAPURAMU
UG CBCS SYLLABUS

(Cluster Electives –B)

III B.Sc.: BOTANY SYLLABUS SEMESTER- VI, CLUSTER ELECTIVE -2-B

PAPER – VIII-B-2

Paper VIII-B-2: Mushroom Culture and Technology

Total hours of teaching 60hrs @ 3hrs per week

Unit I: Introduction, history: (12hrs)

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

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

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

Unit III: Cultivation Technology: (12hrs)

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

Unit IV: Storage and nutrition : (12hrs)

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

Unit V: Food Preparation: (12hrs)

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

Suggested Readings:

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

2. Swaminathan, M. (1990) Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.
3. Tewari, Pankaj Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi.
4. Nita Bahl (1984-1988) Hand book of Mushrooms, II Edition, Vol. I & Vol. II.
5. Biswas, S., M. Datta and S.V. Ngachan. 2011. Mushrooms: A Manual For Cultivation. PHI learning private Ltd., New Delhi, India.
6. Chang, S. and P.G. Miles. 2004. Mushrooms: cultivation, nutritional value, medicinal effect, and environmental impact. CRC Press. USA.
7. Miles, P.G. and S. Chang. 1997. Mushroom Biology: Concise basics and current developments. World Scientific Publishing Co. Pte.Ltd. Singapore.

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

Paper VIII-B-2: PRACTICAL SYLLABUS

1. Identification of different edible and poisonous mushrooms.
2. Microscopic and anatomical observations of different mushroom species.
3. Pure culture - preparation of medium (PDA and Oatmeal agar medium) sterilization.
4. Isolation and preparation of spawn under controlled conditions (preparation of mother spawn in saline bottle and polypropylene bag and their multiplication).
5. Types of Compost preparation and sterilization.
6. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves/waste.
7. Inoculation and spawning of compost.
6. Incubation and harvesting of mushrooms (collection, drying and preservation).
7. Diseases of mushrooms (photographs).
8. Post-harvest technology steps (photographs).

9. Study tour to mushroom cultivation farms

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

Domain skills expected to achieve: Identification of different edible species, skill in media and substrate preparation, isolation of pure culture for spawn, compost preparation, and practices in growing methods of different cultivated mushrooms, Postharvest handling and packing

SCHEME OF PRACTICAL EXAMINATION

PAPER – VIII-B-2 (Cluster Elective): Mushroom Culture and Technology

PRACTICAL- VIII-B-2: Cluster Elective (MODEL QUESTION PAPER)

Time: 3hrs

Max. Marks: 50

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

20 marks

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

08 marks

III. Comment on given specimens C, D and E

3x4 = 12 marks

IV. Report on Field visit

05 marks

V. Practical Record

05 marks

Total = 50 marks

KEY

A-PDA /Oatmeal agar medium

B- Paddy straw compost

C – Edible mushroom (Photograph)

D- Poisonous mushroom (Photograph)

E. Preservation technique (Photograph)

Cluster Electives - B

III B.Sc.: Botany Syllabus Semester- VI, Theory: Cluster Elective –B-3

PAPER – VIII-B-3 (Cluster Elective)

B.Sc - BOTANY
SEMESTER-V/VI: THEORY MODEL PAPER
(General Model Paper)

Time: 3 Hours

Max. Marks:75

SECTION-A (Short Answer Questions)

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

Answer any five of the following question

5x5=25M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

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

11. a)

Or

from unit I

b)

12. a)

Or

from unit II

b)

13. a)

Or

from unit III

b)

14. a)

Or

from unit IV

b)

15. a)

Or

from unit V

b)

INTERNAL EXAMS

- 25Marks

(15 marks for unit tests, 5 marks for assignments and remaining 5 marks for seminar etc.)