

REGISTRAR



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No.ANU/Acad./U.G/CBCS/III Botany/SEM-VI/Syllabus/2017

Date: 30-10-2017

PROCEEDINGS OF THE VICE-CHANCELLOR

Sub:- ANU – Academic –UG courses –CBCS – III year Botany VI semester
Syllabus - Approval - Orders – Issued.

Ref:- 1. Minutes of the meeting of the Board of Studies (UG) in Botany
held on 25-09-2017.

2. Vice-Chancellor's orders dated 24-09-2017.
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ORDER:-

The Vice-Chancellor, after having considered the minutes 1st cited, has approved the III year Botany VI semester syllabus and Model Question Papers for the academic year 2017-18 prepared by the Board of Studies (UG) in Botany. The titles of the papers are mentioned below.

Semester-VI

Any one of the Elective Paper:

1. Paper VII-(A): Organic Farming & Sustainable Agriculture (Theory & Practical)
OR

2. Paper VII- (B): Nursery, Gardening and Floriculture (Theory & Practical)
OR

3. Paper VII-(C): Plant Tissue Culture and Plant Biotechnology (Theory & practical)

Cluster Elective: Any one of the Cluster Elective:

4. Paper VIII- (A1): Plant Diversity and Human Welfare (Theory & practical)

5. Paper VIII- (A2): Ethno Botany and Medicinal Botany (Theory & practical)

6. Paper VIII-(A3): Pharmacognosy and PhytoChemistry (Theory & practical)

OR

7. Paper VIII- (B1): Biological Instrumentation and Methodology

(Theory & practical)

8. Paper VIII-(B2): Mushroom Culture and Technology (Theory & practical)

9. Paper VIII-(B3): Internship/Project Work preferably either in an institute or Industry.

(BY ORDER)

**JOINT REGISTRAR
Academic**

To

The Chairman and all members, Board of Studies (UG) in Botany, ANU.
All the Principals of the Affiliated Colleges under ANU area.

Copy to:

The Dean, Faculty of Natural Science, ANU.

The Dean, CDC, ANU.

The Coordinator, UG (Exams), ANU

The Addl. Controller of Examinations, ANU.

The P.A. to Vice-Chancellor/ Registrar/Rector, ANU.

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

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

Total =		50 Marks

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

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. Policies and incentives of organic production.
3. Farm inspection and certification.
4. 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/vermicompost//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

III B. Sc - BOTANY SYLLABUS SEMESTER- VI

PAPER – VII – ELECTIVE

Paper VII-(B): Nursery, Gardening and Floriculture.

Total hours of teaching 60hrs @ 3hrs per week

Unit I: Nursery: (12 hrs.)

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

Unit II: Gardening (12 hrs.)

1. Definition, objectives and scope - different types of gardening.
2. Landscape and home gardening - parks and its components, plant materials and design .
3. Gardening operations: soil laying, manuring, watering.
4. Landscaping Places of Public Importance: Landscaping highways and Educational Institutions)

Unit III: Propagation methods (12 hrs.)

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

Unit IV: Floriculture: (12 hrs.)

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

Unit V: Commercial Floriculture

(12 hrs.)

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

Books for Reference:

1. Bose T.K. & Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.
2. Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras.
3. Kumar, N., 1997, Introduction to Horticulture, Rajalakshmi Publications, Nagercoil. institution)
4. Randhawa, G.S. and Mukhopadhyay, A. 1986. Floriculture in India. Allied Publishers.

Suggested Activities: Raising a nursery, managing it, studying and drawing various land scaping designs, practicing layering methods, using shade nets to protect horticultural crops, practicing indoor gardening techniques, visiting florists and recording their methods of prolonging vase life of commercial cut flowers.

III B. Sc - BOTANY SYLLABUS SEMESTER- VI (Elective)

Practical Syllabus, Paper VII-(B): Nursery, Gardening and Floriculture

Total hours of teaching 30hrs @ 2hrs per week

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

10. Grading, packing and marketing of cut flowers.
11. Visit to commercial nurseries and commercial tissue culture laboratory
12. Study project under supervision of lecturer – nursery/ornamental flowers/
plants/lawn designing/ landscape designing

Expected domain skills to be achieved: Ability to use a variety of garden tools and implements, proficiency in layering and grafting techniques (cleft grafting and bud grafting), landscape drawings using computers, raising of healthy nurseries of flowering plants, managing vase life of cut flowers etc.

PRACTICAL MODEL PAPER

Paper-VII-(B): Nursery, Gardening and Floriculture

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- Tool/instrument/container used in nursery	
C-Seed propagation technique	
D- Plant used in lawn (plant specimen/photograph)	
E-ornamental flower (photograph/live specimen)	
Q4. Field report	- 05 marks
Q5. Record	- 05 marks
	50 marks

III B. Sc - BOTANY SYLLABUS SEMESTER- VI PAPER – VII – ELECTIVE

Paper VII-(C): Plant tissue culture and its biotechnological applications

Total hours of teaching 60hrs @ 3hrs per week

Unit I: PLANT TISSUE CULTURE – 1

(12hrs)

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

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

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

1. Endosperm culture – Embryo culture -culture requirements – applications, embryo rescue technique.
2. Production of secondary metabolites.
3. Cryopreservation; Germ plasm conservation.

Unit III: Recombinant DNA technology (12hrs)

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

Unit IV: Methods of gene transfer (12hrs)

1. Methods of gene transfer- Agrobacterium-mediated, direct gene transfer by Electroporation, Microinjection, Micro projectile bombardment.
2. Selection of transgenics– selectable marker and reporter genes (Luciferase, GUS, GFP).

Unit V: Applications of Biotechnology (12 hrs)

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

Books for Reference:

1. Pullaiah. T. and M.V.Subba Rao. 2009. Plant Tissue culture. Scientific Publishers, New Delhi.

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

Suggested Activities: In vitro initiation of callus on artificial medium, seminars on utilization of rDNA technology, debates on applications of Biotechnology (whether it is a boon or bane to the society) studying growth patterns, vegetative characteristics of Bt.cotton and identifying the features of its pest resistance

**III B. Sc - BOTANY SYLLABUS SEMESTER- VI
PAPER – VII-(C) Elective**

**Practical Paper VII-(C): Plant Tissue Culture & Plant Biotechnology
Total hours of teaching 30hrs @ 2hrs per week**

1. (a) Preparation of MS medium.
(b) Demonstration of in vitro sterilization methods and inoculation methods using leaf and nodal explants of Tobacco/ Datura/ Brassica etc.
2. Study of embryo and culture, micro propagation of Banana, somatic embryogenesis, artificial seeds through photographs.
3. Construction of restriction map of circular and linear DNA from the data provided.
4. Study of methods of gene transfer through photographs: Agrobacterium-mediated, direct gene transfer by electroporation, microinjection, and micro projectile bombardment.
5. Different steps involved in genetic engineering for production of Bt. cotton, Golden rice, Flavr Savr tomato through photographs.
7. Isolation of plasmid DNA.

8. Restriction digestion and gel electrophoresis of plasmid DNA (optional)
9. Field visit to a lab involved in tissue culture
10. Study project under supervision of lecturer – tissue culture/ genetic engineering

Expected domain skills to be achieved: Ability to prepare artificial nutrient media, preparing independently, applying various sterilization procedures for media, glassware and biological materials, in vitro propagation of Banana callus, morphogenesis--s, clonal propagation methods, isolation of plasmid DNA individually and as a group.

PRACTICAL MODEL PAPER

Paper-VII-(C) : Plant Tissue Culture & Plant Biotechnology

- | | |
|---|------------|
| Q1. Project report (A) | - 15 marks |
| Viva-voce on study project | -05 marks |
| Q2. Identify and write notes on B, C and D (3x4) | -12 marks |
| B- Tool/instrument/container used in sterilization | |
| C- Tool/instrument/container used in gene transfer | |
| D- GM crops (Photographs) | |
| Q3. Construct restriction map of circular and/ or linear DNA from the data provided – | 08 marks |
| Q4. Field report | - 05 marks |
| Q5. Record | - 05 marks |

marks

50

CLUSTER ELECTIVES (Cluster–A or Cluster-B)

III B.Sc.: BOTANY SYLLABUS SEMESTER- VI

Paper VIII, CLUSTER ELECTIVE, Cluster-A,

Paper VIII-A-1 : PLANT DIVERSITY AND HUMAN WELFARE

Total hours of teaching 60hrs @ 3hrs per week

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

- i. Genetic diversity, Species diversity, Plant diversity at the ecosystem level, Agro biodiversity and cultivated plant taxa, wild taxa.
- ii. Values and uses of biodiversity: Ethical and aesthetic values, Methodologies for valuation, Uses of plants.
- iii.

Unit -II: Loss of biodiversity: (12hrs)

- i. Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agro biodiversity.
- ii. Management of plant biodiversity: Organizations associated with biodiversity management-Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR; Biodiversity legislation and conservations.

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

- i. Environmental Impact Assessment (EIA), Geographical Information System GIS, Ecological footprint with emphasis on carbon footprint.
- ii. Solid and liquid waste management

Unit -IV: Conservation of biodiversity (12hrs)

- i. Conservation of genetic diversity, species diversity and ecosystem diversity, *In situ* and *ex situ* conservation,
- ii. Social approaches to conservation, Biodiversity awareness programmes, Sustainable development.

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

- i. Importance of forestry, their utilization and commercial aspects-
 - a) Avenue trees, b) ornamental plants of India.
- ii. Fruits and nuts: Important fruit crops their commercial importance. Wood, fiber and their uses.

Suggested Readings:

1. Krishnamurthy, K.V. (2004). An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi.
2. Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi.
3. Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.

Suggested activities: Study of flora and its diversity in the college campus or local area, enumerating wild and exotic species (*Parthenium*, Water hyacinth etc.)

Project work on any one of the International organizations striving for preservation of biodiversity, study of conservation efforts of local people, and civic bodies, study of locally available fruits in different seasons, enumerating the avenue plantations and their diversity in your town/city

Paper – VIII-A-1 : Practicals: PLANT DIVERSITY AND HUMAN WELFARE

- 1) Study of plant diversity (flowering plants).
- 2) Study of exotic species- Identification and morphological characteristics.
- 3) Identification of forest trees through bark, wood, flowers, leaves and fruits.
- 4) Maceration, Study of wood (Tracheary elements, fibres).
- 5) Methods of preservation and canning of fruits.
- 6) Visit to the local ecosystem to study the plants.
- 7) Write up on the conservation efforts of International organizations.
- 8) Study of Solid and Liquid waste management systems in rural/urban areas.

Domain skills expected to achieve: Identification of exotic plant species, identification of forest trees based on the characteristics of bark, flowers and fruits, understanding the preservation methods of fresh and dry fruits, understanding the methods of safe disposal of biodegradable and non-biodegradable wastes

SCHEME OF PRACTICAL EXAMINATION

PRACTICAL- VIII-A-1 : Cluster Elective (MODEL QUESTION PAPER)
PLANT DIVERSITY AND HUMAN WELFARE

Time: 3hrs

Max. Marks: 50

- I. Assign the plants **A, B and C** to their respective families, giving reasons, family name and classification-2 marks, important diagrams- 3 marks. **15 marks**
- II. Give the protocol of **D** **10 marks**
- III. Comment on specimens **E, F and G** **3x3 = 9 marks**
- IV. Report on Field visit **6 marks**

To study sources of firewood (10 plants), timber-yielding trees (10 trees) and bamboos.

V. Viva-Voce **5 marks**

VI. Practical Record **5 marks**

KEY

A-Cultivated Plant

B- Wild Plant

C –Exotic plant

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

E. Bark/wood/fruit yielding plant

F. Nuts/ Alcoholic beverage plant

G. wood /Fibre yielding plant

III B. Sc - BOTANY SYLLABUS

SEMESTER- VIII : CLUSTER ELECTIVE -A

Paper VIII-A-2 : ETHNOBOTANY AND MEDICINAL BOTANY

Total hours of teaching 60hrs @ 3hrs per week

Unit –I: Ethnobotany (12hrs)

- i. Introduction, concept, scope and objectives; Ethnobotany as an interdisciplinary science. The relevance of ethnobotany in the present context
- ii. Major and minor ethnic groups or Tribals of India, and their life styles.
- iii. Plants used by the tribal populations: a) Food plants, b) intoxicants and beverages, c) Resins and oils.

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

- i. Role of ethnobotany in modern medicine with special example

Rauvolfia sepentina, Trichopus zeylanicus, Artemisia annua, Withania somnifera.

- ii. Significance of the following plants in ethno botanical practices (along with their habitat and morphology)
 - a) *Azadirachta indica*, b) *Ocimum sanctum*, c) *Vitex negundo*, d) *Gloriosa superba*, e) *Tribulus terrestris*, f) *Phyllanthus niruri*, g) *Cassia auriculata*, h) *Indigofera tinctoria*, i) *Senna auriculata* j). *Curcuma longa*.

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

- i. Role of ethnic groups in the conservation of plant genetic resources.
- ii. Biopiracy, Intellectual Property Rights and Traditional Knowledge.

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

- i. Definition and Scope-**Ayurveda**: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments.
- ii. **Siddha**: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine.
- iii. **Unani**: History, concept: Umoor-e- tabiya, tumors treatments/therapy, polyherbal formulations (in brief).

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

- i. Definition: endemic and endangered medicinal plants,
- ii. Red list criteria
- iii. *In situ* conservation: Biosphere reserves, sacred groves, National Parks
- iv. *Ex situ* conservation: Botanical Gardens.

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

Suggested Readings:

- 1) S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
- 2) Glimpses of Indian. Ethnobotny, Oxford and I B H, New Delhi – 1981.
- 3) S.K. Jain (ed.) 1989. Methods and approaches in ethnobotany. Society of ethnobotanists, Lucknow, India.
- 4) S.K. Jain, 1990. Contributions of Indian ethnobotny. Scientific publishers, Jodhpur.
- 5) Colton C.M. 1997. Ethnobotany – Principles and applications. John Wiley and sons – Chichester
- 6) Rama Ro, N and A.N. Henry (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India. Botanical Survey of India. Howrah.
7. Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
8. Purohit and Vyas, 2008. Medicinal Plant Cultivation: A Scientific Approach, 2nd edn. Agrobios, India.
9. Pal, D.C. & Jain, S.K., 1998. Tribal Medicine. Naya Prakash Publishers, Calcutta
10. Raychudhuri, S.P., 1991. (Ed.) Recent advances in Medicinal aromatic and spice crops. Vol.1, Today & Tomorrow's printers and publishers, New Delhi

Cluster Elective VIII-A-2: Practical:

ETHNOBOTANY AND MEDICINAL BOTANY

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

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

C - - Do -

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

E. Photograph of famous personalities in Ayurveda/Siddha medicine.

.III B. Sc - BOTANY SYLLABUS SEMESTER- VIII

CLUSTER ELECTIVE, Paper VIII-A-3

Paper VIII-A-3: Pharmacognosy and Phytochemistry

Total hours of teaching 60hrs @ 3hrs per week

Unit-I: Pharmacognosy

(12hrs)

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

Unit –II: Organoleptic and microscopic studies: (12hrs)

Organoleptic and microscopic studies with reference to nature of active principles and common adulterants of *Alstonia scholaris* (bark), *Adhatoda vasica*(leaf), *Strychnos nuxvomica* (seed), *Rauwolfia serpentina*(root) and *Zinziber officinalis Catharanthus roseus*.

Unit-III: Secondary Metabolites:

(12hrs)

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

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

UNIT-IV: Phytochemistry: (12hrs)

Biosynthesis and sources of drugs:

- (i) Phenols and phenolic glycosides : structural types, biosynthesis, importance of simple phenolic compounds, tannins, anthocyanins.
- (ii) Steroids, sterols, saponins, Biosynthesis, commercial importance.
- (iii) Alkaloids: Different groups, biosynthesis,
- (IV) Volatile oils, aromatherapy.

UNIT-V: Enzymes, proteins and amino acids as drugs: (12hrs)

- i. Vaccines, toxins and toxoids, antitoxins, immune globulins, antiserums,
- ii. Vitamins, Antibiotics – chemical nature, mode of action.
- iii. Pharmacological action of plant drugs, antioxidants, phytoestrogens
- iv. Role of different enzyme inhibitors.

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

BOOKS FOR REFERENCE:

1. Wallis, T. E. 1946. Text book of Pharmacognosy, J & A Churchill Ltd. 2.
Roseline, A. 2011. Pharmacognosy. MJP Publishers, Chennai.
2. Gurdeep Chatwal, 1980. Organic chemistry of natural productis.
Vol.I.Himalaya Publishing house.
3. Kalsi, P. S. and Jagtap, S., 2012. Pharmaceutical medicinal and natural product chemistry N.K. Mehra . Narosa Publishing House Pvt. Ltd. New Delhi.
4. Agarwal, O. P. 2002. Organic chemistry–Chemistry of organic natural products. Vol. II. Goel publishing house , Meerut.

5. Harborne, J. B. 1998. Phytochemical methods –a guide to modern techniques of plant analysis 3 rd edition, Chapman and Hall
6. Datta & Mukerji, 1952. Pharmacognosy of Indian roots of Rhizome drugs. Bulletin No.1 Ministry of Health, Govt. of India.

VIII-A-3: Pharmacognosy and Phytochemistry: PRACTICALS

1. Physical and chemical tests for evaluation of unorganized drugs- Asaphoetida. Honey, Castor oil. Acacia
2. Identification of bark drugs – cinchona, cinnamom
3. Identification of fruit drugs – Cardamom, Coriander
4. Identification of root and rhizome drugs- Ginger, Garlic, Turmeric
5. Identification of whole plant – Aloes, Vinca, Punarnava
6. Herbarium of medicinal plants (minimum of 20 platns)
7. Collection of locally available crude drugs from local venders (minimum of 20)

Domain skills expected to achieve: Identification of various plant parts used as medicines, extraction of active principles from them, isolation by chromatographic techniques, learning callus culture techniques for secondary metabolite enrichment and understanding ethno-pharmacological principles

PRACTICAL: VIII-A-3 Cluster Elective: MODEL QUESTION PAPER

Pharmacognosy and Phytochemistry

Time: 3hrs.

Max.

Marks=50

I. Identify the given crude drugs **A & B** by morphological study and chemical tests. **10 marks**

II. Perform suitable chemical test and identify the given phytochemical **C**

10 marks

III. Comment on D and E
marks

2x5=10

IV. Herbarium and submission of drugs
IV. Viva-Voce
V. Practical Record

-10 marks

5 marks

5 marks

-

Total = 50

marks

KEY

A-Flower/fruit drugs

B-Rhizome/whole plant drugs

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

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

E. photograh/instrument used for tissue culture

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 andKHGoulding. 1986. Principles and techniques of Practical Biochemistry. (3 edn) Edward Arnold, London.
4. Dawson, C. (2002). Practical research methods.UBS Publishers, New Delhi.
5. Stapleton, P., Yondeowei, A., Mukanyange, J., Houten, H. (1995). Scientific writing for agricultural research scientists – a training reference manual. West Africa Rice Development Association, Hong Kong.
6. Ruzin, S.E. (1999). Plant micro technique and microscopy. Oxford 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 resultsthrough 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
-
-

(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*. 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, pickels, 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, omelette, samosa, pickles and curry.
Research Centres - National level and Regional level. Cost benefit ratio.

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)

Paper VIII-B-3: Internship/ Project Work preferably either in an Institute or Industry

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 **Eight** from all.)*

Answer any five of the following question

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

Table-12: B.Sc., SEMESTER – VI

Sno	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	Elective 1: DSC 1, Paper -7 (applied/adv)	100	25	75	3	3
2	Elective-1 Lab Practical	50	0	50	2	2
3	Elective-1: DSC 2, Paper -7 (applied/adv)	100	25	75	3	3
4	Elective-2 Lab Practical	50	0	50	2	2
5	Elective-1: DSC 3, Paper -7 (applied/adv)	100	25	75	3	3
6	Elective-3 Lab Practical	50	0	50	2	2
7	Elective -2: DSC 1, Paper -8 App/Inter-domain/Gen EI	100	25	75	3	3
8	Elective-2 Lab Practical	50	0	50	2	2
9	Elective -2: DSC 2, Paper -8 App/Inter-domain/Gen EI	100	25	75	3	3
10	Elective-2 Lab Practical	50	0	50	2	2

11	Elective -2: DSC 3, Paper -8 App/Inter-domain/Gen EI	100	25	75	3	3
12	Elective-2 Lab Practical	50	0	50	2	2
	Total	900	-	-	30	30

*7th paper of each of the domain specific subjects (1st paper of semester VI) will be a domain related Elective. More than one Elective may be offered giving choice to students. The Electives may be of Domain specific applied or advanced (specialization) in nature. The number of Electives may be decided (along with the syllabus) by the University concerned keeping the feasibility of conduct of University examinations in view.

** Applied Elective: It is desirable that around 25% of syllabus is taught by field experts. The college has to make such an arrangement.

*8th paper of each of the domain specific subjects (2nd paper of semester VI) will also be an Elective. The Electives may be of Inter-domain Clusters** - each Cluster having three papers with or without project work. or General in nature. The number of Clusters may be decided (along with the syllabus) by the University concerned keeping the feasibility of conduct of University examinations in view. It is desirable that around 25% of syllabus is taught by field experts.

****Cluster::** *In the last semester, for paper-8, each domain subject has one elective totaling three papers for each student. Electives may be given as Clusters of three papers each for each subject. A student can opt for all the three papers of the same subject (cluster or stream) including or excluding project work for a wider learning experience. The student will not study the other two domain subjects for paper-8.*

Total Credits for a B.Sc. Course: 158

ACHARYA NAGARJUNA UNIVERSITY :: NAGRAJUNA NAGAR-522 510
III B.Sc. BOTANY – SEMESTER – VI
PAPER – VII :: (A) Elective : ORGANIC FARMING & SUSTAINABLE AGRICULTURE
THEORY MODEL QUESTION PAPER

Time : 3 Hrs.

Max. Marks : 75

Draw neat and labelled diagrams wherever necessary.

SECTION – A (Short Answer Questions) (5 x 5 = 25M)

Answer any FIVE of the following.

1. Principles of organic farming – సేంద్రియ వ్యవసాయ సూత్రాలు.
2. Biodynamic farming – బయోడైనమిక్ వ్యవసాయం.
3. Mulching – మల్చింగ్.
4. Vermi Composting – వర్మి కంపోస్టింగ్.
5. Mechanical methods for plant protection.
మొక్కల సంరక్షణకు యాంత్రిక పద్ధతులు.
6. Apiculture – తేనెటీగల పెంపకం.
7. Livestock component in organic farming.
సేంద్రియ వ్యవసాయంలో పశువుల పాత్ర.
8. Terrace farming – టెర్రస్ వ్యవసాయం.

SECTION – B (Essay questions) (5 x 10 = 50M)

Answer ALL of the following.

9. a) What is organic farming? Write an essay on the benefits of organic farming.
సేంద్రియ వ్యవసాయం అనగానేమి? సేంద్రియ వ్యవసాయంలో గల లాభాల గురించి ఒక వ్యాసం వ్రాయుము.

(OR)

- b) Enumerate the requirements for organic farming.
సేంద్రియ వ్యవసాయానికి అవసరమైన అంశాలను వివరించండి.

10. a) Write an account on the propagation of seeds and planting materials.

విత్తనాల మరియు ఇతర మొక్కల భాగాల ప్రవర్ధనం గురించి వ్రాయుము.

(OR)

b) Write an essay on the types of bio-fertilizers and the methods of application.

వివిధ రకాల జీవ ఎరువులు మరియు వాటిని ఉపయోగించే విధానాలు గురించి వ్యాసం వ్రాయుము.

11. a) Give an account of botanical pesticides.

వృక్ష సంబంధ క్రిమి సంహారిణులు గురించి వ్రాయుము.

(OR)

b) Write an essay on weed management.

కలుపు మొక్కల యాజమాన్యం గురించి వ్యాసం వ్రాయుము.

12. a) Write an account of organic crop production methods of rice.

సేంద్రియ వరి ఉత్పత్తి గురించి వ్రాయుము.

(OR)

b) Write an essay of mushroom cultivation.

కుక్క గొడుగుల పెంపకం గురించి ఒక వ్యాసం వ్రాయుము.

13. a) Write an essay on the policies and incentives of organic production.

సేంద్రియ ఉత్పత్తికి సంబంధించిన పథకాలు మరియు లాభాల గురించి వ్యాసం వ్రాయుము.

(OR)

b) Write an account of certification process in organic farming.

సేంద్రియ వ్యవసాయంలో ధృవీకరణ విధానం గురించి వ్రాయుము.

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ACHARYA NAGARJUNA UNIVERSITY :: NAGRAJUNA NAGAR-522 510

III B.Sc. BOTANY – SEMESTER – VI

PAPER – VII :: (B) Elective : NURSERY, GARDENING AND FLORICULTURE

THEORY MODEL QUESTION PAPER

Time : 3 Hrs.

Max. Marks : 75

Draw neat and labelled diagrams wherever necessary.

SECTION – A (Short Answer Questions)

(5 x 5 = 25M)

Answer any FIVE of the following.

1. Soil sterilization – మృత్తిక విసంక్రామికరణ.
2. Manuring – ఎరువుల వాడకం.
3. Mist chamber – మిస్ట్ ఛేంబర్.
4. Rooting Medium – రూటింగ్ యానకం.
5. Ornamental palms – అలంకరణ పామ్స్
6. Bonsai – బోన్సాయ్
7. Methods of prolonging vase life of flowers.
పుష్పాల వాస్ లైఫ్ ను పొడిగించడానికి అనుసరించే పద్ధతులు.
8. Packaging of cut flowers – కట్ ఫ్లవర్స్ పాకేజింగ్.

SECTION – B (Essay questions)

(5 x 10 = 50M)

Answer ALL of the following.

9. a) Write an account on vegetative propagation.

శాఖీయ ప్రత్యుత్పత్తి గురించి వ్రాయుము.

(OR)

- b) Write an essay on pruning techniques.

ప్రూనింగ్ ఖండన విధానాల గురించి వ్యాసము వ్రాయుము.

10. a) Write an essay on landscaping.

లాండ్ స్కేపింగ్ గురించి వ్యాసము వ్రాయుము.

(OR)

- b) Write an essay on different types of gardening.

వివిధ రకాల గార్డెనింగ్ పద్ధతుల గురించి వ్యాసము వ్రాయుము.

11. a) Write an account on sowing and transplanting.

విత్తుట మరియు నాటుట గురించి వ్రాయుము.

(OR)

b) Write an essay on the propagation of ornamental plants by rhizomes, corms and tubers.

కొమ్ములు, కందములు మరియు దుంపలనుపయోగించి అలంకరణ మొక్కల ప్రత్యుత్పత్తి విధానము గురించి వ్యాసము వ్రాయుము.

12. a) Write an account of the propagation of cacti.

కాక్టె ల ప్రత్యుత్పత్తి గురించి వ్రాయుము.

(OR)

b) Write an essay on the cultivation of plants in pots.

కుండీలలో మొక్కలను పెంచే విధానం గురించి వ్యాసము వ్రాయుము.

13. a) Write an essay on the factors affecting flower production.

పుష్పాల ఉత్పత్తిని ప్రభావితం చేసే కారకాల గురించి వ్యాసము వ్రాయుము.

(OR)

b) Write an essay on the cultivation of cut flowers: Marigold and Rose.

బంతి మరియు గులాబి పుష్పాల సాగు గురించి వ్యాసము వ్రాయుము.

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ACHARYA NAGARJUNA UNIVERSITY :: NAGRAJUNA NAGAR-522 510
III B.Sc. BOTANY – SEMESTER – VI
PAPER – VII :: (C) Elective : PLANT TISSUE CULTURE AND ITS
BIOTECHNOLOGICAL APPLICATIONS
THEORY MODEL QUESTION PAPER

Time : 3 Hrs.

Max. Marks : 75

Draw neat and labelled diagrams wherever necessary.

SECTION – A (Short Answer Questions)

(5 x 5 = 25M)

Answer any FIVE of the following.

1. Differentiation and Dedifferentiation – డిఫరెన్సియేషన్ మరియు డీ డిఫరెన్సియేషన్.
2. Somatic embryogenesis – శాఖీయ పిండోత్పత్తి.
3. Elicitation – ఎలిసిటేషన్
4. Cryopreservation – క్రయో ప్రిజర్వేషన్.
5. Types of restriction endonucleases – రెస్ట్రిక్షన్ ఎండో న్యూక్లియేజ్ల రకాలు.
6. Eukaryotic vectors – నిజకేంద్రక వాహకాలు.
7. Reporter genes – రిపోర్టర్ జన్యువులు.
8. Flavr Savr tomato – ఫ్లేవర్ సేవర్ టమాటా.

SECTION – B (Essay questions)

(5 x 10 = 50M)

Answer ALL of the following.

9. a) Describe the methods of plant tissue culture in detail.
కణజాల వర్ధన పద్ధతులను సవివరంగా వర్ణించండి.
(OR)
b) Describe various methods of sterilization.
వివిధ రకాల స్టెరిలైజేషన్ పద్ధతులను వర్ణించండి.
10. a) Describe the technique of embryo culture and its applications.
పిండ వర్ధన పద్ధతి మరియు దాని ఉపయోగాలను వర్ణించుము.
(OR)
b) What are secondary metabolites? How they can be produced in culture? Describe factors affecting secondary metabolite production in culture.
'ద్వితీయ జీవక్రియా ఉత్పన్నాలు' ఏవి? వర్ధనంలో వాటిని ఎలా ఉత్పత్తి చేయవచ్చు? వర్ధనంలో జీవక్రియా ఉత్పన్నాల ఉత్పాదకతను ప్రభావితం చేసే కారకాలను వివరించండి.

11. a) What is a vector? Describe a plasmid and a phage vector for E.coil.

వాహకం అనగానేమి? ఎ.కోలై బాక్టీరియం కొరకు వాడే ప్లాస్మిడ్ మరియు ఫాజ్ వాహకాలను వర్ణించండి.

(OR)

b) What is Gene cloning? Describe various steps involved in genecloning.

జన్యు క్లోనింగ్ అనగానేమి? జన్యు క్లోనింగ్లోని వివిధ దశలను వివరించుము.

12. a) What is transformation? Describe Agrobacterium mediated gene transfer and Microprojectile bombardment used for bacterial transformation.

పరివర్తనము అనగానేమి? బాక్టీరియా పరివర్తనం కొరకు వాడే ఆగ్రోబాక్టీరియం ద్వారా జన్యు మార్పిడి మరియు మైక్రో ప్రాజెక్టైల్ తాడనంలను గురించి వివరించుము.

(OR)

b) What are Selectable Markers? Describe various categories of Selectable Markers.

సెలెక్టబుల్ మార్కర్లు అనగానేమి? వివిధ రకాల సెలెక్టబుల్ మార్కర్లను వర్ణించుము.

13. a) What are the applications of genetic engineering in crop improvement?

సస్యాభివృద్ధిలో జన్యు ఇంజనీరింగ్ ఉపయోగాలను తెలపండి.

(OR)

b) Discuss the various applications of transgenic plants and the problems encountered in their production / utilization.

ట్రాన్స్జెనిక్ మొక్కల ఉపయోగాలు, వాటి ఉత్పత్తిలో లేదా ఉపయోగంలో ఎదురయ్యే సమస్యలను చర్చించండి.

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ACHARYA NAGARJUNA UNIVERSITY :: NAGRAJUNA NAGAR-522 510

III B.Sc. BOTANY – SEMESTER – VI

PAPER – VIII :: (A-1) PLANT BIODIVERSITY AND HUMAN WELFARE

THEORY MODEL QUESTION PAPER

Time : 3 Hrs.

Max. Marks : 75

Draw neat and labelled diagrams wherever necessary.

SECTION – A (Short Answer Questions)

(5 x 5 = 25M)

Answer any FIVE of the following.

1. Genetic diversity – జన్యు వైవిధ్యం.
2. Uses of plants – మొక్కల ఉపయోగాలు.
3. NBPGR – NBPGR
4. Causes for the loss of ecosystem diversity – ఆవరణ వ్యవస్థ వైవిధ్యం తరిగిపోవడానికి కారణాలు.
5. EIA – EIA
6. Advantages of in-situ conservation – స్వస్థానీయ సంరక్షణ ఉపయోగాలు.
7. Importance of forestry – వనసంరక్షణ ప్రాముఖ్యత.
8. Uses of wood – కలప ఉపయోగాలు.

SECTION – B (Essay questions)

(5 x 10 = 50M)

Answer ALL of the following.

9. a) Write an essay on values of biodiversity.

జీవ వైవిధ్యం విలువల గురించి ఒక వ్యాసము వ్రాయుము.

(OR)

- b) What are the various methods adopted for valuation of biodiversity?

జీవ వైవిధ్య మూల్యాంకనకు అనుసరించే పద్ధతులు ఏవి?

10. a) Write an essay on Agrobiodiversity.

వ్యవసాయ జీవవైవిధ్యంపై ఒక వ్యాసము వ్రాయుము.

(OR)

- b) What is the role of IUCN, UNESCO and WWF in biodiversity management?

జీవ వైవిధ్య యాజమాన్యంలో IUCN, UNESCO మరియు WWF ల పాత్ర ఏమిటి?

11. a) What is carbon foot print? Explain it.

కార్బన్ ఫుట్ప్రింట్ అనగానేమి? వివరించుము.

(OR)

b) Write an essay on solid waste management.

ఘన వ్యర్థాల యాజమాన్య విధానం గురించి వ్యాసము వ్రాయుము.

12. a) Write about ex-situ conservation of Biodiversity.

జీవ వైవిధ్య పరస్థానీయ సంరక్షణ గురించి వ్రాయుము.

(OR)

b) Write about social approaches for conservation of biodiversity.

జీవ వైవిధ్య సంరక్షణలో సామాజిక ప్రమేయం గురించి వ్రాయుము.

13. a) Give the commercial importance of ornamental plants in India.

భారతదేశంలో అలంకరణ మొక్కల వాణిజ్య ప్రాముఖ్యతను వివరించుము.

(OR)

b) What are important fruit crops? Give their commercial importance.

ముఖ్యమైన పండ్ల మొక్కలు ఏవి? వాటి వాణిజ్య ప్రాముఖ్యతను తెలుపుము.

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ACHARYA NAGARJUNA UNIVERSITY :: NAGRAJUNA NAGAR-522 510
III B.Sc. BOTANY – SEMESTER – VI
PAPER – VIII :: (A-2) ETHNOBOTANY AND MEDICINAL BOTANY
THEORY MODEL QUESTION PAPER

Time : 3 Hrs.

Max. Marks : 75

Draw neat and labelled diagrams wherever necessary.

SECTION – A (Short Answer Questions)

(5 x 5 = 25M)

Answer any FIVE of the following.

1. Objectives of Ethnobotany – ఇథ్నోబోటనీ లక్ష్యాలు
2. Major ethnic groups of India – భారతదేశంలోని ప్రధాన ఎథ్నిక్ గ్రూపులు.
3. Role of Rauwolfia serpentina in modern medicine.
ఆధునిక వైద్యంలో రావుల్ఫియా సర్పెంటైనా పాత్ర.
4. Cassia auriculata – morphology – కాసియా ఆరిక్యులేటా బాహ్య స్వరూపం.
5. Biopiracy – బయోపైరసీ.
6. Any five plants used in Siddha medicine – ‘సిద్ధ’ వైద్యంలో వాడే ఏవేని ఐదు మొక్కలు.
7. Umooor-e-tabiya – ఉమూర్-ఇ-టబియా.
8. Botanical gardens – బొటానికల్ గార్డెన్లు.

SECTION – B (Essay questions)

(5 x 10 = 50M)

Answer ALL of the following.

9. a) Describe the importance of ethnobotany in the 21st Century.
21వ శతాబ్దంలో ఇథ్నోబోటనీ యొక్క ప్రాముఖ్యతను వివరించండి.
(OR)
- b) Name any five plants used by tribals as intoxicants and beverages and write their uses.
గిరిజనులు మరియు పదార్థాలు మరియు పానీయాలకు వాడే ఏవేని ఐదు మొక్కల పేర్లను, వాటి ఉపయోగాలను వ్రాయుము?

10. a) What is the role of ethnobotany in modern medicine?

ఆధునిక వైద్యంలో ఇథ్నోబొటనీ పాత్ర ఏమిటి?

(OR)

b) Describe the habitats and morphology of the following plants.

ఈ క్రింద ఇవ్వబడిన మొక్కల యొక్క ఆవాసము మరియు బాహ్య స్వరూపములను వివరించండి.

i) *Azadirachta indica* – అజాడరిక్తా ఇండికా

ii) *Vitex negundo* – వైటెక్స్ నిగుండో

iii) *Indigofera tinctoria* – ఇండిగోఫెరా టింక్టోరియా

iv) *Gloriosa superba* – గ్లోరియోసా సుపర్బా.

11. a) Write an essay on role of ethnic groups in the conservation of plant genetic resources.

మొక్క జన్యు వనరులను కాపాడటంలో గిరిజనుల పాత్రను గురించి ఒక వ్యాసము వ్రాయుము.

(OR)

b) What are intellectual property rights? Why is it necessary to promote and protect intellectual property?

మేథో సంపత్తి హక్కులు ఏవి? మేథో సంపత్తిని పెంచి మరియు సంరక్షించటం ఎందుకు అవసరం?

12. a) Name any ten plants used in ayurveda and write their uses.

ఆయుర్వేదంలో వాడే ఏవేని పది మొక్కల పేర్లు తెలిపి, వాటి ఉపయోగాలను వ్రాయుము.

(OR)

b) What is the origin of Siddha medicinal system? What are the basic concepts of siddha medicine?

'సిద్ధ' వైద్యం ఆవిర్భావం ఏమిటి? సిద్ధ వైద్యం యొక్క ప్రాథమిక భావనలు ఏమిటి?

13. a) How can a taxon be considered endangered?

ఒక జాతి ప్రాణాపాయ స్థితిలో ఉందని ఎలా నిర్ధారిస్తారు?

(OR)

b) Describe 'in situ' conservation of endemic and endangered medicinal plants?

ఎండెమిక్ మరియు ప్రాణాపాయ స్థితిలో ఉన్న మందు మొక్కల స్వస్థానీయ సంరక్షణ పద్ధతులను వివరించుము.

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ACHARYA NAGARJUNA UNIVERSITY :: NAGRAJUNA NAGAR-522 510
III B.Sc. BOTANY – SEMESTER – VI
PAPER – VIII :: (A-3) PHARMACOGNOSY AND PHYTO CHEMISTRY
THEORY MODEL QUESTION PAPER

Time : 3 Hrs.

Max. Marks : 75

Draw neat and labelled diagrams wherever necessary.

SECTION – A (Short Answer Questions)

(5 x 5 = 25M)

Answer any FIVE of the following.

1. Importance of Pharmacognosy – ఫార్మాకోగ్నోసి ప్రాముఖ్యత.
2. Active principle of Rauwolfia Serpentina – రావుల్ఫియా సర్పెంటినాలోని ఆక్టివ్ సూత్రం.
3. Primary metabolites – ప్రాథమిక జీవక్రియా ఉత్పన్నాలు.
4. Extraction of alkaloids – ఆల్కలాయిడ్ల ఎక్స్ట్రాక్షన్.
5. Importance of tannins – టానిన్ల ప్రాముఖ్యత.
6. Saponins – సపొనిన్లు.
7. Immunoglobulins – ఇమ్యూనో గ్లోబ్యులిన్లు.
8. Phytoestrogens – ఫైటో ఈస్ట్రోజెన్లు.

SECTION – B (Essay questions)

(5 x 10 = 50M)

Answer ALL of the following.

9. a) Write an essay on classification of drugs.
డ్రగ్స్ వర్గీకరణ గురించి ఒక వ్యాసం వ్రాయుము.
(OR)
b) What are the various drug evaluation methods? Explain any two methods.
డ్రగ్ ఇవాల్యుయేషన్ పద్ధతులు ఎన్ని రకాలు? ఏవేని రెండు పద్ధతులను వివరించుము.
10. a) Write organoleptic and microscopic studies of *Alstonia Scholaris* and *Catharanthus roseus* with reference to their adulterants.
ఆల్స్టోనియా స్కాలారిస్ మరియు కథరాంథస్ రోజియస్ల ఆర్గానోలెప్టిక్ మరియు మైక్రోస్కోపిక్ అధ్యయనాల గురించి మరియు కల్తీపదార్థాల గురించి వ్రాయండి.
(OR)
b) Write organoleptic and microscopic studies of *Adathoda vesica* and *Zinziber officinalis* and add a note on their adulterants.
ఆడథోడా వెసికా మరియు జింజెబర్ ఆఫిసినాలిస్ల ఆర్గానోలెప్టిక్ మరియు మైక్రోస్కోపిక్ అధ్యయనాల గురించి మరియు కల్తీ పదార్థాల గురించి వ్రాయండి.

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11. a) Define "Secondary Metabolites". Write an account of terpens.
“ద్వితీయ జీవక్రియా ఉత్పన్నాలు” - నిర్వచించండి. టర్పీన్ల గురించి వ్రాయండి.

(OR)

b) Write detailed account of Mevalonate pathway.
మెవలొనేట్ పథం గురించి సవివరంగా వ్రాయండి.

12. a) What are different types of phenols? Describe their biosynthesis.
ఫీనాల్స్ ఎన్ని రకాలు? వాటి జీవ సంశ్లేషణను వివరించుము.

(OR)

b) What are different groups of alkaloids? Describe their biosynthesis.
ఆల్కలాయిడ్ల వివిధ రకాలు ఏవి? వాటి జీవ సంశ్లేషణను వివరించుము.

13. a) What is the chemical nature of antibiotics? Describe their mode of action.
సూక్ష్మజీవనాశకాల రసాయన స్వభావము, అవి పనిచేసే విధానము తెలపండి.

(OR)

b) What is the role of different enzyme inhibitors?
వివిధ రకాల ఎంజైమ్ నిరోధకాల పాత్రను గురించి వ్రాయుము.

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ACHARYA NAGARJUNA UNIVERSITY :: NAGRAJUNA NAGAR-522 510
III B.Sc. BOTANY – SEMESTER – VI
PAPER – VIII :: (B-1) BIOLOGICAL INSTRUMENTATION AND METHODOLOGY
THEORY MODEL QUESTION PAPER

Time : 3 Hrs.

Max. Marks : 75

Draw neat and labelled diagrams wherever necessary.

SECTION – A (Short Answer Questions)

(5 x 5 = 25M)

Answer any FIVE of the following.

1. Principle of light microscopy – లైట్ మైక్రోస్కోపీ సూత్రం.
2. Cytometry – సైటోమెట్రీ.
3. Types of rotors – రోటార్ రకాలు.
4. Sonication – సోనికేషన్.
5. Luminometer – ల్యూమినోమీటర్.
6. Thin layer chromatography – థిన్ లేయర్ క్రొమాటోగ్రఫీ.
7. Technique of using micropipette – మైక్రో పిపెట్ ఉపయోగించే పద్ధతి.
8. Copy right – కాపీరైట్.

SECTION – B (Essay questions)

(5 x 10 = 50M)

Answer ALL of the following.

9. a) What is fluorescence microscopy? Write the applications of fluorescence microscopy.
ఫ్లోరోసెన్స్ మైక్రోస్కోపీ అనగానేమి? ఫ్లోరోసెన్స్ మైక్రోస్కోపీ ఉపయోగాలను వ్రాయుము.
(OR)
b) What is electron microscopy? Describe various stages of sample preparation for electron microscopy.
ఎలక్ట్రాన్ మైక్రోస్కోపీ అనగానేమి? ఎలక్ట్రాన్ మైక్రోస్కోపీ కొరకు నమూనా తయారీలో వివిధ దశలను వివరించుము.
10. a) What is the structure of pH meter? What is its working principle?
pH మీటర్ నిర్మాణము మరియు పనిచేయు సూత్రమును వ్రాయుము.
(OR)
b) What is centrifugation? Explain differential and density gradient centrifugation?
అపకేంద్రీకరణము అనగానేమి? విభేదక మరియు సాంద్రతా ప్రవణత అపకేంద్రీకరణములను వివరించుము.

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11. a) What is the principle involved in Spectrophotometer? What are the essential components of a spectrophotometer instrumentation?

స్పెక్ట్రో ఫోటోమీటర్లో ఇమిడియున్న సూత్రం ఏమిటి? స్పెక్ట్రోఫోటోమీటర్ ఇన్స్ట్రుమెంటేషన్లో వున్న ప్రాముఖ్యమైన అనుఘటకాలు ఏవి?

(OR)

b) What is mass spectroscopy? Write an essay on its applications in Biology.

మాస్ స్పెక్ట్రోస్కోపి అనగానేమి? జీవశాస్త్రంలో దాని ఉపయోగాలను గురించి ఒక వ్యాసం వ్రాయుము.

12. a) Write an essay on gel filtration and its applications.

జెల్ ఫిల్ట్రేషన్ మరియు దాని ఉపయోగాలపై ఒక వ్యాసము వ్రాయుము.

(OR)

b) What is ion exchange chromatography and how does it work? What are its applications?

అయాన్ ఎక్స్ఛేంజ్ క్రోమాటోగ్రఫీ అనగానేమి? మరియు అది ఎలా పనిచేస్తుంది? దాని ఉపయోగాలను వ్రాయుము.

13. a) Write an essay on preparation of solutions.

ద్రావణాల తయారీ విధానము గురించి ఒక వ్యాసము వ్రాయుము.

(OR)

b) What are common toxic chemicals? Write about the safety measures to be taken while handling them.

సాధారణ విషరసాయనాలు ఏవి? వాటిని ఉపయోగించేటపుడు తీసుకోవాల్సిన జాగ్రత్తలు గురించి వ్రాయుము.

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ACHARYA NAGARJUNA UNIVERSITY :: NAGRAJUNA NAGAR-522 510
III B.Sc. BOTANY – SEMESTER – VI
PAPER – VIII :: (B-2) MUSHROOM CULTURE AND TECHNOLOGY
THEORY MODEL QUESTION PAPER

Time : 3 Hrs.

Max. Marks : 75

Draw neat and labelled diagrams wherever necessary.

SECTION – A (Short Answer Questions)

(5 x 5 = 25M)

Answer any FIVE of the following.

1. Pleurotus citrinopileatus – ప్లూరోటస్ సిట్రినో పైలియేటస్.
2. Poisonous mushrooms – విషపూరిత పుట్టగొడుగులు.
3. Oat meal agar medium preparation – ఓట్ మీల్ ఆగార్ యానకం తయారుచేయు విధానం.
4. Mushroom bed preparation – పుట్టగొడుగుల బెడ్ తయారీ విధానం.
5. Cold pasteurization – శీతల పాశ్చరైజేషన్.
6. Vitamins present in mushroom – పుట్టగొడుగులలోని విటమిన్లు.
7. Cost benefit ratio – ధర - లాభం నిష్పత్తి.
8. Soup – సూప్

SECTION – B (Essay questions)

(5 x 10 = 50M)

Answer ALL of the following.

9. a) How many types of edible mushrooms are available in India? Write briefly about them.

భారతదేశంలో ఎన్ని రకాల తినదగిన పుట్టగొడుగులు దొరుకుతాయి? వాటి గురించి సంక్షిప్తంగా వ్రాయండి.

(OR)

- b) What are the medicinal values of mushrooms?

పుట్టగొడుగుల వైద్యపర విలువలను తెలపండి.

10. a) What are the various steps included in the preparation of mother spwan?

మదర్ స్పాన్ తయారీలోని వివిధ దశలను తెలపండి.

(OR)

- b) How can a culture medium be prepared? Give details.

వర్ధన యానకాన్ని ఎలా తయారుచేస్తారు? వివరించండి.

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11. a) Write about the tools used in the cultivation of mushrooms.
పుట్టగొడుగుల పెంపకంలో వాడే పరికరాలను గూర్చి వ్రాయుము.

(OR)

b) What is compost? Write long method of composting.
కంపోస్ట్ అనగానేమి? దీర్ఘకాల కంపోస్టింగ్ విధానం గురించి వ్రాయండి.

12. a) What are the storage methods used for storing mushrooms?
పుట్టగొడుగుల నిలువకు అవలంబించే పద్ధతులను గూర్చి వ్రాయండి.

(OR)

b) Write an account on nutritional value of mushrooms?
పుట్టగొడుగులలోని పోషక విలువలను గురించి వ్రాయండి.

13. a) What are the different types of foods prepared from mushrooms? Give the recipes for curry and cutlet.
పుట్టగొడుగులనుపయోగించి ఏయే రకాల ఆహార పదార్థాలను తయారుచేస్తారు? కర్రీ & కట్లెట్ల తయారీ విధానం వ్రాయండి.

(OR)

b) Give an account of national level and regional research centres on mushroom cultivation.
జాతీయ మరియు ప్రాంతీయ పుట్టగొడుగు పెంపక పరిశోధనా కేంద్రాలను గూర్చి వ్రాయండి.

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