

ADIKAVI NANNYA UNIVERSITY
Bachelor of Vocation: Horticulture
Course structure and syllabi: w.e.f. 2019-20
Admitted Batch I Year; Semester I

S.No	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours	Credits
General Education						
1	English Communication Skills-I	100	25	75	4	4
2	Chemistry (Organic and Inorganic)	100	25	75	4	4
3	Chemistry (Organic and Inorganic)lab	50		50	2	2
4	Foundation course –I (Environmental studies)	50		50	2	2
Skill Education						
1	Fundamentals of plant pathology	100	25	75	4	4
2	Fundamentals of plant pathology Practical	50	0	50	2	2
3	Principles of Horticulture	100	25	75	4	4
4	Principles of Horticulture Practical	50	0	50	2	2
5	Introductory crop physiology	100	25	75	4	4
6	On Job Training-I	50	0	50		2
Total		750				30

Semester II

S.No	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours	Credits
General Education						
1	English Communication Skills-II	100	25	75	4	4
2	Chemistry (Physical and general chemistry)	100	25	75	4	4
3	Chemistry (Physical and general chemistry)lab	50	0	50	2	2
4	Foundation course –II (ICT-I)	50	0	50	2	2
Skill Education						
1	Fundamentals of Plant breeding	100	25	75	2	2
2	Fundamentals of Plant breeding Practical	50	0	50	2	2
3	Vegetable Sciences	100	25	75	4	4
4	Vegetable Sciences Practical	50	0	50	2	2
5	Fundamentals of Entomology	100	25	75	2	2
6	Practical on Fundamentals of Entomology	50	0	50	2	2
7	Ornamental Gardening & Land Scapling	100	25	75	2	2
8	On Job Training-II	50	0	50		2
Total		900				30

ADIKAVI NANNYA UNIVERSITY
Bachelor of Vocation: Horticulture
Course structure and syllabi: w.e.f. 2018-19 onwards
Admitted Batch II Year; Semester III

S.No	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours	Credits
General Education						
1	English Communication Skills-III	100	25	75	4	4
2	Chemistry (Organic and Inorganic)	100	25	75	4	4
3	Chemistry (Organic and Inorganic) lab	50		50	2	2
4	Foundation course –III (ICT-II)	50		50	2	2
Skill Education						
1	Production technology of fruits and flowers	100	25	75	4	4
2	Production technology of fruits and flowers Practical	50	0	50	2	2
3	Fungicides and Plant Disease Management	100	25	75	4	4
4	Fungicides and Plant Disease Management Practical	50	0	50	2	2
5	Introduction to Soil Science	100	25	75	4	4
6	On Job Training -III	50	0	50		2
	Total	800				30

Semester IV

S.No	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours	Credits
General Education						
1	Fundamentals of Statistics	100	25	75	2	2
2	Practical on Fundamentals of Statistics	50	0	50	2	2
3	Chemistry (Spectroscopy and physical chemistry)	100	25	75	4	4
4	Chemistry (Spectroscopy and physical chemistry) lab	50	0	50	2	2
5	Fundamentals of Economics & Marketing	100	25	75	2	2
Skill Education						
1	Production Technology of Flowers, Medicinal & Aromatic Plants	100	25	75	4	4
2	Production Technology of Flowers, Medicinal & Aromatic Plants Practical	50	0	50	2	2
3	Pests of horticultural crops and their management	100	25	75	4	4
4	Pests of horticultural crops and their management Practical	50	0	50	2	2
5	Farm Power and Machinery	100	25	75	2	2
6	Farm Power and Machinery Practical	50	0	25	2	2
7	On Job Training-IV	50	0	50		2
	Total	850				30

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Admitted Batch III Year; Semester V

S.No	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours	Credits
General Education						
1	Chemistry-1 (Organic, Inorganic Physical chemistry)	100	25	75	4	4
2	Chemistry-1(Organic, Inorganic Physical chemistry) Lab	50		50	2	2
3	Chemistry-2 (Organic, Inorganic Physical chemistry)	100	25	75	4	4
4	Chemistry-2 (Organic, Inorganic Physical chemistry)Lab	50		50	2	2
Skill Education						
1	Post Harvest Technology of Fruits	100	25	75	2	2
2	Post Harvest Technology Of fruits Practical	50	0	50	2	2
3	Production Technology of Spices & Plantation Crops	100	25	75	2	2
4	Production Technology of Spices & Plantation Crops Practical	50	0	50	2	2
5	Introduction to agricultural extension and Entrepreneurship development	100	25	75	2	2
6	Protected Cultivation of High Value Vegetables & Flowers	100	25	75	2	2
7	Protected Cultivation of High Value Vegetables & Flowers Practical	50	0	50	2	2
8	Project Work-I	100	0	100	4	4
	Total	950				30

Semester VI

.No	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours	Credits
General Education						
1	Environmental Chemistry	100	25	75	4	4
2	Environmental Chemistry Lab	50	0	50	2	2
3	Fundamentals of Agricultural Engineering & Micro Irrigation	100	25	75	4	4
4	Practicals on Fundamentals of Agricultural Engineering	50	0	50	2	2
Skill Education						
1	Diseases of Horticultural crops and their management	100	25	75	2	2
2	Diseases of Horticultural crops and their management Practical	50	0	50	2	2
3	Seed Production & vegetable crops	100	25	75	2	2
4	Seed Production & vegetable crops Practical	50	0	50	2	2
5	Manures, fertilizers and soil fertility management	100	25	75	2	2
6	Manures, fertilizers and soil fertility management Practicals	50	0	50	2	2
7	Bio-Technology	100	25	75	2	2
6	Project Work -II	100	0	100	4	4
	Total	950				30

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I Year Semester – I

ENGLISH – 1

UNIT – 1

VOCABULARY BUILDING

1. Vocabulary Building
 - Classification of Words
 - 1a. Prefixes and Suffixes
 - 1b. Conversion
 - 1c. Compounding
 - 1d. Analogy
2. One word Substitutes
3. Words Often Confused
4. Synonyms and Antonyms
5. Phrasal Verbs
6. Idioms

UNIT -II

GRAMMAR -1

1. Types of Verbs
2. Subject Verb Agreement

UNIT – III

GRAMMAR -2

1. Meanings of Modals
2. Tense (present and past)and aspect
3. The several Possibilities for denoting future time
4. Articles and prepositions

UNIT– IV

LISTENING SKILLS

1. The Importance of Listening
2. Types of Listening
3. Barriers to effective Listening
4. Strategies for Effective listening

UNIT - V

READING SKILLS

1. Skimming
2. Scanning
3. Intensive Reading and Extensive Reading
4. Comprehension

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I Year Semester – I

ORGANIC AND INORGANIC CHEMISTRY

INORGANIC CHEMISTRY

UNIT –I

P-BLOCK ELEMENTS

Group-13: Synthesis and structure of diborane and higher boranes (B_4H_{10} and B_5H_9), boron-nitrogen compounds ($B_3N_3H_6$ and BN) and carboranes Group - 14: Preparation and applications of silanes, silicones and graphitic compounds. Group - 15: Preparation and reactions of hydrazine, hydroxylamine and Phosphazenes.

UNIT-II

P-BLOCK ELEMENTS -II

Group - 16: Classifications of oxides based on (i) Chemical behaviour and (ii) Oxygen content, Oxyacids of sulphur (structures only). Group-17: Inter halogen compounds, pseudo halogens and comparison with halogens.

2. Organometallic Chemistry

Definition - classification of Organometallic compounds - nomenclature, preparation, properties and applications of alkyls of Li and Mg.

ORGANIC CHEMISTRY

UNIT-III

Structural theory in Organic Chemistry

Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents including neutral molecules like H_2O , NH_3 & $AlCl_3$). Bond polarization: Factors influencing the polarization of covalent bonds, electro negativity - inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance or Mesomeric effect, application to (a) acidity of phenol, and (b) acidity of carboxylic acids. Hyperconjugation and its application to stability of carbonium ions, Free radicals and alkenes, carbanions, carbenes and nitrenes. Types of Organic reactions : Addition - electrophilic, nucleophilic and free radical. Substitution - electrophilic, nucleophilic and free radical. Elimination- Examples.

UNIT-IV

1. Acyclic Hydrocarbons

Alkenes - Preparation of alkenes. Properties: Addition of hydrogen - heat of hydrogenation and stability of alkenes. Addition of halogen and its mechanism. Addition of HX, Markonikov's rule, addition of H_2O , HOX, H_2SO_4 with mechanism and addition of HBr in the presence of peroxide (anti - Markonikov's addition). Dienes - Types of dienes, reactions of conjugated dienes - 1,2 and 1,4 addition of HBr to 1,3 – butadiene and Diel's - Alder reaction.

Alkynes - Preparation by dehydrohalogenation of dihalides, dehalogenation of tetrahalides, Properties; Acidity of acetylenic hydrogen (formation of Metal acetylides). Preparation of higher acetylenes, Metal ammonia reductions, Physical properties. Chemical reactivity - electrophilic addition of X_2 , HX , H_2O (Tautomerism), Oxidation with $KMnO_4$, OsO_4 , reduction and Polymerisation reaction of acetylene.

2. Alicyclic hydrocarbons (Cycloalkanes)

Nomenclature, Preparation by Freund's method, Wislicenus method. Properties - reactivity of cyclopropane and cyclobutane by comparing with alkanes, Stability of cycloalkanes - Baeyer's strain theory, Sachse and Mohr predictions and Pitzer's strain theory. Conformational structures of cyclobutane, cyclopentane, cyclohexane.

UNIT-V

Benzene and its reactivity

Concept of resonance, resonance energy. Heat of hydrogenation, heat of combustion of Benzene, mention of C-C bond lengths and orbital picture of Benzene. Concept of aromaticity - aromaticity (definition), Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation) Reactions - General mechanism of electrophilic substitution, mechanism of nitration, Friedel Craft's alkylation and acylation. Orientation of aromatic substitution - Definition of ortho, para and meta directing groups. Ring activating and deactivating groups with examples (Electronic interpretation of various groups like NO_2 and Phenolic). Orientation of (i) Amino, methoxy and methyl groups (ii) Carboxy, nitro, nitrile, carbonyl and sulphonic acid groups (iii) Halogens
(Explanation by taking minimum of one example from each type)

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ORGANIC AND INORGANIC CHEMISTRY (PRACTICAL)

QUALITATIVE INORGANIC ANALYSIS

Analysis of simple salt containing one anion and cation from the following
Anions: Carbonate, Sulphate, Chloride, Bromide, Acetate, Nitrate, Borate, Phosphate.
Cations: Lead, Copper, Iron, Aluminum, Zinc, Manganese, Nickel, Calcium,
Strontium, Barium, Potassium and Ammonium.

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ENVIRONMENTAL STUDIES

Unit-I

Natural Resources: Definition, scope and importance. Need for public awareness. Brief description of Forest resources: Use and over-exploitation. Deforestation; timber extraction, mining, dams. Effect of deforestation environment and tribal people Water resources: Use and over-utilization. Effects of over utilisation of surface and ground water. Floods, drought. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Food resources: World food problems, Effects of modern agriculture; fertilizer/pesticide, salinity problems. Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Land resources: Land as resources, land degradation, man induced landslides, soil erosion and desertification

Unit-II

Ecosystems, Biodiversity and its conservation Concept of an ecosystem Structure and function of an ecosystem Producers, consumers and decomposers Food chains, food webs and ecological pyramids Characteristic features of the following ecosystems:- Forest ecosystem, Desert ecosystem, Aquatic ecosystem. Value of biodiversity: Consumptive use, productive use. Biodiversity in India. Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. Endangered and endemic species of India Conservation of biodiversity

Unit-III

Environmental Pollution Definition Causes, effects and control measures of :- a. Air pollution b. Water pollution ANUR c. Soil pollution d. Noise pollution Solid waste management; Measures for safe urban and industrial waste disposal Role of individual in prevention of pollution Disaster management: Drought, floods and cyclones

Unit-IV

Social Issues and the Environment From Unsustainable to Sustainable development Water conservation, rain water harvesting, watershed management. Climate change, global warming, ozone layer depletion, Environment protection Act Wildlife Protection Act, Forest Conservation Act

Unit-V

Human Population and the Environment Population explosion, impact on environment. Family welfare Programme Environment and human health Women and Child Welfare Value Education Role of Information Technology in Environment and human health.

Text Book

Environmental Studies by Dr.M.Satyanarayana, Dr.M.V.R.K.Narasimhacharyulu, Dr.G. Rambabu and Dr.V.VivekaVardhani, Published by Telugu Academy, Hyderabad.

Books for Reference

1. Environmental Studies by Dr.M.Satyanarayana, Dr.M.V.R.K.Narasimhacharyulu, Dr.G. Rambabu and Dr.V.VivekaVardhani, Published by Telugu Academy, Hyderabad.
2. Environmental Studies by R.C.Sharma, Gurbir Sangha, published by Kalyani Publishers.
3. Environmental Studies by Purnima Smarath, published by Kalyani Publishers.

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FUNDAMENTALS OF PLANT PATHOLOGY

Unit 1: Introduction to plant diseases and their causal organisms

- 1.1 Introduction to plant pathology , term & concepts used in plant pathology, history of plant pathogen, plant diseases, symptoms, disorder, importance of plant diseases, brief mention important academics of international importance.
- 1.2 History, Importance of plant diseases, scope and objectives of Plant Pathology.
- 1.3 Important plant pathogenic organisms
- 1.4 Binomial system of nomenclature, rules of nomenclature

Unit 2 : Fungi

- 2.1 Fungi: General characters, definition of fungus, somatic structures,
- 2.2 Types of fungal thalli, fungal tissues, modifications of thallus,
- 2.3 Reproduction (Asexual and Sexual).
- 2.4 Taxonomy & classification of fungi- Phylum Zygomycota, Ascomycota-sub Paphrimycota-Phylum Vasidiomycota- difference between rusted fungi, Smuts & Bunts.

Unit 3 : Bacteria and Mollicutes

- 3.1 Bacteria and mollicutes: general morphological characters.
- 3.2 Basic methods of classification and reproduction

Unit 4 : Virus and Parasitic plants

- 4.1 Viruses: nature, architecture, multiplication and transmission.
- 4.2 Study of phanerogamic plant parasites

Unit 5 : Nematodes

Nematodes: General morphology and reproduction, classification, symptoms and nature of damage caused by plant nematodes (Heterodera, Meloidogyne, Anguina etc.)

Text book: Alexopoulos, C J, Mims C.W. and Blackwell M. 1966 Introductory Mycology. Wiley Eastern Ltd., New York.

Reference Books:

1. Alexopoulos, C J, Mims C.W. and Blackwell M. 1966 Introductory Mycology. Wiley Eastern Ltd., New York.
2. Agrios, G.N.2006. Plant Pathology. Elsevier Academic Press, New York.
3. Dhingra and Sinclair, Basic Plant Pathology Methods, CBS Publishers & Distributors, New Delhi.
4. Mehrotra, R.S. 1980. Plant Pathology. Tata McGraw-Hill Publishing Co. Ltd., New Delhi.
5. Singh, R.S.1989, Plant Pathogens – The Prokaryotes. Oxford & IBH Pub Co. Pvt Ltd., New Delhi.

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FUNDAMENTALS OF PLANT PATHOLOGY

PRACTICALS

1. Study of lab equipments.
2. Preparation of PDA (Potato Dextrose Agar).
3. Preparation of NA (Nutrient Agar).
4. General study of different structures of fungi.
5. Study of symptoms of various plant diseases.
6. Staining and identification of plant pathogenic bacteria.
7. Study of phanerogamic parasites.
8. 30 Herbarium.

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MODEL PAPER

B. VOC. (HORTICULTURE) – SEMESTER I
FUNDAMENTALS OF PLANT PATHOLOGY

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any **FIVE** questions. Each question carries equal marks. (5*5 = 25)

1. Write the the important characters of family pythiaceae.
2. What is clamp connection & explain its mode of development.
3. Write in detail about types of ascocarps.
4. Explain somatic structure of fungi.
5. Differentiate between rusts & smuts.
6. Write important rules of nomenclature.
7. Write about the importance of plant pathogens.
8. Explain about Root knot nematode with examples.

SECTION – B

Answer **All** the questions. Each question carries **TEN** marks (5*10 = 50)

9. a) Briefly explain about plant phanerogamic parasites with examples.
(OR)
b) Write important characteristics of order Ustilaginales.
10. a) Explain life cycle of *Puccinia graminis* *F.sp. tritici* with neat labeled diagram..
(OR)
b) Write about scope & objectives of plant pathology.

(2)

11. a) Explain asexual & sexual modes of reproduction in bacteria with diagram

(OR)

b) Differentiate between Pythium & Phytophthora

12. a) Write about distinguishing characters of Downy mildew genera with diagrams.

(OR)

b) Describe the classification of plant pathogenic bacteria with their general characters.

13. a) Write in brief on general characters & casual damages of plant parasitic nematodes with its classification .

(OR)

b) Explain symptoms of various viral diseases, transmission of plant viruses with examples.

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PRINCIPLES OF HORTICULTURE

Unit –I -SCOPE AND IMPORTANCE OF HORTICULTURE

- 1.1 Role of horticulture in national income
- 1.2 Role of horticultural crops in human health

Unit –II- INTRODUCTION TO HORTICULTURE

- 2.1 Branches of Horticulture
- 2.2 Overall Classification of Horticultural Crops and its botanical names
- 2.3 Climatic zones of A.P & India (Temp, Tropic, Sub-Tropical)

Unit –III- LAYOUT AND ESTABLISHMENT OF FRUIT AND PLANTATION CROPS

- 3.1 Nursery techniques & Nursery management, Lawn & its maintenance.
- 3.2 Types of gardens, Orchard management

Unit-IV- PROPAGATION METHODS OF HORTICULTURE

- CROPS** 4.1 Sexual reproduction and its methods
- 4.2 Asexual reproduction and its methods (Cutting, Budding, Grafting, and Layering)

Unit-V- AFTER CARE:-

- 5.1 Planting methods-training methods & pruning methods
- 5.2 Fertilizer and methods of application
- 5.3 Irrigation methods- Water management
- 5.4 Types & use of growth regulators in horticulture
- 5.5 Weed management
- 5.6 Nutrition management (Manures & Fertilizers)
- 5.7 Cropping systems
- 5.8 Mulching Methods (merits & demerits)
- 5.9 Bearing habits (classification)

Text book : Jitendra Singh, 2012. Basic Horticulture. Kalyani Publishers, New Delhi.

Reference Books :

1. Chadha, K.L. 2001. Handbook of Horticulture, ICAR, New Delhi.
2. Jitendra Singh, 2012. Basic Horticulture. Kalyani Publishers, New Delhi.
3. Randhawa, G.S. and Mukhopadhyaya, A.1994. Floriculture in India. Allied Publishers Pvt. Ltd., New Delhi.
4. Kumar, N. 1997. Introduction to Horticulture. Rajyalakshmi Publications, Nagorcoil, Tamilnadu.

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I Year Semester – I

PRINCIPLES OF HORTICULTURE

PRACTICALS

1. Identification of seeds.
2. Implements used for Horticultural Crops.
3. Planting techniques.
4. Practicing model kitchen garden
5. Practicing of grafting methods.
6. Practicing of budding methods.
7. Types and methods of irrigation.
8. Visit to nurseries.

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I Year Semester – I
MODEL PAPER
PRINCIPLES OF HORTICULTURE (1-1)

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any **FIVE** questions. Each question carries equal marks.

(5*5 = 25)

10. Define horticulture? List out the branches of horticulture.
11. What is an orchard? List out the layout of orchard with diagram.
12. Write briefly about the fruit nursery with diagram.
13. What is sexual reproduction? Write down its advantages and disadvantages.
14. What is seed dormancy? Write down the different methods to overcome seed dormancy.
15. What is mulching? Write down its advantages and disadvantages.
16. What is pruning? Write down the objectives and principles of pruning.
17. What is a fertilizer? Explain the method of application of fertilizers.

SECTION – B

Answer **All** the questions. Each question carries **TEN** marks

(5*10 = 50)

1. a) Write down the scope and role of horticulture in national income.
(OR)
b) Write down the classification of vegetables and fruits.
10. a) What is budding? Explain the types of budding with diagrams.
(OR)
b) What is layering? Explain the types of layering with diagrams.
11. a) What is grafting? Explain any seven types of grafting with diagram.
(OR)
b) Describe the horticulture zones of India.
12. a) Explain neatly about the Espalier system and Bower system with diagram.
(OR)
b) Define weed? Explain the preventive and curative methods of weed management.

13. a) Write down the different types of irrigation system with neat diagram.

(OR)

b) What is a lawn? Explain briefly about the maintenance of lawn.

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INTRODUCTORY CROP PHYSIOLOGY

Unit :1 WATER RELATION IN PLANTS

- 1.1 Role of water in plant metabolism
- 1.2 Osmosis inhibition ,diffusion ,water potential and its components
- 1.3 Measurements of water potential in plants ,absorption of water
- 1.4 Mechanism of absorption and ascent of sap

Unit :2 STOMATA

- 2.1 Structure ,distribution ,classification ,mechanism of opening and closing of stomata
- 2.2 Osmotic pressure, guttation, stem bleeding
- 2.3 Transpiration method and mechanism and factors affecting transpiration

Unit :3 DROUGHT

- 3.1 Different types of stresses , water,heat,and cold tolerance ,mechanism of tolerance
- 3.2 Plant nutrition essential,mechanism of absorption
- 3.3 Nutrients role in plant metabolism

UNIT: 4 PHOTOSYTHESIS

- 4.1 Photosynthesis, structure and function of chloroplast ,dark and light reactions, cyclic and non-cyclic electron transfer
- 4.2 Co₂ fixation – C₃,C₄ and CA metabolism, advantages of C₄ pathway

UNIT: 5 PHOTORESPIRATION AND PHYTOHORMONES

- 5.1 Photorespiration and its implications ,factors affecting photosynthesis
- 5.2 Phytohormones, physiological role in controlling plant process environmental stimuli for plant development

Text book: Tais, L. and Zeiger, E. 2010. Plant PhysioLogy 5Th edition, Sinauer Associates, Sunderland, MA,USA

Reference Books :

1. Tais, L. and Zeiger, E. 2010. Plant PhysioLogy 5Th edition, Sinauer Associates, Sunderland, MA,USA
2. Gardner, F.P., Pearce, R.B., and Mitchell, R.L. 1985. Physiology of Crop Plants. Scientific Publishers, Jodhpur.
3. Noggle, G.R. and Fritz, G.J., 1983. Introductory Plant Physiology. 2nd Edition. Prentice Hall Publishers, New Jersey, USA.

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MODEL PAPER

Introductory Crop Physiology (1-1)

TOTAL MARKS -75 M

I Answer any five from the following (5x5=25M)

1. Write about functions of water in plant metabolism?
2. Write about osmosis and its significance?
3. Write the mechanism of opening and closing of stomata?
4. Write about stress and its types and mechanism?
5. Write the difference between active and passive absorption?
6. Factors affecting photosynthesis?
7. Factors affecting transpiration?
8. Difference between C₃ and C₄ cycle?

II Answer any five from the following (5x10=50M)

9. (a) Write C₂ cycle?
or
(b) Write CAM cycle?
10. (a) Write about cyclic photo phosphorylation?
or
(b) Write briefly about plant growth regulators and their physiological role?
11. (a) Write about properties of water?
or
(b) factors affecting absorption of water?
12. (a) Write the macro nutrients and their role?
or
(b) Write the micro nutrients and their role?
13. (a) Write the general nutrient deficiency symptoms?
or
(b) Write about types of soil water?

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ON JOB TRAINING - I

Unit I: SEMINARS

- 1.1 Seminars for the topics allotted for the individual student
- 1.2 Aids used in making the seminar
- 1.3 Practical importance of the seminar

Unit II: FIELD VISITS AND TRIPS

- 2.1 Submission reports regarding the Field trip
- 2.2 Submission of photos
- 2.3 Interpretation of their practical work with the field visit

Unit III: TECHNICAL TRAINING

- 3.1 New technologies involved in the subjects
- 3.2 Possibility of implementation of new technologies
- 3.3 Necessary training programmes such as industrial training etc.

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I Year Semester – II

ENGLISH COMMUNICATION SKILLS - II

CSS 02 aims at improving the speaking skills of the learner. For many learners of English, the sound-spelling relationship of the language appears archaic. Another problem many Indian learners face is English word accent. Unit I and Unit II help learners overcome these problems to a great extent. The remaining units are on the two productive skills, speaking and writing. The techniques of day-to-day conversations and the important characteristics of interviews and GDs presented in this course strengthen the learner's speaking skills. The last unit presents various aspects of presentation in writing.

Unit I: Pronunciation - 1

The Sounds of English

Unit II: Pronunciation – 2

1. Word Accent
2. Intonation

1. Conversation Skills
2. Interview Skills
3. Presentation Skills
4. Public Speaking

1. Role Play
2. Debate
3. Group Discussion

Unit V: Writing Skills

1. Spelling
2. Punctuation
3. Information
Transfer Tables
Bar Diagrams
Line Graphs
Pie Diagrams
Flow Charts
Tree Diagrams
Pictures

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I Year Semester – II

CHEMISTRY (PHYSICAL AND GENERAL CHEMISTRY)

PHYSICAL CHEMISTRY

UNIT-I

SOLID-STATE

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law of symmetry. Definition of lattice point, space lattice, unit cell. Bravais lattices and crystal systems. X-ray diffraction and crystal structure. Bragg's law. Defects in crystals. Stoichiometric and non-stoichiometric defects.

UNIT-II

1. GASEOUS STATE

Compression factors, deviation of real gases from ideal behavior. Vander Waal's equation of state. P-V Isotherms of real gases, Andrew's isotherms of carbon dioxide, continuity of state. Critical phenomena. The Vander Waal's equation and the critical state. Law of corresponding states. Relationship between critical constants and Vander Waal's constants. Joule Thomson effect.

2. LIQUID STATE

Structural differences between solids, liquids and gases. Liquid crystals, the mesomorphic state. Classification of liquid crystals into Smectic and Nematic. Differences between liquid crystal and solid/liquid. Application of liquid crystals as LCD devices.

UNIT-III

SOLUTIONS

Liquid-liquid - ideal solutions, Raoult's law. Ideally dilute solutions, Henry's law. Nonideal solutions. Vapour pressure - composition and vapour pressure- temperature curves. Azeotropes-HCl-H₂O, ethanol-water systems and fractional distillation. Partially miscible liquids-phenol-water, trimethylamine-water, nicotine-water systems. Effect of impurity on consolute temperature. Immiscible liquids and steam distillation. Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

GENERAL CHEMISTRY

UNIT-IV

1. SURFACE CHEMISTRY

Definition of colloids. Solids in liquids(sols), preparation, purification, properties - kinetic, optical, electrical. Stability of colloids, Hardy-Schulze law, protective colloid. Liquids in liquids (emulsions) preparation, properties, uses. Liquids in solids (gels) preparation, uses. Adsorption: Physical adsorption, chemisorption. Freundlich, Langmuir adsorption isotherms. Applications of adsorption

2. CHEMICAL BONDING

Valence bond theory, hybridization, VB theory as applied to ClF₃, Ni(CO)₄, Molecular orbital theory - LCAO method, construction of M.O. diagrams for homonuclear and hetero-nuclear diatomic molecules (N₂, O₂, CO and NO).

UNIT-V

STEREOCHEMISTRY OF CARBON COMPOUNDS

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae. Optical isomerism: Optical activity- wave nature of light, plane polarised light, optical rotation and specific rotation. Chiral molecules- definition and criteria(Symmetry elements)- Definition of enantiomers and diastereomers – Explanation of optical isomerism with examples Glyceraldehyde, Lactic acid, Alanine, Tartaric acid, 2,3-dibromopentane. D,L and R,S configuration methods and E,Z- configuration with examples.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
2019-20 Admitted Batch
I Year Semester – II

CHEMISTRY (GENERAL AND PHYSICAL CHEMISTRY)

PRACTICAL

Analysis of Mixture Salt

(At the end of Semester-II)

Qualitative inorganic analysis

Analysis of mixture salt containing two anions and two cations (From two different groups) from the following:

Anions: Carbonate, sulphate, chloride, bromide, acetate, nitrate, borate, phosphate.

Cations: Lead, copper, iron, aluminum, zinc, manganese, calcium, strontium, barium, potassium and ammonium.

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I Year Semester – II

INFORMATION & COMMUNICATION TECHNOLOGY –1 (ICT-1)
Computer Fundamentals and Office Tools

Unit-I

Basics of Computers :Definition of a Computer - Characteristics and Applications of Computers – Block Diagram of a Digital Computer – Classification of Computers based on size and working – Central Processing Unit – I/O Devices.

Unit-II

Primary, Auxiliary and Cache Memory – Memory Devices. Software, Hardware, Firmware and People ware – Definition and Types of Operating System – Functions of an Operating System – MS-DOS – MS Windows – Desktop, Computer, Documents, Pictures, Music, Videos, Recycle Bin, Task Bar – Control Pane.

Unit-III

MS WORD

Features of MS-Word – MS-Word Window Components – Creating, Editing, Formatting and Printing of Documents – Headers and Footers – Insert/Draw Tables, Table Auto format – Page Borders and Shading – Inserting Symbols, Shapes, Word Art, Page Numbers, Equations – Spelling and Grammar – Thesaurus – Mail Merge

Unit-IV

MS-PowerPoint

Features of PowerPoint – Creating a Blank Presentation - Creating a Presentation using a Template - Inserting and Deleting Slides in a Presentation – Adding Clip Art/Pictures - Inserting Other Objects, Audio, Video - Resizing and Scaling of an Object – Slide Transition – Custom Animation

Unit-V

MS-Excel

Overview of Excel features – Creating a new worksheet, Selecting cells, Entering and editing Text, Numbers, Formulae, Referencing cells – Inserting Rows/Columns –Changing column widths and row heights, auto format, changing font sizes, colors, shading.

Text Book

Fundamentals of Computers by ReemaThareja, Publishers : Oxford University Press, India

Books for Reference

1. Fundamentals of Computers by ReemaThareja, Publishers : Oxford University Press, India
2. Fundamentals of Computers by V.Raja Raman, Publishers : PHI
3. Microsoft Office 2010 Bible by John Walkenbach, Herb Tyson, Michael
4. R.Groh and Faithe Wempen, Publishers : Wiley

ADIKAVI NANNAYA UNIVERSITY
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I Year Semester – II

FUNDAMENTALS OF PLANT BREEDING

Unit I - Reproductive systems and plant breeding

Introduction to plant breeding - objectives and role - historical perspective centers of origin – germplasm – conservation -plant introduction - reproduction in plants- systems of mating - self incompatibility – sterility.

Unit II - Breeding methods of self pollinated crops

Breeding methods: self pollinated crops- pureline selection – mass selection –pedigree breeding – bulk breeding - single seed descent - backcross breeding – multiline.

Unit III - Breeding methods of cross pollinated crops

Breeding methods: cross pollinated crops - mass selection; Heterosis breeding –types of hybrids; recurrent selection - synthetics - composites; asexual breeding methods

Unit IV - Special breeding methods

Mutation breeding - polyploidy breeding and distant hybridization — Introduction to markers -Use of markers for crop improvement

Unit V – Botanical description and Breeding techniques in different crops

Classification of plants, Botanical description, Floral biology, Emasculation and Pollination techniques in fruits and vegetables – Tomaoto, Brinjal, Bhindi, Chilli, Mango, Citrus, Banana and Gourds.

Text book: Singh, B.D.2015, *Plant breeding: Principles and methods*. Kalyani Publishers, New Delhi.

Reference Books:

1. R.W. Allard, *Principles of plant breeding*. John Wiley & Sons, New York.
2. Singh, B.D.2015, *Plant breeding: Principles and methods*. Kalyani Publishers, New Delhi.
3. Sharma, J.R. 1994. *Principles and Practice of Plant breeding*. Tata McGraw Hill Publishing Company Ltd., New Delhi.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
2019-20 Admitted Batch
I Year Semester – II

FUNDAMENTALS OF PLANT BREEDING

PRACTICALS

1. Botanical description and floral biology-General
2. Plant Breeders Kit
3. Different emasculation and crossing techniques in important horticultural crops
4. Breeding objectives floral biology, selfing- emasculation crossing techniques in Tomato, Bhendi and Chillies.
5. Breeding objectives floral biology, selfing- emasculation crossing techniques in Bottle gourd and Ridge gourd.
6. Breeding objectives floral biology, selfing- emasculation crossing techniques in Mango.
7. Determination of mode of reproduction in plants.
8. Field layout and experimental designs.
9. Maintenance experimental records & registers
10. Developmental of hybrids (One line, Two line and Three line Breeding)
11. Calculation of Heterosis , Heterobeltionsis and standard Heterosis and inbreeding depression.
12. Calculation of genetic advance and heritability.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
2019-20 Admitted Batch
I Year Semester – II

VEGETABLE SCIENCE

Unit:-1.

Olericulture.
Importance of Vegetable Cultivation.
Role of Vegetables in Human Health.
Role of Vegetables in Economy.

Unit:-2.

Markets.
Types of Market.

Unit:-3

Classification of Vegetables.

Family
Season.
Edible Part.
Type of Planting.
Time of Sowing.
P.H.

Unit:4

Nursery Raising.
Nursery Bed Preparation
Seed Bed Preparation.

Unit:-5.

Vegetable Production, Fertilizer Application, Hybrid Varieties, Deficiency Symptoms and Pest and Disease Management.

- | | |
|---------------------------|-------------------------------|
| • Tomato | Brinjal |
| • Bhendi | Beans(Cluster And French) |
| • Chilli and Capsicum | Cucurbits. |
| • Cabbage and Cauliflower | Onion. |
| • Carrot | Tubers(Potato,Yam,Colacassia) |

Text book : S.Thamburaj, 2014. Text book of vegetable, tuber crops and Spices. ICAR, New Delhi

Reference Books:

1. S.Thamburaj, 2014. Text book of vegetable, tuber crops and Spices. ICAR, New Delhi
2. P.Hazra, 2011. Modern Technology in vegetable Production. New India publishing agency. New Delhi
3. K.V Kamath, 2007. Vegetable Crop Production, Oxford Book Company, New York

ADIKAVI NANNAYA UNIVERSITY
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2019-20 Admitted Batch
I Year Semester – II

VEGETABLE SCIENCE

PRACTICALS

1. Identification Of Vegetable Seeds
2. Nursery Bed Preparation
3. Nursery Raising
4. Methods Of Sowing
5. Vegetable Production.
 - A. Tomato B. Brinjal
 - C. Bhendi
 - D. Beans(Cluster And French)
6. Weed Management
7. Pest And Disease Management
8. Irrigation

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
2019-20 Admitted Batch
I Year Semester – II

FUNDAMENTALS OF ENTOMOLOGY

Unit I: History and importance

History of Entomology in India; Position of insects in the animal kingdom and their relationship with other classes of Arthropoda; Reasons for insect dominance.

Unit II: Morphology

General organisation of insect body wall - structure and function, cuticular appendages, moulting; Body regions - insect head, thorax and abdomen, their structure and appendages.

Unit III: Anatomy and physiology

Digestive, excretory, respiratory, circulatory, nervous and reproductive systems in insects, sense organs and their functions; Embryonic and post embryonic development.

Unit IV: Taxonomy of Apterygota and Exopterygota

Insect systematics; Distinguishing characters of agriculturally important orders and families of Hexapoda. Apterygota (Thysanura, Diplura, Protura and Collembola); Exopterygota (Ephemeroptera, Odonata, Orthoptera, Phasmida, Dictyoptera, Dermaptera, Hemiptera, Isoptera, Mallophaga, Thysanoptera).

Unit V: Taxonomy of Endopterygota

Distinguishing characters of agriculturally important families of Lepidoptera, Coleoptera, Diptera, Hymenoptera, Siphonaptera, Neuroptera.

ADIKAVI NANNAYA UNIVERSITY
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I Year Semester – II

FUNDAMENTALS OF ENTOMOLOGY

PRACTICALS

1. Observations on external features of cockroach,
2. Methods of insect collection, preservation
3. Types of insect head, antenna, mouth parts
4. Types of insect legs, wings and their modifications – wing coupling.
5. Structure of abdomen, and its modifications.
6. Metamorphosis in insects – immature stages in insects.
7. Study of digestive and reproductive systems of cockroach
8. Observing the characters of agriculturally important orders and families.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
2019-20 Admitted Batch
I Year Semester – II

ORNAMENTAL HORTICULTURE & LANDSCAPING

Unit:-1.

1. Definition of ornamental horticulture- Importance of Ornamental Horticulture.
2. Definition of Floriculture- Scope and importance of floriculture industry in India.
3. Definition of Landscape and Landscaping.
4. Garden components and features.
5. Garden adornments- garden seats, ornamental tubs urns, vases, bird baths- sundials floral clocks ornamental stones- fountains and statues

Unit:-2.

1. Features of English – Italian- French and Japanese gardens-Water ponds- water falls- fountains bridges- water basins-fences and gates.
2. Famous gardens of India- Lal Bagh- Brindavan garden_ Botanical garden- Moghul garden-Chandigarh Rose garden.
3. Specialized gardens-Herb garden Bog garden- sanken garden- kitchen garden-gardening in hanging baskets- window garden-importance of green house.
4. Rock garden- water garden and roof garden.

Unit:-3.

1. Lawn-selection of grass-site selection- soil- preparation of soil- drainage-manuring and grading-maintenance of lawn-mowing rolling irrigation weeding- diseases and other problems.
2. Ornamental and shady trees.
3. Shrubs
4. Herbaceous perennials
5. Climbers

Unit:-4.

1. Palms
2. Ferns
3. Cactai
4. Circulance
5. Bio-aesthetic planning

Unit:-5.

1. Land scaping
2. Floral ornaments- garlands-bouquets floral arrangements
3. Study of principles of landscape design and elements of landscape design

Text book: A.K. Tiwari & R.Kumar, Fundamentals of ornamental Horticulture and Landscape gardening

Reference Books:

1. A.K. Tiwari & R.Kumar, Fundamentals of ornamental Horticulture and Landscape gardening
2. K.V.Peter, 2009 ornamental plants. New India Publishing agency Pitampura, New Delhi

ADIKAVI NANNAYA UNIVERSITY
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2019-20 Admitted Batch
I Year Semester – II

ON JOB TRAINING -II

I.	FIELD TRIP (3)	:	3 trips X 5 M = 15 Marks
II.	PROJECT REPORT	:	15 Marks
III.	FIELD WORK	:	10 X 1M = 10 Marks
	1.		
	2.		
	3.		
	4.		
	5.		
	6.		
	7.		
	8.		
	9.		
	10.		
IV.	SEMINAR	:	5 Marks
V.	VIVA	:	5 Marks
	TOTAL MARKS	:	50 Marks

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
2018-2019 Admitted Batch onwards
II Year Semester – III

ENGLISH COMMUNICATION SKILLS – III

A current axiom is that hard skills will get a person an interview, but soft skills will get that person the job. Unit I of the course is on soft skills, which are absolutely necessary in the global job market. Writing is considered the most difficult of all the skills. Units II to V help the learner improve their writing skills, especially academic/formal writing.

Unit I: Soft Skills

1. Positive Attitude
2. Body Language
3. SWOT/SWOC Analysis
4. Emotional Intelligence
5. Netiquette

Unit II: Paragraph Writing

1. Paragraph Structure
2. Development of Ideas

Unit III: Paraphrasing and Summarizing

1. Elements of Effective Paraphrasing
2. Techniques for Paraphrasing
3. What Makes a Good Summary?
4. Stages of Summarizing

Unit IV: Letter Writing

1. Letter Writing (Formal and Informal)
2. E-correspondence

Unit V:

1. Resume and CV
2. Cover Letter

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
2018-2019 Admitted Batch onwards
II Year Semester – III

INORGANIC CHEMISTRY

UNIT – I

1. Chemistry of d-block elements:

Characteristics of d-block elements with special reference to electronic configuration, variable valence, magnetic properties, catalytic properties and ability to form complexes. Stability of various oxidation states.

2. Theories of bonding in metals:

Metallic properties and its limitations, Valence bond theory, Free electron theory, Explanation of thermal and electrical conductivity of metals, limitations, Band theory, formation of bands, explanation of conductors, semiconductors and insulators.

UNIT – II

1. Metal carbonyls :

EAN rule, classification of metal carbonyls, structures and shapes of metal carbonyls of V, Cr, Mn, Fe, Co and Ni.

2. Chemistry of f-block elements:

Chemistry of lanthanides - electronic structure, oxidation states, lanthanide contraction, consequences of lanthanide contraction, magnetic properties. Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides, separation of lanthanides by ion exchange method and solvent extraction method.

ORGANIC CHEMISTRY

UNIT – III

1. Halogen compounds

Nomenclature and classification of alkyl (into primary, secondary, tertiary), aryl, aryl alkyl, allyl, vinyl, benzyl halides. Nucleophilic aliphatic substitution reaction- classification into SN^1 and SN^2 – reaction mechanism with examples – Ethyl chloride, t-butyl chloride and optically active alkyl halide 2-bromobutane.

2. Hydroxy compounds

Nomenclature and classification of hydroxy compounds. Alcohols: Preparation with hydroboration reaction, Grignard synthesis of alcohols. Phenols: Preparation i) from diazonium salt, ii) from aryl sulphonates, iii) from cumene. Physical properties- Hydrogen bonding (intermolecular and intramolecular). Effect of hydrogen bonding on boiling point and solubility in water. Identification of alcohols by oxidation with $KMnO_4$, Ceric ammonium nitrate, Luca's reagent and phenols by reaction with $FeCl_3$.

Chemical properties:

- a) Dehydration of alcohols.
- b) Oxidation of alcohols by CrO_3 , $KMnO_4$.
- c) Special reaction of phenols: Bromination, Kolbe-Schmidt reaction, Reimer-Tiemann reaction, Fries rearrangement, azocoupling, Pinacol-Pinacolone rearrangement.

UNIT-IV

Carbonyl compounds

Nomenclature of aliphatic and aromatic carbonyl compounds, structure of the carbonyl group. Synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3-dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties: Reactivity of carbonyl group in aldehydes and ketones.

Nucleophilic addition reaction with a) NaHSO_3 , b) HCN , c) RMgX , d) NH_2OH , e) PhNHNH_2 , f) 2,4 DNPH, g) Alcohols-formation of hemiacetal and acetal. Base catalysed reactions: a) Aldol, b) Cannizzaro's reaction, c) Perkin reaction, d) Benzoin condensation, e) Haloform reaction, f) Knoevenagel reaction. Oxidation of aldehydes- Baeyer-Villiger oxidation of ketones. Reduction: Clemmensen reduction, Wolf-Kishner reduction, MPV reduction, reduction with LiAlH_4 and NaBH_4 . Analysis of aldehydes and ketones with a) 2,4-DNPH test, b) Tollen's test, c) Fehling test, d) Schiff's test

e) Haloform test (with equation)

UNIT-V

1. Carboxylic acids and derivatives

Nomenclature, classification and structure of carboxylic acids. Methods of preparation by a)

Hydrolysis of nitriles, amides b) Hydrolysis of esters by acids and bases with mechanism c)

Carbonation of Grignard reagents. Special methods of preparation of aromatic acids by a)

Oxidation of side chain. b) Hydrolysis by benzotrichlorides.

c) Kolbe reaction. Physical properties: Hydrogen bonding, dimeric association, acidity-strength of acids with examples of trimethyl acetic acid and trichloroacetic acid. Relative differences in the acidities of aromatic and aliphatic acids. Chemical properties: Reactions involving H, OH and COOH groups- salt formation, anhydride formation, acid chloride formation, amide formation and esterification (mechanism). Degradation of carboxylic acids by Huns-Diecker reaction, decarboxylation by Schimdt reaction, Arndt- Eistert synthesis, halogenation by Hell- Volhard- Zelinsky reaction.

2. Active methylene compounds

Acetoacetic ester: keto-enol tautomerism, preparation by Claisen condensation, Acid hydrolysis and ketonic hydrolysis.

Preparation of

a) monocarboxylic acids.

b) Dicarboxylic acids. c) Reaction with urea

Malonic ester: preparation from acetic acid. Synthetic applications: Preparation of

a) monocarboxylic acids (propionic acid and n-butyric acid). b) Dicarboxylic acids (succinic acid and adipic acid) c) α,β -unsaturated carboxylic acids (crotonic acid).

d) Reaction with urea.

Text Book

1. A Text Book of Organic Chemistry by B.S. Bahl and Arun Bahl

List of Reference Books

2. Selected topics in inorganic chemistry by W.D.Malik, G..D.Tuli,R.D.Madan
3. Inorganic Chemistry J E Huheey, E A Keiter and R L Keiter
4. A Text Book of Organic Chemistry by B.S. Bahl and Arun Bahl
5. A Text Book of Organic chemistry by Vol I by I.L. Finar Vol I
6. Organic chemistry by Bruice
7. Organic chemistry by Clayden
8. Advanced Inorganic chemistry by Gurudeep Raj
9. Basic Inorganic Chemistry by Cotton and Wilkinson
10. Concise Inorganic Chemistry by J.D.Lee

ADIKAVI NANNAYA UNIVERSITY
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2018-2019 Admitted Batch onwards
II Year Semester – III

ORGANIC AND INORGANIC CHEMISTRY (PRACTICAL)

Practical -III: Titrimetric Analysis and Organic Functional Group Reactions

Titrimetric analysis

1. Determination of Fe (II) using KMnO_4 with oxalic acid as primary standard.
2. Determination of Cu(II) using $\text{Na}_2\text{S}_2\text{O}_3$ with $\text{K}_2\text{Cr}_2\text{O}_7$ as primary standard.

Organic Functional Group Reactions

3. Reactions of the following functional groups present in organic compounds:
(at least four) Alcohols, Phenols, Aldehydes, Ketones, Carboxylic acids and Amides

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II Year Semester – III

INFORMATION & COMMUNICATION TECHNOLOGY -2 (ICT -2)

Unit I:

Fundamentals of Internet : Networking Concepts, Data Communication – Types of Networking, Internet and its Services, Internet Addressing – Internet Applications – Computer Viruses and its types – Browser –Types of Browsers.

Unit II:

Internet applications: Using Internet Explorer, Standard Internet Explorer Buttons, Entering a Web Site Address, Searching the Internet.

Introduction to Social Networking: Twitter, LinkedIn, Facebook, Flickr, Skype, Yahoo!, Google+, Youtube, WhatsApp, etc.

Unit III:

E-mail: Definition of E-mail - Advantages and Disadvantages – User Ids, Passwords, Email Addresses, Domain Names, Mailers, Message Components, Message Composition, Mail Management, Email Inner Workings.

Unit IV:

WWW- Web Applications, Web Terminologies, Web Browsers, URL – Components of URL, Searching WWW – Search Engines and Examples

Unit V:

Basic HTML: Basic HTML – Web Terminology – Structure of a HTML Document – HTML, Head and Body tags – Semantic and Syntactic Tags – HR, Heading, Font, Image and Anchor Tags –Different types of Lists using tags – Table Tags, Image formats – Creation of simple HTML Documents.

Reference Books

1. In-line/On- line: Fundamentals of the Internet and the World Wide Web, 2/e – by Raymond Green law and Ellen Hepp, Publishers.

ADIKAVI NANNAYA UNIVERSITY
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2018-2019 Admitted Batch onwards
II Year Semester – III

PRODUCTION TECHNOLOGY OF FRUIT SCIENCE

Unit I:

Role of fruit crops in national economy, pollination mechanism-Propagation – definition – methods - merits and demerits – propagation through seeds - dormancy and methods of overcoming dormancy – Vegetative propagation – merits and demerits – cutting, layering, grafting and budding – rootstock influence – stock / scion relationship– micro propagation. Scope and importance of fruit crops-classification of fruit crops – area, production, productivity and export potential.

Unit II:

Climate and soil requirements – varieties – propagation - planting density and systems of planting –cropping systems - after care - training and pruning - water, nutrient and weed management– fertigation –special horticultural techniques - plant growth regulation – Important disorders – maturity indices and harvest- post harvest management.

Crops: Mango, Banana, Grapes, Citrus (sweet orange, mandarin, acid lime), Papaya, Indian goose berry (Aonla)

Unit III:

Climate and soil requirements – varieties – propagation - planting density and systems of planting –cropping systems - after care - training and pruning - water, nutrient and weed management-special horticultural techniques –plant growth regulation - important disorders –maturity indices and harvest- post harvest management.

Crops: Sapota, pomegranate, Guava, Pineapple, Jack, Apple, Pear, Plum.

Unit IV:

Fundamentals of Floriculture – Loose flowers and cut flowers-Classification – scope – area and production – Domestic and export potential of commercial flowersprotected cultivation - propagation – nursery practices – special practices like pinching, training and pruning – role of growth regulators

Unit V:

Loose flower : rose, jasmine, chrysanthemum, tuberose, crossandra and marigold –Cut flowers - rose, carnation, cut chrysanthemum, gerbera, liliium, anthurium and tropical orchids –Macro and micro climate - varieties – planting methods – nutrient, water and weed management – Irrigation and fertigation — harvest –post harvest management practices – grading and packaging – export standards of loose and cut flowers –flower arrangement

Text book: Chandha, K.L. (ICAR) 2002, 2001. Hand book of Horticulture. ICAR, New Delhi.

Reference Books:

1. Chundrawat, B.S. 1990. Arid fruit culture, Oxford and IBH, New Delhi.
2. Chandha, K.L. (ICAR) 2002, 2001. Hand book of Horticulture. ICAR, New Delhi.
3. Symmonds, 1996. Banana. II Edn. Long man, London.
4. Radha T and Mathew L., 2007. Fruit crops. New India Publishing Agency
5. S.P Singh, 2004. Commercial fruits. Kalyani Publishers, New Delhi.

ADIKAVI NANNAYA UNIVERSITY
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2018-2019 Admitted Batch onwards
II Year Semester – III

Production Technology of Fruit Science

PRACTICALS

1. Features of an orchard – Tools, implements and machineries used for horticultural operations
2. Micro propagation, protocol for mass multiplication and hardening of fruit crops.
4. Propagation techniques, selection of planting material, varieties, important cultural practices for Mango, Banana
3. Propagation techniques, selection of planting material, varieties, important cultural practices for Grapes and Papaya
4. Propagation techniques, selection of planting material, varieties, important cultural practices for Sapota and Guava
5. Identification of varieties and propagation, fertilizer application and pruning practices

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
2018-2019 Admitted Batch onwards
II Year Semester – III
MODEL PAPER

Production Technology of Fruit Science (2-1)

TOTAL MARKS -75 M

I Answer any five from the following (5x5=25M)

14. Explain briefly about grafting?
15. Write about Scope and importance of fruit crops?
16. Write about the factors favoring cross pollination?
17. Write about post harvest handling of flowers?
18. Write about the special cultural practices involved in flower crops?
19. Write about the scope and importance of flower crops
20. Write the steps involved in tissue culture technique and explain briefly along with flow chart?
21. Write the merits and demerits of sexual and asexual propagation?

II Answer any five from the following (5x10=50M)

9. (a) Write the harvesting indices of mango?
or
(b) Write the harvesting indices of banana?
10. (a) what is alternate bearing in mango
or
(b) Write the important cultural operations in banana?
11. (a) Write about bahar treatment?
or
(b) Maturity indices of sapota and pineapple?
12. (a) write about training in grape plants
or
(b) Briefly write about production technology of apple?
13. (a) Write about propagation of pine apple and banana?
or
(b) Briefly write about production technology of papaya?

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2018-2019 Admitted Batch onwards
II Year Semester – III

FUNGICIDES AND PLANT DISEASE MANAGEMENT

Unit-1

Survival of plant pathogens- Dispersal of plant pathogens. Infection process – pre-penetration, penetration and post-penetration. Role of enzymes in pathogenesis Role of toxins in pathogenesis. Defense mechanism in plants – structural , bio chemical. Plant disease epidemiology.

UNIT II

Principles of plant disease management – Avoidance, Exclusion, Eradication, Protection and Resistance. Physical methods and biological methods- important fungal and bacterial biocontrol agents.

UNIT III

Protection – Classification of fungicides based on chemical nature and method of application- Mode of action and formulations of fungicides

UNIT IV

Introduction to botanicals and other non chemical preparation used in them disease management in organic and natural farming systems. Host plant resistance. Integrated disease management. Application of bio-technology in plant disease management

UNIT V

Diseases of important horticultural crops and their management

1. Citrus, Mango, Guava , Papaya, Sapota, Banana & Pomegranate
2. Chillies , Brinjal, Tomoto , cursifers and cucurbit
3. Betalvine, onion, and garlic
4. Coconut, oil palm
5. Turmeric , ginger, mulbury,
6. Rose, marigold, chrysanthemum

Text book: Singh, R.S.1999. Diseases of Vegetable crops. Oxford & IBH Publications, New Delhi.

Reference Books

1. Rangaswami, G & Mahadevan, K.2001. Diseases of crop plants in India, Prentice Hall of India Pvt. Ltd, New Delhi.
2. Singh, R.S.2005. Plant Diseases. Oxford & IBH Publications, New Delhi.
3. Singh, R.S.1999. Diseases of Vegetable crops. Oxford & IBH Publications, New Delhi.
4. Chauble, H.S and V.S Pundhir, 2012. Crop Diseases & Their Management. PHI Pvt. Ltd, New Delhi.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
2018-2019 Admitted Batch onwards
II Year Semester – III

FUNGICIDES AND PLANT DISEASE MANAEMENT

PRACTICALS

1. Survey and assessment of important plant diseases
2. Preparation of Bordeaux mixture
3. Methods of application of fungicides
4. Special methods of application –pseudo stem injection, root feeding, pairing and pralinage, trunk injection
5. Study of symptoms identification and histopathological studies on following diseases
6. Citrus diseases
7. Mango diseases
8. guava and sapota diseases
9. Papaya, banana and pomegranate diseases
10. Field visits for diagnose the crop diseases
11. Chilli, brinjal and bhindi diseases
12. Crucifers and cucurbit diseases
13. Betel vine , onion, beans, colocasia and coriander diseases
14. Coconut and oil palm diseases
15. Mulberry, rose, chrysanthemum diseases
16. Students should submit 50 pressed as well as mounted species

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II Year Semester – III
MODEL PAPER

FUNGICIDES & PLANT DISEASE MANAGEMENT

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any **FIVE** questions. Each question carries equal marks. (5*5 = 25)

1. What are essential considerations in plant disease management?
2. Explain the factors affecting the success of process of infection.
3. Explain Disease triangle & Disease pyramid.
4. Describe the classification of toxins.
5. Write about classification of fungicides based on chemical nature.
6. Define the terms biotroph, syndrome, predisposition, sign and disorder.
7. Differentiate between soil inhabitants & soil invaders.
8. Define Immunization and explain types of resistance.

SECTION – B

Answer **All** the questions. Each question carries **TEN** marks (5*10 = 50)

9. a) Explain the process of vector mediated gene transfer with neat diagram.
(OR)
b) What is IPDM? Write IPDM strategies in Rice & sugarcane.
10. a) Briefly write about mechanisms of biological control.
(OR)
b) Explain about the principles of plant disease management
11. a) classify and explain the methods of biochemical defense mechanism.
(OR)
b) Briefly write about role of growth regulators in plant pathogenesis.
12. a) Explain the process of infection along with stages in diagram.
(OR)
b) Explain the viral disease transmission through vectors with 10 examples.
13. a) Explain the sources of survival of pathogens briefly.
(OR)
b) Write about classifications of systemic fungicides along with their mode of action on plant diseases.

ADIKAVI NANNAYA UNIVERSITY

**Bachelor of Vocation: HORTICULTURE
2018-2019 Admitted Batch onwards
II Year Semester – III**

INTRODUCTION TO SOIL SCIENCE

UNIT – I INTRODUCTION TO SOIL SCIENCE & SOIL CHEMISTRY

Definition of soil and various concept of soil-Branches of soil science
Rocks-Classification of rocks.Minerals.Weathering

UNIT – II SOIL COMPONENTS:

Soil air, Soil water, organic and inorganic solids, Soil temperature.

UNIT – III PHYSICAL PROPERTIES:

Soil separates, texture, Aggregation and Structural Characters, Temperature, Color and Soil consistency. Properties of Soil Mixture, Pore Space, Bulk Density, Particle Density, Aeration. Drainage, compaction, Surface area, Soil water relations. Soil strength and its importance.

UNIT - IV MORPHOLOGY OF COLLOIDS & BIOLOGICAL PROPERTIES OF SOIL

Chemistry of clays, Ionic exchange. Acidity, alkalinity, PH, and salinity relations, Liming and Acidification. Soil Organic matter, C:N relations; CEC N Transformations, Soil organisms, Sulphur transformation.

UNIT - V GENESIS SOIL TAXONOMY AND CLASSIFICATION

Profile, Soil forming factors-Pedogenic process – Difference between surface soil and sub soil. Soil physical properties-Soil texture. Soil distribution, Classification of Systems, Drainage, Erosion: Mechanisms and Control.

Soil classification – early systems of soil classification- Diagnose the origin

Soil groups of India – alluvial soils, black soils, red soils, laterite soils and coastal sands.

Text book: Dilip Kumar Das, 2015. Introductory Soil Science. Kalyani Publishers, Ludhiana.

Reference Books

1. Brady Nyle C and Ray R Well, 2014, Nature and Properties of soils. Pearson Education Inc., New Delhi.
2. Indian Society of Soil Science, 2002. Fundamentals of Soil Science, IARI, New Delhi.
3. Dilip Kumar Das, 2015. Introductory Soil Science. Kalyani Publishers, Ludhiana.
4. Biswas, T.D. and Mukharjee, S.K., 2015. Text Book of Soil Science. Tata Mc Graw Hill Publishing Co. Ltd., New Delhi.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
2018-2019 Admitted Batch onwards
II Year Semester – III

INTRODUCTION TO SOIL SCIENCE

PRACTICALS

1. Land use selection, texture Bulk density and pore space
2. Soil health card, Parameters, EC, PH and their Importance.
3. Determination of EC
4. Determination of PH of soil
5. Fertilizer recommendations
6. Soil testing , soil sampling procedures for field and horticultural soils.
7. Determination of N, P and K of the soil
8. Determination of Sulphur
9. Description of soil profile in the field.
10. Determination of soil moisture content by gravitational method

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II Year Semester – III

MODEL PAPER

INTRODUCTION TO SOIL SCIENCE

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

Answer any **FIVE** questions. Each question carries equal marks. (5*5 = 25)

1. Define Soil? Why it is called OS natural body?
2. Discuss about the profile of the Soil.
3. What do you mean by soil texture and soil structure?
4. Write a note on soil Air and Soil water.
5. What do you mean by soil color? What was the impact of soil color on crop growth.
6. Define Soil Science and mention the importance of soil science in Agriculture.
7. What is Soil survey and dismiss about soil survey reports.
8. Write a note on classification of soil.

SECTION – B

Answer **All** the questions. Each question carries **TEN** marks (5*10 = 50)

9. a) What do you mean the seep out of top soil? Explain its types.

(OR)

b) What is drainage? Write its types.
10. a) Write a detailed note on soil relations.

(OR)

b) What is ion? What do you mean by ionic exchanger? Discuss about cat ion exchange capacity.
11. a) Write an essay on soil organic matter? Its importance for flora & fauna of soil.

(OR)

b) Write about the chemistry of soil? Discuss about bulk and practical density.
12. a) Write a note on Porosity of soil.

(OR)

b) Discuss about nitrogen transformation in detailed manner.
13. a) Scope and importance of soil sciences and how it helps for future agriculture.

(OR)

b) Write a note on sulfur transformation.

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II Year Semester – III

ON JOB TRAINING -III

I. FIELD TRIP (3) : 3 trips X 5 M = 15 Marks

II. PROJECT REPORT : 15 Marks

III. FIELD WORK : 10 X 1M = 10 Marks

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

IV. SEMINAR : 5 Marks

V. VIVA : 5 Marks

TOTAL MARKS : 50 Marks

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
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II Year Semester – IV

FUNDAMENTALS OF STATISTICS

Unit-1

Introduction- Various Definitions of Statistics, Singular and plural reference of Statistics, a comprehensive definition of Statistics, Importance of Statistics in agriculture, limitations of statistics. Frequency Distribution - exclusive and inclusive methods, discrete and continuous variables. Central tendency - Definition, measures of Central tendency, list of all the different measures and study of Arithmetic Mean in detail (including merits and average) Arithmetic Mean for ungrouped and grouped data

Unit-2

Measures of Dispersion - meaning of measures of Dispersion, Standard Deviation for ungrouped and grouped data. Coefficient of Variation (C.V), Standard Error (S.E.) and difference between S.D. and S.E. Normal Curve and its properties, identification of normality through data i.e. , $\mu \pm \sigma$ criterion. Etc., expression for frequency function of normal distribution Testing of Hypothesis - Concept, Null hypothesis, Type 1 and Type II Errors, Level of Significance, critical region, general setup of testing

Unit-3

SND test for one sample when σ known and unknown. SND test for two sample when σ known and unknown. Students t-test for one and two samples. Paired t- test and F-test Chi-Square test for 2×2 and $m \times n$ contingency Table, Yate's Correction for continuity. Correlation – Scatter diagram, positive and negative correlation. Correlation Coefficient “r” and its testing. Regression – Fitting of linear regression equation of Y on X and X on Y and the inter relation-ship with “r” and testing of regression coefficients

Unit-4

Analysis of Variance (ANOVA), Definition and assumptions, ANOVA with One-way Classification. ANOVA with Two way Classification. Need for experimental designs and planning of an experiment. Principles and Planning of experimental designs Uniformity Trials- its use in determining optimum plot size, shape and size of Blocks. Uniformity Trials – Maximum Curvature method, FF Smith Methods. Completely Randomized Design (CRD) – layout and analysis with equal and unequal repetitions, advantages and disadvantages Randomized Block Design (RBD) – layout and analysis, advantages and disadvantages Latin-Square Design(LSD) - layout and analysis, advantages and disadvantages.

Unit-5

Missing Plot technique – in RBD with one missing value. Missing Plot technique – in LSD with one missing value. Factorial Experiments – Introduction , 22 Factorial Experiments using Yate's method. Factorial Experiments – 23 Factorial Experiments using Yate's method. Mixed factorial Experiments. Introduction to Sampling, Sampling Vs Census, Purposive and Random Sampling. Simple Random Sampling, method of selection, estimates of Population Mean and Total and the estimates of their variances and confidence limits. Stratified Random Sampling with random allocation, estimates of Population Mean and Total and the estimates of their variances and Confidence Limits

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Bachelor of Vocation: HORTICULTURE
2018-2019 Admitted Batch onwards
II Year Semester – IV

FUNDAMENTALS OF STATISTICS

PRACTICALS

1. Preparing frequency distribution for ungrouped data by using inclusive and exclusive methods
2. Computation of A.M. for grouped and un-grouped data by direct and deviation methods
3. S.D and CV% for grouped and ungrouped data
4. SND test for one Sample, two sample with known and unknown conditions
5. Student's t-test for single sample, two sample and paired t- test
6. F-test (Test for homogeneity of variances)
7. Chi-square test and Yates Correction in Chi-square test
8. Correlation Coefficient and its testing
9. Fitting of Linear Regression and its testing
10. Analysis of CRD with equal and unequal repetitions
11. Analysis of RBD
12. Analysis of LSD.
13. Missing plot Technique in RBD and LSD.
14. Analysis of Factorial experiments using Yates' method
15. Simple Random Sampling
16. Stratified Random sampling with random allocation

Text Book

Nageswara Rao, G 2007, Statistics for Agricultural Sciences, B S Publications, Hyderabad

Books for Reference

Nageswara Rao, G 2007, Statistics for Agricultural Sciences, B S Publications, Hyderabad

Rangaswamy, R 1995, A Text Book of Agricultural Statistics, New Age International (P) Limited, Hyderabad

ADIKAVI NANNAYA UNIVERSITY
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II Year Semester – IV

SPECTROSCOPY AND PHYSICAL CHEMISTRY

SPECTROSCOPY

UNIT-I

General features of absorption - Beer-Lambert's law and its limitations, transmittance, Absorbance, and molar absorptivity. Single and double beam spectrophotometers. Application of Beer-Lambert law for quantitative analysis of 1. Chromium in $K_2Cr_2O_7$

2. Manganese in Manganous sulphate

Electronic spectroscopy:

Interaction of electromagnetic radiation with molecules and types of molecular spectra. Energy levels of molecular orbitals (σ , π , n). Selection rules for electronic spectra. Types of electronic transitions in molecules effect of conjugation. Concept of chromophore and auxochrome.

UNIT-II

Infra red spectroscopy

Different Regions in Infrared radiations. Modes of vibrations in diatomic and polyatomic molecules. Characteristic absorption bands of various functional groups. Interpretation of spectra-Alkanes, Aromatic, Alcohols carbonyls, and amines with one example to each.

Proton magnetic resonance spectroscopy (1H -NMR)

Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants.

Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

PHYSICAL CHEMISTRY

UNIT-III

Dilute solutions

Colligative properties. Raoult's law, relative lowering of vapour pressure, its relation to molecular weight of non-volatile solute. Elevation of boiling point and depression of freezing point. Derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods of determination. Osmosis, osmotic pressure, experimental determination. Theory of dilute solutions. Determination of molecular weight of non-volatile solute from osmotic pressure. Abnormal Colligative properties- Van't Hoff factor.

UNIT-IV

Electrochemistry-I

Specific conductance, equivalent conductance. Variation of equivalent conductance with dilution. Migration of ions, Kohlrausch's law. Arrhenius theory of electrolyte dissociation and its limitations. Ostwald's dilution law. Debye- Huckel-Onsagar's equation for strong electrolytes (elementary treatment only). Definition of transport number, determination by Hittorf's method. Application of conductivity measurements- conductometric titrations.

UNIT-V

1. Electrochemistry-II

2. Single electrode potential, sign convention, Reversible and irreversible cells Nernst Equation- Reference electrode, Standard Hydrogen electrode, calomel electrode, Indicator electrode, metal – metal ion electrode, Inert electrode, Determination of EMF of cell, Applications of EMF measurements - Potentiometric titrations.

3.Phase rule

Concept of phase, components, degrees of freedom. Thermodynamic Derivation of Gibbs phase rule. Phase equilibrium of one component system - water system. Phase equilibrium of two- component system, solid-liquid equilibrium. Simple eutectic diagram of Pb-Ag system, simple eutectic diagram, desilverisation of lead., NaCl-Water system, Freezing mixtures.

Text Book

1. Spectroscopy by William Kemp
2. Spectroscopy by Pavia

List of Reference Books

3. Spectroscopy by William Kemp
4. Spectroscopy by Pavia
5. Organic Spectroscopy by J. R. Dyer
6. Modern Electrochemistry by J.O. M. Bockris and A.K.N.Reddy
7. Advanced Physical Chemistry by Atkins
- 8.Introduction to Electrochemistry by S.Glasstone
9. Elementary organic spectroscopy by Y.R. Sharma
10. Spectroscopy by P.S.Kalsi

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II Year Semester – IV

SPECTROSCOPY AND PHYSICAL CHEMISTRY (PRACTICALS)

Practical Paper - IV Physical Chemistry and IR Spectral Analysis

Physical Chemistry

1. Critical Solution Temperature- Phenol-Water system
2. Effect of NaCl on critical solution temperature (Phenol-Water system)
3. Determination of concentration of HCl conductometrically using standard NaOH solution.
4. Determination of concentration of acetic acid conductometrically using standard NaOH Solution.

IR Spectral Analysis

5. IR Spectral Analysis of the following functional groups with examples
 - a) Hydroxyl groups
 - b) Carbonyl groups
 - c) Amino groups
 - d) Aromatic groups

ADIKAVI NANNAYA UNIVERSITY
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II Year Semester – IV

FUNDAMENTALS OF ECONOMICS & MARKETING

Unit-1

Economics - meaning, definitions, nature, scope and subject matter of economics. Traditional and modern approach of economics. Nature of micro and macro economics. Basic terms and concepts - Goods and services, classification of goods. Utility - meaning, characteristics of utility and forms of utility. Price - meaning; wealth - attributes of wealth, types of wealth, distinction between wealth and welfare. Wants - meaning, characteristics of human wants and classification of wants. Demand - meaning, individual and aggregate demand schedule, individual and aggregate demand curves, types of demand-price demand, income demand, cross demand. Factors affecting demand

Unit-2

Law of demand - Contraction and extension in demand, increase and decrease in demand. Elasticity of demand - Types of Elasticity of demand - degrees of elasticity of demand and practical importance of elasticity of demand. Stock, Supply - meaning, difference between stock and supply, supply schedule, supply curve, types of supply- factors influencing supply Law of supply - Extension, contraction and increase and decrease in supply. Elasticity of supply-degrees of elasticity of supply-factors influencing elasticity of Supply. Consumers surplus –meaning, importance, assumptions, explanation of the consumers surplus with table and diagram, difficulties in measuring consumers surplus

Unit-3

Conditions of perfect and imperfect markets, characteristics of perfect and imperfect Competition. Classification of imperfect competition-monopolistic-oligopoly- duopoly- monopolymonopsony, bilateral monopoly. Price determination under perfect market situations. Law of diminishing marginal utility- law, assumptions, importance, explanation and limitations of the law.Law of Equi-marginal utility-meaning, assumptions of law, importance, explanation and limitations of the law. Nature and scope of Agricultural Economics, its role and importance

Unit-4

Characteristics of factors of production, measures to improve land productivity, Government Policies.Labour – division of Labour - meaning, forms of division of labour, problems of unemployment, under employment and disguised unemployment. Capital meaning, Characteristics of capital, fixed and working capital, capital formation meaning three stages in capital formation, factors affecting capital formation. Forms of business organizations-individual enterprises or individual proprietorship, partnership, joint stock company their advantages and disadvantages

Unit-5

Forms of business organizations - Co-operative enterprises and public enterprises and their advantages and disadvantages. Market – definition, functions, essentials of markets, classification of markets based on different criteria. National income-concepts. National income – measurements. Inflation –meaning, classification, types of inflation. Inflation –Causes of inflation and remedial Measures. Public Revenue/Tax- meaning, cannons of taxation, kinds of taxes, direct and indirect Taxes. Characteristics features of developed and under developed economies

Text book

Jain P.C. 1960, A Text Book of Modern Economics - Allahabad Chaitanya Publishing House, Allahabad.

Books for Reference

Dewett K.K. and Verma J.D. 1986, Elementary Economic Theory - S.Chand & Co., New Delhi.

Jain P.C. 1960, A Text Book of Modern Economics - Allahabad Chaitanya Publishing House, Allahabad.

Ruddor Dutt, K.P.M.Sundaram 1996, Indian Economy - S. Chand & Co., New Delhi.

Mishra S.K. and Puri V.K. 1996, Indian Economy - Himalaya Publishing house, New Delhi.

Subba Reddy S. , Raghu Ram, Neelakanta Sasthri and Bhavani Devi, 2009.

Agricultural Economics. Oxford and IBH publishing Co.Pvt. Ltd., New Delhi.

ADIKAVI NANNAYA UNIVERSITY
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2018-2019 Admitted Batch onwards
II Year Semester – IV

PRODUCTION TECHNOLOGY OF FLOWERS, MEDICINAL, AROMATIC PLANTS

Unit 1:

1. Scope and importance of commercial floriculture in India – present status, future prospects and strategies needed for improvement
2. Features, types and styles of ornamental gardens.

Unit 2 :

Floriculture: Climate, Soil, varieties, propagation, training & pruning, irrigation, harvest and yields- production techniques of flowering plants such as

1. Rose	6. Jasmine
2. Marigold	7. Tuberose
3. Chrysanthemum	8. Crossandra
4. Carnation	9. Antherium Gerbera
5. Gladiolus	10. Orchirds

Unit 3

Medicinal plants – importance of medicinal plants –production technology of

1. Diosorea,	6. phyllanthus
2. prewinkle,	7. Solanum,
3. Aloe,	8. Coleus,
4. Asparagus,	9. Belladona,
5. Costus ,	10. Aswagandha

Unit 4

Aromatic plants –Importance – essential oil industry in india – properties of essential oils – production technology of

1. Mint	5. Palmorosa
2. Ocimum	6. Geranium
3. Lemongrass	7. Vettivar
4. Citronella	8. Patchoul

Unit 5

1. post harvest techniques of cut flowers
2. dehydration techniques for drying of flowers

Reference Books:

1. *K.K.Singh.2006. Flower Crops, cultivation and management.New India Publishing agency, Pitampura. New Delhi.*
2. *T.K.Bose, L.P.Yadav, P.Patil, P.Das and V.A. Partha Sarathy.2003 Commercial Flowers*
3. *Randhawa, G.S. Amitabha Mukhopadhyay, 2004. Floriculture in India. Allied Publishers Pvt ltd*

ADIKAVI NANNAYA UNIVERSITY
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2018-2019 Admitted Batch onwards
II Year Semester – IV

PRODUCTION TECHNOLOGY OF FLOWERS, MEDICINAL, AROMATIC PLANTS

Practicals:

1. Planning and layout of ornamental gardens training and pruning in flower crops lily, rose, chrysanthemum.
2. Harvest, packaging and storage methods of flowers.
3. Vase life determination in cut flowers
4. Nursery bed preparation and sowing of flower crops
5. Visit to ornamental gardens/ parks and flower gardens
6. Propagation methods in aromatic & medicinal plants
7. Harvesting and processing methods of aromatic and medicinal plants
8. Visit to herbal gardens
9. Importance of medicinal plants- production harvest and processing techniques in diossea, periwinkle, aloe, solamun, semna, coleus, belladonna.

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II Year Semester – IV

PESTS OF HORTICULTURAL CROPS AND THEIR MANAGEMENT

Unit I - Introduction, Economic classification of Insects

1. Study of insect pests(Distribution, host range, biology, Nature of damage and management) in horticultural crops
2. Tropical fruits
3. Mango: Hoppers, red banded caterpillar, nut weevil, stem borer, leaf webber, mealy bug, oriental fruit fly, leaf gall midges, thrips
4. Guava: Tea mosquito bug, fruit fly, fruit borer, mealy bug, bark eating caterpillar.
5. Sapota : Leaf webber, bud borer, fruit fly., seed borer Ber: Ber fruit fly, fruit borer.
6. Banana: Rhizome weevil, pseudostem borer, aphid. Papaya: mealy bug, spiraling white fly
7. Pomegranate : Pomegranate butterfly, fruit borer, fruit sucking moths
8. Wood apple: Castor shoot and fruit borer.
9. Custard apple: Mealy bug , Tamarind: Fruit borer

Unit -II Pests of Sub-Tropical fruits

1. Grapevine: Flea beetle, thrips, stem girdler, mealy bug, stem borer, 2 spotted spidermite
2. Citrus: Citrus butterfly, fruit sucking moths, citrus leaf miner, psylla, white fly, black fly, mango mite.
3. Litchi: fruit borer, leaf miner, rust mite
4. Temperate fruits.
5. Apple: Sanjose scale, woolly aphid, cottony cushion scale, codling moth , tent caterpillar, gypsy moth, European red mite.
6. Peach: leaf curl aphid, borer, plum weevil, apricot chalcid

Unit III- Pests of Plantation crops

1. Cashew: Cashew shoot and root borer, shoot and blossom webber, tea mosquito bug, thrips, leaf miner, fruit borer.
2. Coconut & Oil Palm: Black header caterpillar, rhinoceros beetle, red palm weevil, Eriophid mite, coconut scale.
3. Tea: Tea mosquito bug, thrips, mite complex(red spider mite, yellow mite, pink mite, purple mite, scarlet mite)
4. Coffee: Green scales, white borer, red borer, shot borer, berry borer.
5. Arecanut: scales, mites, thrips, nymphalid butterfly.
6. Cocoa: Tea mosquito bug, chaffer. Rubber: Bark caterpillar, scales beetles

Unit-IV- Pests of Medicinal & Aromatic plants

1. Cinchona: Root grub, bugs.
2. Neem : Root grub, slug caterpillar, mired bug, mealy bug, tea mosquito bug.
3. Crotalaria: Sun hemp hairy caterpillar
4. Cinnamon: leaf eating caterpillar, jumping bug.
5. Camphor: leaf roller, mealy bug, scales.
6. Mint: leaf roller, hairy caterpillars, termites, pyralid moth.
7. Datura: spotted borer, thrips
8. Opium: cutworm, capsule borer, weevil.
9. Bellodona: Cut worm, potato beetle, flea beetle.
10. Dioscorea: aphids, red spider mites.

Unit-V- PESTS OF STORED PRODUCTS

1. Tamarind beetle, cigarette beetle, Lesser grain borer, Kapra beetle
2. Drug store beetle, Dried fruit moth, sweet potato tuber moth, red flour beetle, rice moth, Indian meal moth.
3. Dried current moth, Tobacco moth, dried fruit beetle, saw toothed beetle.
4. Insecticide residues problem in fruit, plantation, medicinal and aromatic plants and their tolerance limits.

Text book: *Insects and Mites of Crops in India, Nair, M.R.G.K. 1975.ICAR, New Delhi*

Reference Books :

Insects and Mites of Crops in India, Nair, M.R.G.K. 1975.ICAR, New Delhi

Elements of Economic Entomology, David, B.V. and Kumaraswamy, T. 1978. Popular Book Depot, Madras.

Introduction to insect pest management, Metcalf, R.L and Luckman, W.H. 1982. Wiley Inter Science Publishing, New York.

Insects & Fruits, Butani, D.K.1984. Periodical Expert book agency, New Delhi

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2018-2019 Admitted Batch onwards
II Year Semester – IV

PESTS OF HORTICULTURAL CROPS AND THEIR MANAGEMENT

PRACTICALS

1. Sampling techniques for estimation of insect damage
2. Survey, surveillance and forecasting of pest incidence
3. Calculation of insecticidal doses/ concentrations of different formulations
4. Typical symptoms of damage caused by various phytophagous insects
5. Identification of insects and damage symptoms of pests of mango
6. Identification of insects and damage symptoms of pests of guava, sapota
7. Identification of insects and damage symptoms of pests of ber, banana, papaya
8. Identification of insects and damage symptoms of pests of pomegranate
9. Identification of insects and damage symptoms of pests of grapevine and citrus
10. Identification of insects and damage symptoms of pests of apple, peach and plum
11. Identification of insects and damage symptoms of pests of cashew
12. Identification of insects and damage symptoms of pests of coconut, oil palm, cocoa
13. Identification of insects and damage symptoms of pests of tea, coffee and rubber
14. Identification of insects and damage symptoms of pests of medicinal and aromatic plants
15. Identification of insects and damage symptoms of pests of stored products

ADIKAVI NANNAYA UNIVERSITY
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2018-2019 Admitted Batch onwards
II Year Semester – IV

FARM POWER AND MACHINERY

UNIT 1:

Status of farm power in India- Sources of farm power – I.C engines – Working principles of I.C engines – Comparison of two stroke and four stroke cycle engines – Study of different components of I.C engine .

UNIT 2:

I.C. engine terminology and solved problems- Familiarization with different systems of I.C engines – Air cleaning – Cooling – Lubrication – Fuel supply and Hydraulic control system of tractor.

UNIT 3:

Familiarization with power transmission system – Clutch – Gear box – Differential and final drive of a tractor – Tractor types – Cost analysis of a tractor power and attached implements for hill agriculture.

UNIT 4:

Implements for intercultural operations – Familiarization with sowing and planting equipment – Calibration of seed drill and solved examples.

UNIT 5:

Familiarization with plant protection equipment – Familiarization with harvesting and threshing equipment.

Text book: *Jagdishwar Sahay. 1992. Elements of Agricultural Engineering. Agro Book Agency, Patna.*

Reference Books:

1. *Jagdishwar Sahay. 1992. Elements of Agricultural Engineering. Agro Book Agency, Patna.*
2. Jain, S.C.20013. Farm Machinery – An Approach. Standard Publishers and Distributors, New Delhi.
3. Nakra, C.P.1986. Farm Machinery and Equipment. Dhanpat Rai and Sons, New Delhi.
4. Michal, A.M. andOjha, T.P.2008. Principles of Agricultural Engineering (Vol. I). Jain Brothers.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: HORTICULTURE
2018-2019 Admitted Batch onwards
II Year Semester – IV FARM

POWER AND MACHINERY

PRACTICALS

1. Study of different components of I.C engine
2. Study of working of four stroke petrol and diesel engine
3. Study of working of Two stroke petrol and diesel engine
4. Study of different parts of Mb plough, measurement of plough size, horizontal and vertical suction, determination of line of pull. Etc.
5. Study of different parts of disc plough and harrows
6. Study of seed-cum- fertilizer drills – furrow openers, seed metering mechanisms and calibration of seed drills
7. Study of different inter cultivation equipment used in Horticultural crops
8. Study of operation and maintenance of tractor and cost calculation.
9. Learning of tractor driving-I
10. Learning of tractor driving-II
11. Study of operation, and maintenance of power tiller.

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2018-2019 Admitted Batch onwards
II Year Semester – IV

ON JOB TRAINING -IV

I. FIELD TRIP (3) : 3 trips X 5 M = 15 Marks

II. PROJECT REPORT : 15 Marks

III. FIELD WORK : 10 X 1M = 10 Marks

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IV. SEMINAR : 5 Marks

V. VIVA : 5 Marks

TOTAL MARKS : 50 Marks

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III Year Semester – V

INORGANIC AND ORGANIC PHYSICAL CHEMISTRY -1 Paper -
V (INORGANIC, ORGANIC & PHYSICAL CHEMISTRY- 1)

INORGANIC CHEMISTRY

UNIT – I

Coordination Chemistry:

IUPAC nomenclature - bonding theories - Review of Werner's theory and Sidgwick's concept of coordination - Valence bond theory - geometries of coordination numbers 4-tetrahedral and square planar and 6-octahedral and its limitations, crystal field theory - splitting of d-orbitals in octahedral, tetrahedral and square-planar complexes - low spin and high spin complexes - factors affecting crystal-field splitting energy, merits and demerits of crystal-field theory. Isomerism in coordination compounds - structural isomerism and stereo isomerism, stereochemistry of complexes with 4 and 6 coordination numbers.

UNIT-II

1. Spectral and magnetic properties of metal complexes:

Types of magnetic behaviour, spin-only formula, calculation of magnetic moments, experimental determination of magnetic susceptibility-Gouy method.

2. Stability of metal complexes:

Thermodynamic stability and kinetic stability, factors affecting the stability of metal complexes, chelate effect, determination of composition of complex by Job's method and mole ratio method.

ORGANIC CHEMISTRY

UNIT-III

Nitro hydrocarbons:

Nomenclature and classification-nitro hydrocarbons, structure -Tautomerism of nitroalkanes leading to aci and keto form, Preparation of Nitroalkanes, reactivity - halogenation, reaction with HONO (Nitrous acid),Nef reaction and Mannich reaction leading to Micheal addition and reduction.

UNIT – IV

Nitrogen compounds:

Amines (Aliphatic and Aromatic): Nomenclature, Classification into 1°, 2°, 3° Amines and Quarternary ammonium compounds. Preparative methods Ammonolysis of alkyl halides 2. Gabriel synthesis 3. Hoffman's bromamide reaction (mechanism). Reduction of Amides and Schmidt reaction. Physical properties and basic character - Comparative basic strength of Ammonia, methyl amine, dimethyl amine, trimethyl amine and aniline - comparative basic strength of aniline, N-methylaniline and N,N-dimethyl aniline (in aqueous and non-aqueous medium), steric effects and substituent effects. Chemical properties: a) Alkylation b) Acylation c) Carbylamine reaction d) Hinsberg separation e) Reaction with Nitrous acid of 1°, 2°, 3° (Aliphatic and aromatic amines). Electrophilic substitution of Aromatic amines – Bromination and Nitration. Oxidation of aryl and Tertiary amines, Diazotization.

PHYSICAL CHEMISTRY

UNIT- V

Thermodynamics

The first law of thermodynamics-statement, definition of internal energy and enthalpy. Heat capacities and their relationship. Joule-Thomson effect- coefficient. Calculation of w , for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes. State function. Temperature dependence of enthalpy of formation- Kirchoff's equation. Second law of thermodynamics. Different Statements of the law. Carnot cycle and its efficiency. Carnot theorem. Concept of entropy, entropy as a state function, entropy changes in reversible and irreversible processes. Entropy changes in spontaneous and equilibrium processes.

Text Book

Coordination Chemistry by Basalo and Johnson

Organic Chemistry by G.Mare loudan,

Books for Reference

1. Concise coordination chemistry by Gopalan and Ramalingam
2. Coordination Chemistry by Basalo and Johnson
3. Organic Chemistry by G.Mare loudan, Purdue Univ
4. Advanced Physical Chemistry by
5. Text book of physical chemistry by S Glasstone
6. Concise Inorganic Chemistry by J.D.Lee
7. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan
8. A Text Book of Organic Chemistry by Bahl and Arun bahl
9. A Text Book of Organic chemistry by I L Finar Vol I
10. Advanced physical chemistry by Gurudeep Raj

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INORGANIC AND ORGANIC PHYSICAL CHEMISTRY -1

PRACTICAL

Organic Qualitative Analysis:

Analysis of an organic compound through systematic qualitative procedure for functional group identification including the determination of melting point and boiling point with suitable

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INORGANIC AND ORGANIC PHYSICAL CHEMISTRY -2

Paper - VI (INORGANIC, ORGANIC & PHYSICAL CHEMISTRY-2)

INORGANIC CHEMISTRY

UNIT-I

1. Reactivity of metal complexes:

Labile and inert complexes, ligand substitution reactions - SN^1 and SN^2 , substitution reactions of square planar complexes - Trans effect and applications of trans effect.

2. Bioinorganic chemistry:

Essential elements, biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and Cl^- .
Metalloporphyrins – Structure and functions of hemoglobin, Myoglobin and Chlorophyll.

ORGANIC CHEMISTRY

UNIT- II

Heterocyclic Compounds

Introduction and definition: Simple five membered ring compounds with one hetero atom Ex. Furan. Thiophene and pyrrole - Aromatic character – Preparation from 1,4,- dicarbonyl compounds, Paul-Knorr synthesis.

Properties : Acidic character of pyrrole - electrophilic substitution at 2 or 5 position, Halogenation, Nitration and Sulphonation under mild conditions - Diels Alder reaction in furan.

Pyridine – Structure - Basicity - Aromaticity - Comparison with pyrrole - one method of preparation and properties - Reactivity towards Nucleophilic substitution reaction.

UNIT-III

Carbohydrates

Monosaccharides: (+) Glucose (aldo hexose) - Evidence for cyclic structure of glucose (some negative aldehydes tests and mutarotation) - Proof for the ring size (methylation, hydrolysis and oxidation reactions) - Pyranose structure (Haworth formula and chair conformational formula).

(-) Fructose (keto hexose) - Evidence of 2 - keto hexose structure (formation of pentaacetate, formation of cyanohydrin its hydrolysis and reduction by HI). Cyclic structure for fructose (Furanose structure and Haworth formula) - osazone formation from glucose and fructose – Definition of anomers with examples.

Interconversion of Monosaccharides: Aldopentose to Aldohexose (Arabinose to D- Glucose, D-Mannose) (Kiliani - Fischer method). Epimers, Epimerisation - Lobry de Bruyn van Ekenstein rearrangement. Aldohexose to Aldopentose (D-Glucose to D- Arabinose) by Ruff degradation. Aldohexose to Ketohexose

[(+) Glucose to (-) Fructose] and Ketohexose to Aldohexose (Fructose to Glucose)

UNIT- IV

Amino acids and proteins

Introduction: Definition of Amino acids, classification of Amino acids into alpha, beta, and gamma amino acids. Natural and essential amino acids - definition and examples, classification of alpha amino acids into acidic, basic and neutral amino acids with examples. Methods of synthesis: General methods of synthesis of alpha amino acids (specific examples - Glycine, Alanine, valine and leucine) by following methods: a) from halogenated carboxylic acid b) Malonic ester synthesis c) strecker's synthesis.

Physical properties: Zwitter ion structure - salt like character - solubility, melting points, amphoteric character, definition of isoelectric point.

Chemical properties: General reactions due to amino and carboxyl groups - lactams from gamma and delta amino acids by heating peptide bond (amide linkage). Structure and nomenclature of peptides and proteins.

PHYSICAL CHEMISTRY

UNIT-V

1. Chemical kinetics

Rate of reaction - Definition of order and molecularity. Derivation of rate constants for first, second, third and zero order reactions and examples. Derivation for time half change. Methods to determine the order of reactions. Effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy.

2. Photochemistry

Difference between thermal and photochemical processes. Laws of photochemistry- Grothus-Draper's law and Stark-Einstein's law of photochemical equivalence. Quantum yield-Photochemical reaction mechanism- hydrogen- chlorine, hydrogen- bromine reaction. Qualitative description of fluorescence, phosphorescence, Photosensitized reactions- energy transfer processes (simple example)

Text Book

1. Organic Chemistry by G.Mare loudan, Purdue Univ
2. Advanced Physical Chemistry by Atkins

Books for Reference

3. Concise coordination chemistry by Gopalan and Ramalingam
4. Coordination Chemistry by Basalo and Johnson
5. Organic Chemistry by G.Mare loudan, Purdue Univ
6. Advanced Physical Chemistry by Atkins
7. Text book of physical chemistry by S Glasstone
7. Instrumentation and Techniques by Chatwal and Anand
8. Essentials of nano chemistry by pradeep
9. A Textbook of Physical Chemistry by Puri and Sharma

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INORGANIC AND ORGANIC PHYSICAL CHEMISTRY -2

PRACTICAL

1. Determination of rate constant for acid catalyzed ester hydrolysis.
2. Determination of molecular status and partition coefficient of benzoic acid in Benzene and water.
3. Determination of Surface tension of liquid
4. Determination of Viscosity of liquid. Adsorption of acetic acid on animal charcoal, verification of Freundlich Isotherm

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III Year Semester – V

POST HARVEST TECHNOLOGY OF FRUITS

Unit-1

Importance of post harvest technology of horticultural crops, extent of PHT losses, Factors affecting for post harvest losses- (A) Primary causes (B) Secondary causes.

Unit-2

Factors responsible for deterioration. Post harvest control measures- cold sterilization, ionizing radiation, hot water treatment, vapour heat treatment. Physiological disorder – internal browning, black heart chilling, freezing injury.

Unit-3

Fruit ripening : physiological and biochemical changes : Physiological – softening, physiological loss in weight, texture, respiration and transpiration, biochemical- changes in carbohydrates, organic acids, pigments, phenolic compounds, flavouring compounds, enzyme activity. Maturity indices of all fruits and vegetables. Harvesting : definition, Methods, Manual and Mechanical harvesting, Advantages and disadvantages.

Unit-4

Handling: Removal of heat , pre packing, packing house operations, damage in transport bruising.

Grading : definition, methods, benefits.

Grading of all fruits and vegetables. Ripening regulation- Hastening ripening-Ethylene and ethylene releasing compounds, smoke, alcohols, fatty acids. Delaying ripening- 2,4D, 2,4,5,T and 2,4,5,TP.

Unit-5

Methods of storage for local market and export – Traditional and Improved storage
Types of Packing, packing methods. Mode of transport. Quality and grades specification of horticulture produce.

Text book :

Thompson, A.K.1996- post harvest technology of fruits and vegetables- Blackwell science, London

Reference books:

1. Thompson, A.K.1996- post harvest technology of fruits and vegetables- Blackwell science, London
2. Pandey, P.H. 1998- principles and practice of post harvest technology- kalyani publishers
3. Sudheer, k.p. 2007- post harvest of horticultural crops- New india, publishing agency, new delhi

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POST HARVEST TECHNOLOGY OF FRUITS

PRACTICALS

1. Practice in judging the maturity of various horticulture produce
2. Determination of physiological loss in weight and quality
3. Post harvest disorders in horticultural products
4. Identification of storage pest and diseases
5. Visit to market, packing house and cold storages.

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III Year Semester – V

PRODUCTION TECHNOLOGY OF SPICES AND PLANTATION CROPS

Unit-1

History, scope and importance, present status, area and production, uses, export potential and role in Indian economy, Classification of spices. Unit-2

History and development, Scope and importance, area and production, export and import potential of plantation crops, role in national and state economy. Unit-3

Spices- Production Technology of

1. Cardamom
2. Black pepper
3. Betel vine
4. Ginger
5. Turmeric
6. Clove
7. Nutmeg

Unit-4

Spices- Production Technology of

8. Cinnamon
9. Curry leaf
10. Coriander
11. Fenugreek
12. Fennel
13. Cumin
14. Saffron

Unit-5

Plantation- Production technology of

1. Coconut
2. Arecanut
3. Oil palm
4. Cocoa
5. Cashew nut
6. Coffee
7. Tea

Reference books:

Introduction to spices, Plantation crops and aromatic plants. Oxford and IBH, New Delhi.

Kumar, N.J.B. M. Md. Abdulkhaddar, Ranga swamy, P. and Irrulappan, I. 1997.

Shanmugavelu, K.G. Kumar, N and Peter, K.V., 2005. Production technology of spices and plantation crops.. Agrosis, Jodhpur.

Shanmugavelu, K.G. and Madhava Rao, 1977, Spices and Plantation crops. Madras popular Book depot.

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PRODUCTION TECHNOLOGY OF SPICES AND PLANTATION CROPS

PRACTICALS

1. Identification of spices seeds
2. Preparation and submission of specimens of spices and condiments
3. Seed treatment , Sowing layout and planting methods of Spices and condiments
4. Intercultural operations, Harvesting and processing, grading of Spices and condiments.
5. Different methods of tapping of rubber
6. Raising of nursery and nursery management in cocoa
7. Layout and planting of coconut, Areca nut and oil palm, cashew nut, cocoa.

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**INTRODUCTION TO AGRICULTURAL EXTENSION AND ENTERPRENEURSHIP
DEVELOPMENT**

UNIT I - Introduction to Extension Education

Extension Education – meaning, definition, scope, objectives, philosophy, principles; Extension Education Process; Differences among formal, informal and non-formal education; Extension education as a science – relationship with other social sciences.

UNIT II - Early Rural Development attempts and Extension approaches in India Historical development of extension in India – Famine Commission, Royal Commission, Scheme of Rural Reconstruction, Economic Conference of Mysore, Gurgaon Experiment, Sriniketan, Sevagram, Marthandam project, India Village Service, Firka development scheme, Etawah pilot project, Nilokheri Experiment; Extension programmes of Ministry of Agriculture – Training and Visit (T&V) System, Broad Based Extension System (BBES), Farming System Research Extension(FSRE) , Agricultural Technology Management Agency (ATMA); Firstline Extension System – KVK, IVLP, ATIC, Frontline demonstrations.

UNIT III - Major Rural Development Programmes

Rural Development – meaning, definition, concept, importance; Rural Development in India - Democratic Decentralization –Meaning of Democratic Decentralization and Panchayat Raj – Three tiers of Panchayat Raj system – Powers, Functions and Organizational setup –Community Development Programme (CDP), National Extension Service (NES), IADP, IAAP, HYVP, IVLP, WDP, NATP, ITDP, IRDP, SFDA, MFAL, NREP, RLEGP, DPAP, CADP, FFW, JRY, EAS, IAY, SGSY, PMEY, SJSRY, PMGSY, SGRY, MGNREGA, PURA, NAIP, NADP (RKVY) - the strengths and weaknesses of the above programmes. Women Development Programmes – DWCRA, RMK, ICDS, MSY, TANWA; Youth Development Programmes – TRYSEM.

UNIT IV - Extension Programme Planning

Extension Programme Planning – definition, principles; meaning of project, plan, calendar of work, plan of work; steps in programme planning.

Unit V – Entrepreneurship

Entrepreneur – entrepreneurship – types, characteristics and process. Innovation, business incubation and financing entrepreneurs.

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III Year Semester – V

PROTECTED CULTIVATION OF HORTICULTURAL CROPS

Unit-1

Importance and scope. Current status of protected cultivation in India. Problems/ constraints of greenhouse cultivation and future strategies. Classification of protected structures- green house, poly house, protected nursery house, vegetable grafting sheds.

Unit-2

Planning and design of greenhouse, design criteria of green house for cooling and heating purposes. Green house equipment, materials of construction for traditional and low cost green house.

Unit-3

Soil culture-type of soil required, drainage, flooding and leaching, soil pasteurization. Soil less culture- advantages, disadvantages. Types of growing media in peat moss and mixture, rock wool and other inert media. NFT, hydroponics and aeroponics.

Unit-4

Irrigation and fertigation systems used in green houses. Choice of selection of crops for green house cultivation (Tomato, Capsicum, Cucumber)

Unit-5

Hi-tech protected cultivation, plant protection and post harvest handling techniques for

- Tomato
- Capsicum
- Cucumber

Reference books:

Balraj Singh. 2006. Protected cultivation of vegetables crops. Kalyani publishers, Ludhiana

Brahma Singh, 2014. Advances in protected cultivation. New India publishing Agency. New Delhi.

Reddy, p. parvatha.2011. Sustainable crop protection under protected cultivation. Springer publications. USA

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III Year Semester – V

PROTECTED CULTIVATION OF HORTICULTURAL CROPS

PRACTICALS

1. Study of different types of green houses based on shape, construction and cladding materials.
2. Estimation of drying rate of agriculture products inside green house.
3. Soil sampling and testing to study its suitability for growing crops in green house.
4. The study on Pro-trays based nursery raisings.
5. Visit to commercial green house.
6. Study the economics of protected cultivation

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Project work – I

I. Presentation of synopsis : 20 Marks

II. Desertation and evaluation : 50 Marks

III. Seminar : 20 Marks

IV. Viva voice : 5 Marks

TOTAL MARKS : 100 Marks

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III Year Semester – VI

ENVIRONMENTAL CHEMISTRY

UNIT-I

Introduction

Concept of Environmental chemistry - Scope and importance of environment in now a days – Nomenclature of environmental chemistry – Segments of environment - Natural resources – Renewable Resources – Solar and biomass energy and Non-renewable resources – Thermal power and atomic energy – Reactions of atmospheric oxygen and Hydrological cycle.

UNIT-II

Air Pollution

Definition – Sources of air pollution – Classification of air pollution – Acid rain – Photochemical smog – Green house effect – Formation and depletion of ozone – Bhopal gas disaster – Controlling methods of air pollution.

UNIT-III

Water pollution

Unique physical and chemical properties of water – water quality and criteria for finding of water quality – Dissolved oxygen – BOD, COD, Suspended solids, total dissolved solids, alkalinity – Hardness of water – Methods to convert temporary hard water into soft water – Methods to convert permanent hard water into soft water – eutrophication and its effects – principal wastage treatment – Industrial waste water treatment.

UNIT-IV

Chemical Toxicology

Toxic chemicals in the environment – effects of toxic chemicals – cyanide and its toxic effects – pesticides and its biochemical effects – toxicity of lead, mercury, arsenic and cadmium.

UNIT-V

Ecosystem and biodiversity

Ecosystem: Concepts – structure – Functions and types of ecosystem – Abiotic and biotic components – Energy flow and Energy dynamics of ecosystem – Food chains – Food web – Tropic levels – Biogeochemical cycles (carbon, nitrogen and phosphorus)

Biodiversity: Definition – level and types of biodiversity – concept - significance – magnitude and distribution of biodiversity – trends - biogeographical classification of India – biodiversity at national, global and regional level.

REFERENCE BOOKS

1. Fundamentals of Ecology by M.C.Dash
2. A Text book of Environmental chemistry by W. Moore and F.A. Moore
3. Environmental Chemistry by Samir K. Banerji

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ENVIRONMENTAL CHEMISTRY

PRACTICAL

1. Determination of carbonate and bicarbonate in water samples (acidity and alkalinity)
2. Determination of hardness of water using EDTA
 - a) Permanent hardness
 - b) Temporary hardness
3. Determination of Acidity
4. Determination of Alkalinity
5. Determination of chlorides in water samples

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PRINCIPLES OF ORGANIC FARMING

1. Organic farming – definition – need – scope – principles – characteristics – relevance to modern agriculture.
2. Different eco friendly farming systems – biological farming, natural farming, regenerative agriculture – permaculture – biodynamic farming.
3. Relevance of organic farming to A.P, India, and global agriculture and future prospects – advantages – barriers.
4. Initiatives – taken by the central and state governments, NGOs and other organizations for promotion of organic agriculture in india.
5. Organic nutrient sources and their fortification – organic manures – methods of composting.
6. Green manures – bio fertilizers – types, methods of application – benefits and limitations.
7. Nutrient use in organic farming – scope and limitations.
8. Nutrient management in organic farming.
9. Organic ecosystem and their concepts.
10. Choice of crops and varieties in organic farming – crop rotations – need and benefits – multiple cropping.
11. Fundamentals of insect, disease and weed management under organic mode of production – cultural – biological methods – non chemical pest and disease management.
12. Botanicals – pyrethrum, neem seed kernel extract, neem seed powder, soluble neem formulations, neem oil.
13. Operational structure of NPOP – other agencies for organic production.
14. Inspection – certification – labeling and accreditation procedures for organic products.
15. Processing – economic consideration and viability.
16. Marketing and export potential of organic products – national economy.

References

1. Arun K.Sharma.2002 A Hand book of organic farming. Agrobios, India. 627p.
2. Palaniappan, S.P and Annadurai, K.1999. Organic farming-Theory and Practice. Scientific publishers, Jodhpur, India 257p.
3. Mukund Joshi and Prabhakarasetty, T. K.2006. Sustainability through organic farming. Kalyani publishers, New Delhi. 349p.
4. Balasubramanian, R.,Balakrishnan, K and siva Subramanian, K.2013. Principles and practices of organic farming. Satish Serial publishing house. 453p.
5. Tarafdar, J.C., Tripathi, K.P and Mahesh kumar, 2009. Organic agriculture. Scientific Publishers, India. 369p.
6. Tiwari, V.N., Gupta, D.K., Maloo, S.R and Somani, L.L 2010. Natural, Organic biological, ecological and biodynamicfarming. Agrotech publusing Academy,Udaipur.420p.
7. Dushyent Gehlot. 2005. Organic farming-standards, ac creditation,certification and inspection. Agrobios,India.357p.

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PRINCIPLES OF ORGANIC FARMING

PRACTICAL

1. Visit to organic farm to study the various components, identification and utilization of organic products.
2. Compost making – aerobic and anaerobic methods.
3. Vermicompost preparation.
4. Preparation of enriched farm yard manure.
5. Visit to organic clusters and bio control lab to study the maintenance of bio-fertilizers/bio-inoculant cultures.
6. Biological nitrogen fixers.
7. Methods of application of Bio-pesticides (Trinchoards, BT, NPV)
8. Preparation of neem products and other botanicals for pest and disease control.
9. Preparation of green pesticides (panchagavya, beezamrutam, jeevamrutam, ghanajeevamrutam, dravajeevamrutam).
10. Different methods of biofertiliser applications.
11. Quality analysis of biofertilisers/bioinoculants and compost.
12. Case studies of indigenous Technical knowledge (ITK) for nutrient, insect, pest disease and weed management.
13. Economic analysis of organic production system.
14. Study of post harvest management in organic farming.
15. Study of quality parameters of organic produce.
16. Visit to organic farms to study the various components and their utilization

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III Year Semester – VI

DISEASES OF HORTICULTURAL CROPS AND THEIR MANAGEMENT

Unit -1

Disease management of fruit crops

1. Mango
2. Citrus
3. Banana
4. Guava
5. Sapota
6. Papaya
7. Pomegranate
8. Apple

Unit-2

Disease management of Plantation crops

1. Coconut
2. Oil palm
3. Coffee
4. Tea
5. Cashew
6. Cocoa

Unit -3

Disease management of Vegetables

1. Solanaceous
2. Bhendi
3. Crucifers
4. Cucrbits
5. Root crops
6. Leafy vegetables

Unit-4

Disease management of spices

1. Onion and garlic

2. Clove
3. Cinnamom
4. Cardamom
5. Coriander
6. Cumin

Unit-5

Disease management of Ornamental crops

1. Rose
2. Jasmine
3. Crossandra
4. Tuberose
5. Asters
6. Carnation
7. Gladiolus
8. Chrysanthemum

Text book :

Singh, R.S plant diseases

Reference :

Singh, R.S plant diseases

Rangaswami G and Mahadevan A, Diseases of crop plant in india

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III Year Semester – VI

DISEASES OF HORTICULTURAL CROPS AND THEIR MANAGEMENT

PRACTICALS

1. Diseases of Mango
2. Diseases of banana
3. Diseases of papaya
4. Diseases of solanaceous
5. Diseases of crucifers
6. Diseases of cucurbits
7. Diseases of leafy vegetables
8. Diseases of spices
9. Diseases of ornamental

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2018-2019 Admitted Batch onwards
III Year Semester – VI

SEED PRODUCTION AND VEGETABLE CROPS

Unit -1

Introduction to seed production-concept of seed technology-seed quality-definitions of seed technology-objectives goals of seed technology-importance of seed production.

Definitions of seed-differences between grain and seed –classes of seed

Importance and scope of vegetable seed production in India and principles of

Vegetable seed production .

Unit – 2

Seed extraction-methods of seed extraction

Seed drying-methods of seed drying-sun drying-forced air drying-principles of forced air drying-properties of air and their effects on seed drying-moisture

Equilibrium between seed and air - drying zones in seed bin drying-forced air

Drying method.

Seed drying –heated air drying system-building requirements-types of distribution system and seed drying-multiple bin storages-selection of crop dryers and systems of heated air drying- recommended temperature and depth

For heated air drying of various crop seeds in bin-management of seed drying operation

Seed cleaning-principles and methods cleaning seeds-air screen machine-principles of cleaning-parts of air screen cleaner – upgrading the quality of

Cleaned seeds-different upgrading machines, their principles of operation and uses

Unit-3

Seed treatment-benefits-types of seed treatment – conditions under which seed must be treated - seed treating products-equipment used for seed treatment-coloring of seeds – causes of poor treatment-precautions to be taken during seed treatment

Seed packing - operations in packing- equipments used for packing of seeds-types of bags and packing sizes .

Seed storage- categories of seeds –orthodox a and recalcitrant seed s-factors effecting seed longevity in storage and conditions required for good storage-general principles of seed storage

Seed marketing –marketing structure and organization.

Unit- 4

Seed testing-objectives of seed testing-international seed testing Association(ISTA) and Association of Official seed certifying Agencies (AOSCA) -establishment of Seed Testing Laboratory (STL) - seed testing procedures for quality assessment .

Seed purity analysis methods in different horticultural crops .

Seed dormancy-seed germination-seed viability – seed vigour – seed health and seed moisture.

Unit – 5

Seed certification-History of seed certification-procedure for seed certification

World Trade Organization (WTO)-objectives and functions –Intellectual Property Rights (IPR)-Plant Breeders Rights (PBR) -benefits of PBR – disadvantages of PBR-Protection of Plant Variety and Farmers’Rights (PPVand FR)Act

Text book :

Prem singh Arya, 2003- Vegetable breeding, production and seed production.

Reference

Prem singh Arya, 2003- Vegetable breeding, production and seed production.

Rattan lal agarawal- seed technology

Agrawal, P.K – Principles of seed technology

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III Year Semester – VI

SEED PRODUCTION AND VEGETABLE CROPS

PRACTICALS

1. Study of seed structure ., colour size ,shape and texture .
2. seed extraction in different crops.
3. purity analysis in different crops .
4. germination analysis I n different crops
5. seed viability teste.
6. seed vigour tests.
7. seed certification procedure indifferent vegetables crops.
8. study of seed production plots-hybrid seed production plots of cole crops .
9. study of seed production plots –hybrid seed production plots of root vegetables
10. study of seed production plots –hybrid seed production plots of bulb crops.
11. study of seed production plots -hybrid seed production plots of solanaceous vegetables .

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MANURES, FERTILIZERS AND SOIL FERTILITY MANAGEMENT

Unit-I

Essential Nutrients Soil fertility and productivity-

Essential nutrients – functions, deficiency and toxicities. Concepts and methods of soil fertility evaluation.

Unit-II

Nutrient Dynamics

Nutrients – sources, forms, mobility, transformations, fixation, losses and availability of nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, iron, manganese, zinc, copper, boron, molybdenum, nickel, chloride in soils – Beneficial elements – Nutrient interactions.

Unit-III :

Classification of Fertilizers

Fertilizers – Definition and classification, sources, properties and reactions of primary, secondary and micro nutrient fertilizers in soil – Manufacture of urea, ammonium sulphate, SSP, DAP, MOP and SOP. Complex, mixed fertilizers, customized/Speciality fertilizers – Water soluble fertilizers, liquid fertilizers. Micro nutrient mixtures and chelated micronutrients – Preparation, characteristics and compatibility – Fertilizer Control Order (FCO). Manures – classification, nutrient contents. Composting techniques.

Unit-IV

Application Methods

Methods of fertilizer application – Seed coating, pelletization, seedling dipping – Nutriseed pack – Soil Application – Foliar spray – Fertigation – water soluble fertilizers, fertigation scheduling (Fertilizer – water interaction, fertilizer solubility, comparison of fertilizer application methods).

Unit-V

Nutrient Management

Nutrient management concepts – INM, STCR, IPNS, SSNM and RTNM. Nutrient use efficiencies of major and micronutrients and enhancement techniques (Soil, Cultural and Fertilizer strategies). Soil health – Quality indices and their management – Long term effect of fertilization on soil.

Unit-VI

Compost and composting- Green manures- Definitions of penning -Introduction and importance of organic manures- Bulky organic manures- Different methods of composting including the starters and raw materials

References

1. Indian Society of Soil Science.2012. Fundamentals of Soil Science. IARI, New Delhi.
2. Yawalkar K.S, Agarwal, T.P and Bokde, S 1995. Manures and Fertilisers. Agril. Publishing House, Nagpur
3. Samuel Tisdale, Nelson Werner L, Beaton James D and Havlin John L. 2005. Soil Fertility and Fertilizers: An Introduction to Nutrient Management, Macmillian Publishing Co., New York.
4. D. K .Das 2014. Introductory Soil Science. Kalyani Publishers, New Delhi

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III Year Semester – VI

MANURES, FERTILIZERS AND SOIL FERTILITY MANAGEMENT

PRACTICAL

1. Introduction to analytical instruments and principles-spectrometry and flame photometry
2. Estimation of available N in soils
3. Estimation of available P in soils
4. Estimation of available K in soils
5. Estimation of available S in soils
6. Estimation of available Ca and Mg in soils
7. Estimation of available Zn in soils
8. Basic of plant analysis and estimation of N in plant samples
9. Estimation of P in plant samples
10. Estimation of K&S in plant samples
11. Identification of acid radicals in fertilizers / salts
12. Identification of basic radicals in fertilizers / salts
13. Estimation of N in Ammonium sulphate
14. Estimation of N in Urea and FYM
15. Estimation of water soluble P₂O₅ SSP
16. Estimation of K Muriate of potash or Sulphate of potash by using flame photo meter.

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VI Biotechnology

Unit-1

Concepts and applications of plant biotechnology- scope and importance. Introduction of plant tissue culture- history- terminology –steps – types of sterilization and nutrient media-types of cultures-organ-cell-callus-pollen cultures and their applications

Unit-2

Micro propagation- procedure techniques-organogenesis and embryogenesis- problems- advantages-limitations.

Unit-3

Anther culture-embryo culture-ovule culture-somatic embryogenesis-synthetic seeds and its applications

Unit-4

Markers-Morphological, biochemical and molecular markers- RFLP, RAPD AND SSR- marker assisted selection for crop improvement.

Unit-5

Polymerase chain reaction- procedure and applications. Transgenic plants- present status- applications in crop improvement-limitations-biotechnology regulations.

Reference :

1. David L. Nelson, Michael M.cox principles of biochemistry
2. Biochemistry, Dr.U.Sathyanarayana , Dr.U. Chakrapani
3. Introduction to plant biotechnology HS Chawla

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III Year Semester – VI

Project work – II

I. Presentation of synopsis : 20 Marks

II. Dissertation and evaluation : 50 Marks

III. Seminar : 20 Marks

IV. Viva voice : 5 Marks

TOTAL MARKS : 100 Marks