

ADIKAVI NANNYA UNIVERSITY

Bachelor of Vocation: Agriculture

Course structure and syllabi: w.e.f 2019-20 Admitted Batch I Year; Semester I

S.No	Course	Mid Sem Exam*	Sem End Exam	Total Marks	Teaching Hours	Credits
General Education						
1	English Communication Skills-I	25	75	100	4	4
2	Organic and inorganic Chemistry	25	75	100	4	4
3	Organic and inorganic Chemistry practical		50	50	2	2
4	Foundation course –I (Environmental studies)		50	50	2	2
Skill Education						
1	Fundamentals of Genetics	25	75	100	4	4
2	Introduction to Agronomy	25	75	100	4	4
3	Introduction to Agronomy Practical		50	50	2	2
4	Introduction to Soil Science	25	75	100	4	4
5	Introduction to Soil Science Practical	0	50	50	2	2
6	On Job Training - 1	0	50	50		2
	Total			750	28	30

I Year; Semester II

S.No	Course	Mid Sem Exam*	Sem End Exam	Total Marks	Teaching Hours	Credits
General Education						
1	English Communication Skills-II	25	75	100	4	4
2	Physical & general Chemistry	25	75	100	4	4
3	Physical & general Chemistry practical		50	50	2	2
4	Foundation course –II Information & communication technology -1 (ICT-I)		50	50	2	2
Skill Education						
1	Introduction to plant pathology	25	75	100	4	4
2	Introduction to plant pathology Practical		50	50	2	2
3	Introduction to Entomology	25	75	100	4	4
4	Introduction to Entomology Practical		50	50	2	2
5	Introduction to Plant Breeding	25	75	100	4	4
6	On Job Training - II		50	50		2
	Total			750	28	30

ADIKAVI NANNYA UNIVERSITY
Bachelor of Vocation: Agriculture
Course structure and syllabi: w.e.f 2018-2019 Admitted Batch onwards
II Year; Semester III

S.No	Course	Mid Sem Exam*	Sem End Exam	Total Marks	Teaching Hours	Credits
General Education						
1	English Communication Skills-III	25	75	100	4	4
2	Organic & inorganic Chemistry	25	75	100	4	4
3	Organic & inorganic Chemistry practical		50	50	2	2
4	Foundation course –III Information & communication technology -1 (ICT-II)		50	50	2	2
Skill Education						
1	Agronomy of Field Crops	25	75	100	4	4
2	Agronomy of Field Crops Practical	0	50	50	2	2
3	Pests of Field Crops and their Management	25	75	100	4	4
4	Pests of Field Crops and their Management Practical	0	50	50	2	2
5	Manures, Fertilizers and Soil Fertility Management	25	75	100	4	4
6	Manures, Fertilizers and Soil Fertility Management practical	0	50	50	2	2
7	On Job Training - III	0	50	50		2
	Total			750	28	30

Semester IV

S.No	Course	Mid Sem Exam*	Sem End Exam	Total Marks	Teaching Hours	Credits
General Education						
1	Fundamentals of Statistics	25	75	100	2	2
2	Practical Fundamentals Statistics	0	50	50	2	2
3	Spectroscopy and physical Chemistry	25	75	100	4	4
4	Spectroscopy and physical Chemistry Practical	0	50	50	2	2
5	Fundamentals of Economics & Marketing	25	75	100	2	2
Skill Education						
1	Agronomy- Weed & Water management	25	75	100	4	4
2	Agronomy- Weed & Water management Practical	0	50	50	2	2
3	Fungicides and Plant Disease Management	25	75	100	4	4
4	Fungicides and Plant Disease Management Practical	0	50	50	2	2
5	Farm Power and Machinery	25	75	100	4	4
6	On Job Training -IV	0	50	50		2
	Total			750	28	30

ADIKAVI NANNYA UNIVERSITY
Bachelor of Vocational: Agriculture
Course structure and syllabi: w.e.f 2018-2019 Admitted Batch onwards
III Year; Semester V

S.No	Course	Mid Sem Exam*	Sem End Exam	Total Marks	Teaching Hours	Credits
General Education						
1	Inorganic,organic & physical chemistry-1	25	75	100	4	4
2	Inorganic,organic & physical chemistry-1 practical		50	50	2	2
3	Inorganic,organic & physical chemistry-2	25	75	100	4	4
4	Inorganic,organic & physical chemistry-2 practical		50	50	2	2
Skill Education						
1	Principles of Seed Technology	25	75	100	4	5
2	Principles of Seed Technology Practical	0	50	50	2	2
3	Diseases of field crops and their management	25	75	100	4	5
4	Diseases of field crops and their management Practical	0	50	50	2	2
5	Introduction to Agricultural Economics and Farm Management	25	75	100	4	5
6	Project Work -1	0	100	100	4	4
	Total			850	32	30

Semester VI

S.No	Course	Mid Sem Exam*	Sem End Exam	Total Marks	Teaching Hours	Credits
General Education						
1	Environmental Chemistry	25	75	100	4	4
2	Environmental Chemistry practical	0	50	50	2	2
3	Principles of organic farming	25	75	100	4	4
4	Principles of organic farming practical	0	50	50	2	2
Skill Education						
1	Pests of horticultural crops and Productive entomology	25	75	100	4	4
2	Pests of horticultural crops and Productive entomology Practical	0	50	50	2	2
3	Breeding of field crops	25	75	100	4	4
4	Breeding of field crops Practical	0	50	50	2	2
5	Introduction to Agricultural Extension and Entrepreneurship Development	25	75	100	4	4
6	Project Work - 2	0	50	50	2	2
	Total			850	32	30

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

ENGLISH COMMUNICATION SKILLS – 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 & Intensive Reading and Extensive Reading & 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

I. 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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2019-20 Admitted Batch
I Year Semester – I

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.

ADIKAVI NANNAYA UNIVERSITY
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I Year Semester – I

FOUNDATION COURSE -1

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; fertilizerpesticide, 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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I Year Semester – I

INTRODUCTION TO AGRONOMY

UNIT- I: Importance and scope

Agriculture - Definition

Branches of agriculture

History of agricultural development in the World and India.

UNIT - II: Agroclimatic zones

Agronomy - Definition - Importance - Meaning and

scope Agro-climatic zones of Andhra Pradesh & India

Crops and their classification

Factors affecting crop production

UNIT - III: Tillage

Types - Objectives - Modern concepts of tillage

Crop establishment methods

UNIT – IV: Manures and fertilizers

Irrigation management

Fertilizer application

UNIT – V: Cropping patterns and cropping systems

Weed management

Sustainable agriculture

Integrated farming systems

Organic agriculture

Reference Books

1. Reddy , S R and Reddi Ramu 5th edition 2016, -kalyani publishers, Ludhiana.

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I Year Semester – I

INTRODUCTION TO AGRONOMY (PRACTICAL)

1. Visit to college farm & Study of farm features and measurements
2. Identification of crops and seeds
3. Study of seed treatment practices
4. Study of tillage implements- practicing ploughing, puddling operations.
5. Calculation of the seed rate and fertilized requirements.
6. Different methods of seeds sowing and planting.
7. Methods of inter – cultivation implements
8. Fertilizer applications and participation in field operations.

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I Year Semester – I

MODEL PAPER
B VOC (AGRICULTURE) 1-1
INTRODUCTION TO AGRONOMY

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

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

1. Define Agronomy? Discuss about its scope & importance briefly.
2. Write a note on Agro Climatic Zones of Andhra Pradesh.
3. What do you mean by sustainable Agriculture? Mention the Features of Sustainable Agriculture.
4. Write a note on tillage and list out the importance of tillage.
5. Discuss about zero tillage and Stubble nuclear tillage.
6. Differentiate between manures and fertilizers.
7. What do you mean by Cropping system and Cropping pattern.
8. What is a Crop? Classify the crops.

SECTION – B

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

1. a) Write a detailed note on Integrated Farming System (IFS).
(OR)
b) Discuss about Organic Farming.
2. a) What do you mean by fertilizers? Write a note on methods of fertilizer application.
(OR)
b) Future Scope of Organic Agriculture.
3. a) What is a Weed? Describe the methods of Weed control.
(OR)
b) What do you mean by manures? List out the most Familiar manures.
4. a) Write a detailed note on modern concepts of tillage.
(OR)
b) Write an essay on Crop establishment methods.
5. a) What is irrigation? List out the methods or types of irrigation.
(OR)
b) Mention the objectives and importance of tillage.

ADIKAVI NANNAYA UNIVERSITY
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I Year Semester – I

INTRODUCTION TO SOIL SCIENCE

UNIT - I. INTRODUCTION:

- 1.1 Definition of soil
- 1.2 Soil as a Natural Body

UNIT - II. SOIL COMPONENTS:

- 2.1 Soil air
- 2.2 Soil water
- 2.3 organic and inorganic solids

UNIT - III. PHYSICAL PROPERTIES:

- 3.1 Soil separates, texture, Aggregation and Structural Characters, Temperature, Colour.
- 3.2 Properties of Soil Mixture, Pore Space, Bulk Density, Particle Density, Aeration.
- 3.3 Drainage, compaction, Surface area, Soil water relations.

UNIT - IV. MORPHOLOGY OF COLLOIDS & BIOLOGICAL PROPERTIES OF SOIL

- 4.1 Chemistry of clays, Ionic exchange
- 4.2 Acidity, alkalinity, PH, and salinity relations, Liming and Acidification.
- 4.3 Soil Organic matter, C:N relations
- 4.4 N Transformations, Soil organisms, Sulphur transformation.

UNIT - V. GENESIS AND CLASSIFICATION

- 5.1 Profile, Soil forming factors
- 5.2 Soil Survey methods
- 5.3 Soil survey Reports
- 5.4 Soil distribution, Classification of Systems, Drainage, Erosion: Mechanisms and Control.

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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I Year Semester – I

INTRODUCTION TO SOIL SCIENCE(PRACTICAL)

1. Soil sampling procedures for field and horticultural crops
2. Determination of EC.
3. Determination of PH of soil.
4. Land use, texture bulk density, Definition of Soil Physical properties.
5. Determination of N, P and K of the soil
6. Determination of Sulphur.
7. Fertilizer recommendations.
8. Soil health card, parameters, EC, PH and their Importance

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2019-20 Admitted Batch
I Year Semester – I
MODEL PAPER
B VOC (AGRICULTURE) (1-1)
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 knowledge.
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)

1. a) What do you mean the seep out of top soil? What were types of it.
(OR)
b) What is drainage? Write its types.
2. 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.
3. 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.
4. a) Write a note on Porosity of soil.
(OR)
b) Discuss about nitrogen transformation in detailed manner.
5. a) Scope and importance of soil sciences and how it helps for future agriculture.
(OR)
b) Write a note on sulfur transformation.

ADIKAVI NANNAYA UNIVERSITY
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2019-20 Admitted Batch
I Year Semester – I
Fundamentals of Genetics

1. Introduction and definitions of cytology, genetics and cytogenetics – interrelationships among cytology, genetics, plant breeding and also with other branches of science – history – historical developments – cell theory and protoplasm theory
2. Cell – differences between plant cell and animal cell – differences between prokaryotic and eukaryotic cell ; Ultrastructure of cell and cell organelles – cell wall – plasma membrane – cytoplasm – endoplasmic reticulum – ribosomes
3. Ultrastructure of cell and cell organelles – golgi complex – lysosomes – cytoplasmic vacuoles – microbodies – microtubules and microfilaments – centrosomes – basal granules – sphaerosomes – microbodies – cilia and flagella
4. Ultrastructure of cell and cell organelles – plastids – classification of plastids – structure of chloroplast – mitochondria – nucleus – nucleolus, nuclear membrane and nucleoplasm
5. Chromosomes – morphology of chromosomes – shape, size and number of chromosomes – structure of chromosome – composition of chromosome – euchromatin and heterochromatin – karyotype and ideogram
6. Chromosomes – special types of chromosomes – lamp brush chromosomes, salivary gland chromosomes, supernumerary chromosomes, iso -chromosomes and sex chromosomes
7. Deoxyribo Nucleic Acid (DNA) and its structure – Watson and Crick model – functions and types of DNA
8. Modes of DNA replication – semi-conservative DNA replication – experimental proof; Ribo Nucleic Acid (RNA) – structure, function and types – messenger RNA (mRNA), ribosomal RNA (rRNA) and transfer RNA (tRNA) – differences between DNA and RNA
9. Genetic code – properties of genetic code – central dogma – outline of protein synthesis – transcription and translation
10. Gene expression and differential gene activation – Operon concept – Lac Operon
11. Mitosis – definition – process of mitosis – mitotic cycle – significance in plant breeding
12. Meiosis – definition – process – differences between mitosis and meiosis – significance in plant breeding
13. Arrangement of genes on chromosomes – linkage – definition – linkage groups – coupling phase and repulsion phase – types of linkage – distinction between linkage and pleiotropism
14. Theories of linkage – estimation of linkage – Morgan’s work in *Drosophila* – importance of test cross in linkage studies – significance in plant breeding
15. Crossing over – mechanism of crossing over – types of crossing over – factors effecting crossing over – crossing over at four strand stage – cytological proof of crossing over in *Drosophila* – significance of crossing over in plant breeding – coincidence – interference
16. Chromosome mapping – two-point and three-point test cross – cytological maps and genetic maps – importance of linkage and chromosome maps in plant breeding
17. Mendelian genetics – terminology – Mendel’s experiments – reasons for selection of pea as experimental material – characters studied – reasons for Mendel’s success

18. Mendel's Laws – Law of segregation – Law of independent assortment – Principle of dominance – Principle of unit characters – exceptions to Mendel's Laws
19. Monohybrid and dihybrid ratios – modifications of F₂ ratio in monohybrid and dihybrid crosses and lethal factors
20. Gene action – types of gene action – pleiotropism – alleles – characteristic features of alleles – multiple alleles (blood groups in human beings, fur / coat colour in rabbits and self incompatibility alleles in plants) – characteristic features of multiple alleles – pseudo-alleles – penetrance (complete penetrance and incomplete penetrance) and expressivity (uniform expressivity and variable expressivity)
21. Qualitative and quantitative characters – definition – monogenic and polygenic inheritance and their differences – multiple factor hypothesis
22. Sex determination – various mechanisms of sex determination – genic balance theory of sex determination in *Drosophila melanogaster* – sex linked (colour blindness and hemophilia in human beings) sex influenced (horns in some breeds of sheep and baldness in men) and sex limited characters (plumage of male fowls, milk production in female cattle and appearance of beard in men) – pseudohermaphrodites – gynandromorphs
23. Cytoplasmic inheritance – definition – chloroplast inheritance (leaf variegation in *Mirabilis jalapa* and iojap in maize) – mitochondrial inheritance (cytoplasmic male sterility in maize and pokyness in neurospora) – characteristic features of cytoplasmic inheritance – differences between chromosomal and extrachromosomal inheritance
24. Gene mutations – introduction – definition – brief history – terminology – classification of mutations – characteristic features of mutations – spontaneous mutations and induced mutations
25. Gene mutations – artificial induction of mutations – physical and chemical mutagens – molecular basis of mutations – detection of sex linked lethals in *Drosophila* by CLB technique – detection of mutations in plants – importance of mutation in plant breeding programmes – chimeras – xenia and metaxenia
26. Structural chromosomal aberrations – breakage-fusion-bridge cycle – deletions (deficiencies), duplications and their significance in plant breeding
27. Structural chromosomal aberrations – inversions – pericentric inversions and paracentric inversions – inversions as cross over suppressors – translocations – simple and reciprocal translocations – meiotic behaviour – their role in plant breeding
28. Numerical chromosomal aberrations – terminology – classification – euploidy and aneuploidy – kinds of polyploids – autopolyploids, allopolyploids and segmental allopolyploids
29. Numerical chromosomal aberrations – euploidy – monoploids – haploids – differences between monoploids and haploids – diploidy – polyploidy – origin of polyploidy – induction of polyploidy – triploids – tetraploids – cytological behaviour and their significance in plant breeding
30. Numerical chromosomal aberrations – polyploidy and evolution of crop species – wheat, cotton, tobacco, *Triticale*, *Brassica* etc.
31. Numerical chromosomal aberrations – aneuploidy – types of aneuploids – monosomics, double monosomics, nullisomics, double nullisomics, trisomics (primary, secondary and tertiary trisomics) and tetrasomics – their cytological behaviour and significance in plant breeding – effects of polyploidy
32. Genomic approaches in agriculture – definitions of genomics, structural genomics and functional genomics – Human Genome Project – genome size – brief outline

References

- Gupta, P.K. 1985. *Cytology, Genetics and Cytogenetics*. Rastogi Publications, Meerut.
- Gupta, P.K. 2007. *Genetics*. Rastogi Publications, Meerut.
- Pundhan Singh, 2000. *Elements of Genetics*. Kalyani Publishers, Ludhiana.
- Singh, B.D. 2007. *Fundamentals of Genetics*. Kalyani Publishers, Ludhiana.
- Strickberger, M.W. 2004. *Genetics*. Prentice – Hall of India Pvt. Ltd., New Delhi.
- Verma, P.S. and Agarwal, V.K. 2005. *Cell Biology, Genetics, Molecular Biology, Evolution and Ecology*. S. Chand and Co., New Delhi.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
2019-20 Admitted Batch
I Year Semester – I
MODEL PAPER
PRINCIPLES OF GENETICS

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

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

1. What are the characteristics of Mutations.
2. Explain lac operon concept of general regulation with neat labeled diagram.
3. Differentiate between linkage & Crossing over.
4. Explain Mendel's law of heredity with suitable examples.
5. Write the Properties of Genetic code.
6. Write about types of DNA & RNA.
7. Explain the experiment to show cytological proof of crossing over.
8. Explain the different types of structural chromosomal aberration with suitable illustrations.

SECTION – B

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

1. a) Explain Semi Conservative method of replication.
(OR)
b) Explain the experiment for identification of recessive lethal mutations in *Drosophila*.
2. a) Differentiate between mitosis & meiosis.
(OR)
b) Explain lethal gene action with the help of suitable example.
3. a) Define gene interaction? Explain any two of the gene interactions with help of suitable examples.
(OR)
b) Explain different models of sex determination in plants.
4. a) Explain about the special types of chromosomes.
(OR)
b) Describe the effects of various factors that affect the frequency of recombination.
5. a) Explain the Phenomenon of multiple allele with the help of an appropriate example.
(OR)
b) Write about classification, Characteristics of linkage

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Bachelor of Vocation: AGRICULTURE
2019-20 Admitted Batch
I Year Semester – I

ON JOB TRAINING – I
Credits 3

- 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. Identification of Oil Seeds
 2. Identification of Cereal seeds
 3. Identification of Pulses seeds
 4. Identification of millet seeds
 5. Identification of weeds
 6. Identification of Green Leaf Manuring and Green Manuring Crops
 7. Nursery bed preparation – Sunken Bed and Raisen Bed
 8. Methods of Sowing
 9. Irrigation Methods
 10. Preparation of Organic Solutions
- IV. **SEMINAR** : 5 Marks
- V. **VIVA** : 5 Marks
- TOTAL MARKS** : **50 Marks**

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
2019-20 Admitted Batch
I Year Semester - II
ENGLISH COMMUNICATION SKILLS - II

English Communication Skills aims at improving the speaking skills of the learner. For many learners of English, the sound-spelling relationship of the language appears an 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

Unit III: Speaking Skills -1

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

Unit IV: Speaking Skills -2

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

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
2019-20 Admitted Batch
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 ClF_3 , $\text{Ni}(\text{CO})_4$, Molecular orbital theory - LCAO method, construction of M.O. diagrams for homonuclear and hetero-nuclear diatomic molecules (N_2 , O_2 , 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: AGRICULTURE
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.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
2019-20 Admitted Batch

I Year Semester – II
FOUNDATION COURSE – 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 R.Groh and Faithe Wempen, Publishers : Wiley

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

INTRODUCTION TO ENTOMOLOGY

Credits: 4

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 in brief .

Unit IV: Taxonomy of Apterygota and Exopterygota

Insect systematics; Distinguishing characters of agriculturally important orders and families of Hexapoda. Characters of Apterygota ,Exopterygota (Ephemeroptera, Odonata, Orthoptera, Phasmida, Dictyoptera, Embioptera, Dermaptera, Hemiptera, Isoptera, Psocoptera, Mallophaga, Thysanoptera and Siphunculata).

Unit V: Taxonomy of Endopterygota

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

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

PRACTICAL ENTOMOLOGY
Credits: 2

1. Observations on external features of grasshopper / cockroach,
2. Methods of insect collection, preservation – Preparation of Riker mount.
3. Types of insect head, antenna, mouth parts – Structure of thorax.
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 grasshopper / cockroach –
8. Observing the characters of agriculturally important orders and families.

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

INTRODUCTION TO PLANT PATHOLOGY
Credits: 4

UNIT 1: Introduction to plant diseases and their causal organisms

History, Importance of plant diseases, scope and objectives of Plant Pathology. Important plant pathogenic organisms, Classification of Plant Diseases 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)

UNIT 3 : Bacteria and Mollicutes

Bacteria – General Characters, Classification of plant pathogenic bacteria
Important plant bacterial diseases and their causal agents
Mollicutes :Phytoplasma and Spiroplasma – General characters and important diseases and vectors

UNIT 4 : Plant Viruses

Fastidious vascular Bacteria – general characters and important diseases and vectors
Viruses: General characters of plant viruses, nature, architecture
Symptoms of various viral diseases, transmission of plant viruses.
Important plant viral diseases and their vectors.

UNIT 5: Viroids, phanerogamic plant parasites and plant parasitic

nematodes 5.1 Viroids – General characters and important diseases
Phanerogamic plant parasites – general characters, propagation, survival and their hosts
Plant parasitic nematodes – general characters and important plant parasitic nematodes.

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

PRACTICAL PLANT PATHOLOGY
Credits: 2

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.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
2019-20 Admitted Batch
I Year Semester – II
INTRODUCTION TO PLANT BREEDING
Credits: 4

Unit I - Reproductive systems and plant breeding. Introduction to plant breeding - objectives and role - historical perspective centres of origin – Germplasm – conservation - plant introduction - reproduction in plants- systems of mating - self incompatibility – sterility-apomixes.

Unit II - Breeding methods of self pollinated crops .Breeding methods: self pollinated crops-pureline selection – mass selection – hybridization and 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 – use of male sterility systems – 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 .

Unit V – Botanical description and Breeding techniques in different crops. Classification of plants, Botanical description, Floral biology, selfing and crossing , Emasculation and Pollination techniques in cereals, millets, pulses, oil seeds.

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

ON JOB TRAINING – II

- I. **FIELD TRIP (3)** : 3 trips X 5 M = 15 Marks
(Attendance for each trip 5 marks)
 - II. **PROJECT REPORT** : 10 Marks
 - III. **FIELD WORK** : 10 X 1M Per Pracitcal= 10 Marks
 - IV. **ECONOMICAL SURVEY** : 2.5M X2 FARMERS=5 MARKS
(Interaction with two farmers and gathering the data)
 - V. **SEMINAR** : 5 Marks
 - VI. **VIVA** : 5 Marks
- TOTAL MARKS : 50 Marks**

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
2018-19 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: AGRICULTURE
2018-2019 Admitted Batch onwards
II Year Semester - III ORGANIC
AND INORGANIC CHEMISTRY

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:

- Dehydration of alcohols.
- Oxidation of alcohols by CrO_3 , KMnO_4 .
- Special reaction of phenols: Bromination, Kolbe-Schmidt reaction, Riemer-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 DNP, 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-DNP 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
Bachelor of Vocation: AGRICULTURE
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

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
2018-2019 Admitted Batch onwards
II Year Semester - III
FOUNDATION COURSE – III (ICT-II)

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
Bachelor of Vocation: AGRICULTURE
2018-2019 Admitted Batch onwards
II Year Semester - III

AGRONOMY OF FIELD CROPS-II

UNIT-I: CEREALS : Rice, wheat.

UNIT-II: MILLETS : Maize, sorghum, Pearl millet, Finger millet, Proso millet, Kodo millet, Foxtail millet, Little millet, Barnyard millet

UNIT-III: PULSES: Pigeon pea, Green gram, Black gram, Bengal gram, Peas, Horse gram, Cowpea

UNIT-IV: OIL SEEDS: Ground nut , Sesame, Sunflower, Castor, Rape seed, mustard, safflower, niger, Coconut and oil palm

UNIT-V:SUGAR & FIBER CROPS: Sugarcane, Sweet sorghum, Cotton, Jute, Mestha, Sunhemp

UNIT-VI: OTHER CROPS AND FODDER CROPS:: Tobacco, Fodder, sorghum, cowpea, napier, lucern, berseam, oats

Reference Books

1. Reddy , S R and Reddi Ramu 5th edition 2016, Agronomy of Field Crops-kalyani publishers, Ludhiana.
2. Chidda Singh, Singh ,P and Singh R, Modern Techniques of Raising field crops-oxford publishing house, New Delhi.
3. Rajendra Prasad 2004 text book of Field Crop Production Volume i, Volume ii
4. Panda S C 2014 Agronomy of Fodder a forage crops, kalyani publishers Ludhina

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

AGRONOMY OF FIELD CROPS
(PRACTICAL)

1. Identification of cereals, millets, pulses, oil seed, sugar and fibre crops in the crop cafeteria.
2. Practicing various nursery types and main field preparation for field crops.
3. Acquiring skill in different seed treatment techniques in important field crops.
4. Estimation of plant population, seed rate and fertilizer requirement for important field crops.
5. Acquiring skill in field preparation, sowing and manuring of crops under pure and intercropping situations for field crops.
6. Acquiring skill in using seed drill for sowing operations.
7. Observations on growth parameters of cereals, millets, pulses, green manures and forage crops.
8. Study on yield parameters and estimation of yield in field crops.
9. Working out cost and returns of important cereals, millets and pulses.
10. Collection of seeds of field crops.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
2018-2019 Admitted Batch onwards
II Year Semester - III
MODEL PAPER
B VOC (AGRICULTURE) 2-1
AGRONOMY OF FIELD CROPS

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

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

1. Differentiate between *Corchorus capsularis* & *Corchorus Olitorius*.
2. Explain about Sorghum effect.
3. Write about Refting process of Jute.
4. Write down the Nutritional values of Bajra & finger millet
5. Classification of wheat with scientific names
6. Write briefly about different types of nurseries practiced in Rice.
7. Write down some varieties of Wheat, Maize, Sunflower, Cotton & Sorghum.
8. Write down common names, scientific names and their origins of all major & minor millets.

SECTION – B

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

1. a) Write down the importance of pulses in india.

(OR)

b) Write down the importance of oilseeds in india.
2. a) Write about SRI Method of rice cultivation.

(OR)

b) Write about all planting methods of sugarcane.
3. a) Write general package of practices of millets.

(OR)

b) Write general package of practices of oilseeds.
4. a) Write about nutrient management of Rice, wheat & Maize.
b) Write about nutrient management of Groundnut, Cotton & Sunflower.
5. a) Write Seed rate, sowing, nutrient management, water Management, Weed Management, harvesting & yield of groundnut.

(OR)

b) Write seed rate, sowing, nutrient Management, Water Management, Weed Management, harvesting & yield of Rice.

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

PESTS OF FIELD CROPS AND THEIR MANAGEMENT

UNIT: I:

Pests of Cereals and Millets Distribution, bionomics, symptoms of damage and management strategies for insect pests and integrated pest management of rice, wheat, maize, sorghum, cumbu and ragi.

Unit II:

Pests of Pulses and Oilseeds Distribution, bionomics, symptoms of damage and management strategies of insect pests and integrated pest management of pulses (grams, cowpea.), groundnut, castor, gingelly, sunflower, safflower, soybean and mustard.

Unit III.

Pests of Cotton and Sugarcane Distribution, bionomics, symptoms of damage and management strategies of insect pests and integrated pest management of cotton and sugarcane.

Unit IV:

Pests of Green Manures, Stored Products, bionomics, symptoms of damage and management strategies of pests of green manures (Sunnhemp, Sesbania, Daicha) and stored products.

Unit V:

Rodents and birds of agricultural importance and their management. Locusts and their management.

Reference Books

1. Vasanthraj David. B and Rama murthy VV 2016 Elements of Economic Entomology, popular book depot, Coimbatore
2. Vasanthraj David. B and Ananthakrishnan T.N.2016. General and applied Entomology , Tata McGraw-Hill publishing house, New Delhi.
3. Nair MRGK 1986, Insects and Mites of Crops in India, ICAR, New Delhi.
4. Khare, S.P 1993 Stored Grain Pests and their Management, kalyani publishers, Ludhina.

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

PESTS OF FIELD CROPS AND THEIR MANAGEMENT
(PRACTICAL)

1. Pests of rice
2. Pests of maize, sorghum and cumbu
3. Pests of wheat and ragi
4. Pests of grams and cowpea
5. Pests of groundnut, gingelly and sunflower
6. Pests of castor, soybean, safflower and mustard
7. Pests of cotton
8. Pests of sugarcane
9. Pests of stored products
10. Gadgets for management of stored product insects.
11. Calculation on the doses and their application techniques
12. Assessment of losses in stored grain pests, fumigation of grains stored in godowns
13. Visit to nearest FCI/AWC/SWC godown.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
2018-2019 Admitted Batch onwards
II Year Semester – III
MODEL PAPER
Pest of Field Crops (2-1)

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

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

(5*5 = 25)

1. Write down symptoms and management for Brown Plant Hopper and Green Leaf Hopper of paddy.
2. Write down symptoms and management for Stem borer and Corn worm or ear worm of maize.
3. Write down symptoms and management for Red hairy caterpillar and leaf hopper.
4. Write down symptoms and management for Leaf eating caterpillar and Diamond back moth.
5. Write down symptoms and management for Root grub and Leaf miner of groundnut.
6. Write down symptoms and management for Pink bollworm and American boll worm of cotton.
7. Write down symptoms and management for Sugarcane scales and sugarcane pyrilla
8. List out the Internal and External feeders with their scientific names of stored grain pest.

SECTION – B

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

(5*10 = 50)

1. a) Write down IPM practices of Paddy.

(OR)

b) Write down symptoms and management for Mustard saw fly, Groundnut aphid and sorghum gall fly.

10. a) Write down IPM practices of Pulses.

(OR)

b) Write down symptoms and management for termites, castor shoot borer, and castor jassids.

11. a) Write down IPM practices of Cotton.

(OR)

b) Write down symptoms and management for spotted boll worm, Red cotton bug, and cotton thrips.

12. a) Write down IPM practices of Stored grain pest.

(OR)

b) Write down symptoms and management for Ragi pink borer, sorghum ear head bug, and sorghum midge.

13. a) Write down the management practices for Rodents

(OR)

b) List out the pests of birds and locusts with their scientific names and their management.

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

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

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

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 on N in plant samples
9. Estimation of P in plant samples
10. Estimation of K&S in plant samples
11. Identification 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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Bachelor of Vocation: AGRICULTURE
2018-2019 Admitted Batch onwards
II Year Semester - III
MODEL PAPER

B VOC (AGRICULTURE) 2-1
MANURES, FERTILIZERS & SOIL FERTILITY MANAGEMENT

Time: 3 Hours

Maximum: 75 Marks

SECTION – A

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

1. Give formula for Nutrient use efficiency (NUE) & Nutrient requirement (NR).
2. Write about FCO with specifications of urca.
3. Explain the factors affecting for ammonification of Nitrozen.
4. Explain Sulphur cycle with suitable diagram.
5. Explain briefly about DRIS.
6. What is meant by INM & STCR and explain it briefly.
7. Write about soil application, foliar spray of fertilizers and explain about fertigation
8. Write transformations & fixation of phosphorus & Pottassium.

SECTION – B

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

1. a) Write functions of all essential nutrients.

(OR)

b) Write definition of toxicity symptoms of all essential.
2. a) Differentiate between manures &

(OR)

b) Differentiate between Bulky & Conc. Organic manure.
3. a) Define manures & Write down the classification of manures.

(OR)

b) Define composting & Write about different methods of composting.
4. a) Explain different methods of fertilizer applications with suitable tree diagram.

(OR)

b) Write about classification of nitrogenous, Phosphorus & Potassium with suitable examples.
5. a) Write about soil health and the parameters responsible for assessment of soil health.

(OR)

b) Write about sources, forms, mobility, transformations, fixation availability of nitrogen.

ADIKAVI NANNAYA UNIVERSITY
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2018-2019 Admitted Batch onwards
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.**
- IV. SEMINAR : 5 Marks**
- V. VIVA : 5 Marks**
- TOTAL MARKS : 50 Marks**

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
2018-2019 Admitted Batch onwards
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

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

PRACTICALS ON FUNDAMENTALS OF STATISTICS

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
Bachelor of Vocation: AGRICULTURE
2018-2019 Admitted Batch onwards
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-Onsager's equation for strong electrolytes (elementary treatment only). Definition of transport number, determination by Hittorfs 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
- 6.Introduction to Electrochemistry by S. Glasstone
- 7.Elementary organic spectroscopy by Y.R. Sharma
8. Spectroscopy by P.S.Kalsi

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

AGRONOMY – WEED AND WATER MANAGEMENT
(THEORY)

WEED MANAGEMENT

Unit-I : Weed Biology and Ecology Weeds:

Introduction, Definitions; harmful and beneficial effects, classification, propagation, dissemination and weed seed dormancy; Weed biology and ecology; Critical periods of crop weed competition and allelopathy. Principles of Weed Management Concepts of weed prevention, control and eradication; Methods of weed management: cultural, mechanical, chemical, biological and biotechnological methods; Integrated weed management.

Unit-II : Herbicides

Herbicides: Definition – advantages and limitation of herbicide usage in India; Herbicide classification, formulations, methods of application; Introduction to Adjuvants and their use in herbicides. Weed management in field crops; aquatic, problematic, invasive alien weeds and their management.

WATER MANAGEMENT

Unit-III : Importance and History of Irrigation

Role of water in plant growth – Importance of irrigation – Water resources and irrigation potential of India – History and development of irrigation in India – Irrigation systems of India. Soil – water – plant relationship – Soil Plant Atmospheric Continuum (SPAC) – Hydrological cycle – Moisture extraction pattern – Absorption of water – Evapotranspiration – Plant water stress and its effect and methods to overcome stress.

Unit-IV : Crop Water Requirement and Management

Crop water requirement – Potential evapotranspiration (PET) and consumptive use – Definition and estimation – Factors affecting water requirement – Effective rainfall – Critical stages for irrigation – Water requirement of crops – Water management for major field crops.

Unit-V : Methods of Irrigation

Scheduling of irrigation – Different approaches – Methods of irrigation: surface, sub – surface, sprinkler and drip irrigation – Micro irrigation: layout, suitability, merits and demerits – Fertigation – Water use efficiency – Methods to improve WUE – Conjunctive use of surface and ground water. Quality of irrigation water – Agronomic practices for use of poor quality water (saline, effluent and sewage water) for irrigation.

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

AGRONOMY – WEED AND WATER MANAGEMENT
(PRACTICAL)

1. Identification, classification and characterization of terrestrial weeds.
2. Identification, classification and characterization of aquatic weeds and parasitic weeds.
3. Estimation of soil weed seed bank.
4. Identification, classification and characterization of herbicides.
5. Herbicide residue determination by bioassay techniques.
6. Practicing Skill development on herbicide application techniques and spray equipments.
7. Calculation on irrigation water based on source, water flow, soil moisture status and depth of irrigation and WUE.
8. Land leveling and land shaping – Beds and channels – check basin – ridges and furrows-border strips – broad bed furrow method of irrigation.
9. Operation and maintenance of sprinkler irrigation systems and drip irrigation systems.
10. Scheduling of irrigation based on simple techniques and devices.
11. Weed herbarium collection.

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

FUNGICIDES AND PLANT DISEASE MANAEMENT
(THEORY)

UNIT 1

Introduction to plant pathology, terms and concepts used in plant pathology, history of plant pathology. Survival of plant pathogens. Dispersal of plant pathogens

UNIT 2

Infection process – pre-penetration, penetration and post-penetration. Role of enzymes in pathogenesis. Role of toxins in pathogenesis

UNIT 3

Defense mechanism in plants – structural, induced defense in plants. Plant disease epidemiology. Remote sensing

UNIT 4

Principles of plant disease management. Physical methods and biological methods. Protection – Classification of fungicides based on chemical nature and method of application

UNIT 5

Host plant resistance. Integrated disease management. Application of bio-technology in plant disease management

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

FUNGICIDES AND PLANT DISEASE MANAEMENT
(PRACTICAL)

1. Survey and assessment of important plant diseases
2. Seeds health tests – dry seed examination, seed washing, blotter test
3. Preparation of bordeaux mixture
4. Methods of application of fungicides
5. Special methods of application – acid delinting, pseudostem injection, root feeding, pairing and pralinage, trunk injection
6. Mass multiplication of Trichodermaspp and method of application
7. Cross protection
8. Preparation of leaf extracts

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

FARM POWER AND MACHINERY THEORY

UNIT I:

Farm Power in INDIA – Introduction- Different sources of farm power- Merits and demerits of farm sources- status of farm power in India. Farm mechanization- Scope- Concept of farm mechanization
Classifications of energy sources- Renewable- Non- renewable- Need of renewable energy sources-
Types of renewable energy sources- Solar energy- Wind energy- Biogas.

UNIT II:

Heat engines- Introduction- Types- External combustion engine- Internal combustion engine-
Classification of IC engine - Two stroke and Four stroke engine- Diesel engine- Petrol engine,
Components of IC engine. Valve working and valve timing diagram.

UNIT III:

Tillage- Objectives- Classification- Primary Tillage and Secondary tillage implements, Types
of tillage.Primary tillage implements- Mouldboard Plough, Disc Plough, Chisel Plough,
Subsoiler, Components and Functions, Types, Advantages and Disadvantages.

UNIT IV:

Secondary Tillage implement– Harrows- Types- Animal drawn harrow- Tractor drawn harrow,
cultivators- Types Land Forming Equipment-Wetland Equipment –Puddlers and Green Manure
Tramplers - cage wheels.

UNIT V:

Planting and fertilizing equipments- Methods of sowing- study of animal drawn seed cum
ferti drill- study of tractor drawn seed cum ferti drill. Planters- potato, sugarcane planter,
study of intercultivationequipments- weeders.

TEXT BOOKS:

- 1.JagdishwarSahay (1977), Elements of Agricultural Engineering, Standard Publications, New Delhi.
- 2.Pakirappa and Naresh V (2014), Energy sources and power plant engineering, radiant Publishing House, Hyderabad.

REFERENCE BOOKS

- 1.Michel A.M, and Ojha T.P, Principles of Agricultural Engineering, Vol.I, Jain Brothers, New Delhi.
- 2.Kepner R.A, Roy Bainer and Barger E.L, Principles of Farm Machinery, CBS Publishers and Distributors, New Delhi.

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
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 1.**
- IV. SEMINAR : 5 Marks**
- V. VIVA : 5 Marks**
- TOTAL MARKS : 50 Marks**

ADIKAVI NANNAYA UNIVERSITY
Bachelor of Vocation: AGRICULTURE
2018-2019 Admitted Batch onwards
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

15h

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

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

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

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

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

PRINCIPLES OF SEED TECHNOLOGY
(THEORY)

Unit I - Introduction to seed and seed quality

Seed - definition - Seed structure - Seed development and maturation

Germination - phases of seed germination

Dormancy - types of seed dormancy - Seed senescence - causes of seed senescence

Seed quality characteristics - significance

Classes of seed - Generation system of seed multiplication in seed supply chain .

Unit II - Principles of seed production

2.1 Seed replacement rate and varietal replacement - Seed Multiplication Ratio - Seed renewal period

2.2 Causes of varietal deterioration and maintenance

Genetic and agronomic principles of seed production

Factors affecting quality seed production

Methods of seed production of varieties and hybrids.

Unit III - Seed production techniques of agricultural crops

Floral biology and pollination behavior - seed production techniques of varieties and hybrids of:

rice, maize,

sorghum, bajra

redgram

blackgram and greengram

groundnut and sesame

sunflower,

cotton varieties and hybrids – Bt cotton

Unit IV - Seed production techniques of vegetable crops

Floral biology and pollination behavior - seed production techniques of varieties and hybrids of:

tomato,

brinjal,

chillies,

bhendi,

onion,

snakegourd, bittergourd ,ashgourd, ribbed gourd and bottlegourd

Unit V - Post harvest seed handling techniques

Threshing - methods

Drying - methods of seed drying - advantages and disadvantages

Seed processing – definition - importance

Seed cleaning and grading - upgrading - equipments - working principles

Seed treatment - importance - types - Seed invigouration techniques - seed hardening - seed fortification - seed priming - Seed enhancement techniques - seed coating - seed pelleting.

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III Year Semester – V

PRINCIPLES OF SEED TECHNOLOGY
PRACTICAL

1. Study of seed structure of agricultural and horticultural crops.
2. Seed dormancy breaking methods.
3. Acid delinting in cotton.
4. Detasseling techniques for hybrid seed production in maize.
5. Emasculation and dusting techniques for hybrid seed production in important field crops.
6. Practicing pre-germinative techniques , enhancing floral ratio and improving seed set in cucurbits
7. Fruit grading and seed extraction methods in vegetables - tomato, brinjal, chillies, bhendi and cucurbits.
8. Seed cleaning and grading techniques and detection of seed mechanical injury.
9. Collection of seeds.

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III Year Semester – V

**DISEASES OF FIELD CROPS AND THEIR MANAGEMENT
THEORY**

Unit 1- Diseases of Cereals

- Diseases of Rice
- Diseases of wheat and sorghum
- Diseases of maize, cumbu, bajra and ragi
- Diseases of minor millets.

Unit 2 - Diseases of Pulses

- Diseases of red gram
- Diseases of green gram
- Diseases of Bengal gram and cowpea
- Diseases of soybean and field bean

Unit 3 - Diseases of oil seeds

- Diseases of ground nut
- Diseases of mustard and rape seed
- Diseases of sesame
- Diseases of sunflower and safflower
- Diseases of castor

Unit 4 - Diseases of cash crops

- Diseases of cotton
- Diseases of jute
- Diseases of sugarcane
- Diseases of Tobacco

Unit 5 - Integrated Disease Management

- Diseases of mulberry
- Bio-control agents in plant disease management
- Botanicals in Plant disease management
- Genetic engineering in plant disease management
- Integrated disease management in different crops.

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III Year Semester – V

DISEASES OF FIELD CROPS AND THEIR MANAGEMENT
PRACTICAL

1. Identification of various diseases
2. Identification of various plant protection chemicals
3. IDM in rice
4. IDM in maize
5. IDM in sorghum
6. Use of bio control agents in plant disease management
7. Preservation of disease specimens
8. Cultural methods of disease control
9. Herbarium

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2018-2019 Admitted Batch onwards
III Year Semester – V

**INTRODUCTION TO AGRICULTURAL ECONOMICS AND FARM MANAGEMENT
THEORY**

Unit 1: Production Economics and Farm Management - Nature and Scope

Production Economics: Meaning, Definition and Nature and Scope – Farm Management: Definition and Objectives of farm management – Production Economics Vs. Farm Management – Farm Management Decisions: Decision making process – Scope of farm management – Types and Systems of farming: Types – Specialized, Diversified, and Mixed farming – Systems of farming: Peasant Farming, State Farming, Capitalistic, Collective and Co – operative Farming.

Unit 2: Factor – Product Relationship

Factor – Product relationship: Meaning – Agricultural Production Function: Meaning, Definition – Laws of Returns: Increasing, Constant and Decreasing Returns – Classical production function and Three stages of production – Elasticity of production – Types / Forms of Production functions – Linear, Cobb–Douglas and Quadratic – Cost Concepts and Cost curves: Total, Average and Marginal Costs – Economies of Scale – Economies of Size - Determination of Optimum Input and Output – Physical and Economic Optimum.

Unit 3: Factor – Factor Relationship

Factor – Factor relationship: Meaning - Isoquant: Definition and Types, Isoquant map – Marginal Rate of Technical Substitution – Factor Intensity – Isocline – Ridge Line – Returns to Scale – Elasticity of Factor Substitution – Isocost line – Principle of Factor Substitution and Least Cost Combination of inputs – Expansion Path – Effect of input price changes on the least cost combination.

Unit 4: Product – Product Relationship

Product – Product relationship: Meaning – Production Possibility Curve – Marginal Rate of Product Transformation – Enterprise relationship: Joint Products, Complementary, Supplementary and Competitive Products – Isorevenue line – Optimum Combination of Products – Principle of Equi–Marginal Returns – Principle of Opportunity Cost and Minimum Loss Principle.

Unit 5: Farm Planning and Budgeting

Farm Planning: Importance – Characteristics of good Farm Plan – Farm planning procedure – Budgeting: Definition and Types: Partial budgeting, Enterprise budgeting, Complete budgeting and Cash flow budgeting – Limitations of budgeting – Linear Programming: Assumptions – Linear Programming Model: Definition, Graphical solution, Advantages and Limitations – Risk and Uncertainty: Definition – Types of Risk and Uncertainty – Safeguards against Risk and Uncertainty.

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III Year Semester – V

Project work - 1

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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III Year Semester – VI

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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2018-2019 Admitted Batch onwards
III Year Semester – VI

Pests of horticultural crops & productive entomology
THEORY

Unit I

Importance and history of sericulture – organizations involved in sericulture – silkworm types-mulberry cultivation – varieties - morphology of mulberry plant – identification of popular mulberry genotypes – methods of propagation – nursery and main field preparation – planting methods – identification of nutrient deficiency symptoms – identification of weeds – herbicide application methods – irrigation methods and management practices

Unit II

Rearing house – types – disinfection – room and bed disinfectants – egg incubation methods – chawki rearing – feeding, cleaning and spacing – rearing of late age worms – feeding, cleaning, spacing and moulting care different stages – spinning – mountages – harvesting. Visit to sericulture farms – interaction with sericulturists- visit to grainage and cocoon market-economics of mulberry silkworm rearing Pests and diseases of silkworm and their management – post cocoon technology – stifling to weaving. Byproducts of sericulture - non –mulberry silkworms – eri, tasar and muga silkworms.

Unit III

Apiculture - Bee species – comparison- castes of bees, bee behaviour and bee dance; Apiary management practices – bee pasturage, foraging, seasonal variations; Bee products – properties and uses; Effect of agricultural inputs on bee activity – pesticide poisoning; Lac insect- biology-strains-natural enemies of lac insect and lac products;

Unit IV

Pests of vegetable crops – Distribution ,bionomics, symptoms of damage and management strategies for insect ,pest and integrated management of solanaceous, cucurbits, crucifers, root crops, leafy vegetables and bhendi

Unit IV

Pests of fruit crops – Distribution ,bionomics, symptoms of damage and management strategies for insect ,pest and integrated management of mango,citrus,banana,guava,sapota,papaya,pomegranate,apple.

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2018-2019 Admitted Batch onwards
III Year Semester – VI

Pests of horticultural crops & productive entomology
PRACTICAL

1. Morphology of mulberry plant – description – distinguishing characters of promising mulberry genotypes. Nursery bed preparation – care in selection of planting materials – Biofertilizer treatment in nursery.
2. Main field preparation – methods of planting, methods of irrigation - Identification of nutrient deficiency symptoms – corrective measures.
3. Identification of weeds – Herbicide application method. Pruning methods – leaf / shoot harvest– preservation of leaves.
4. Identification of pests of mulberry and damage symptoms.
5. Identification of symptoms of diseases and nematodes of mulberry.
6. Morphology of silkworm – different stages – Identification of races by cocoon shape, colour and larval marking –Dissection of mouth parts and silk glands.
7. Rearing house and appliances – Methods of disinfection. Incubation of eggs – methods – Chawki rearing – brushing – feeding.
8. Silkworm rearing – shelf and shoot rearing – skill involved in brushing – feedingmoulting care – bed cleaning – spacing – mountages — spinning and cocoon harvest.
9. Identification of pests and diseases of silkworm – damage – symptoms - Mass multiplication of hyperparasitoid.
10. Integrated Farm System with Sericulture in Integrated Farming system – Mechanization in sericulture.
11. Eri silkworm – morphology – food plants – methods of rearing – methods of spinning – Tasar silkworm – morphology – food plants – early and late instar larval rearing.
12. Apiculture - Bee species – comparison- castes of bees, bee behaviour and bee dance; Apiary management practices – bee pasturage, foraging, seasonal variations; Bee products – properties and uses; Effect of agricultural inputs on bee activity – pesticide poisoning;
13. Lac insect- biology-strains-natural enemies of lac insect and lac products;

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III Year Semester – VI

BREEDING OF FIELD CROPS
THEORY

Place of origin – putative parents – related wild species – classification – objectives of breeding – methods of breeding – quantity – quality – stress – conventional – innovative – heterosis breeding – distant hybridization and important varieties in following crops:

Unit-I: Cereals

- Rice
- Wheat
- Grain and fodder Maize
- Grain and fodder Sorghum

Unit – II: Millets

- Pearl millet
- Finger millet
- Foxtail millet
- Kodo millet
- Little millet
- Proso millet
- Barn yard millet.

Unit-III : Pulses

- Red gram
- Bengal gram
- Green gram
- Black gram
- Soybean
- lab – lab

Unit – IV: Oilseeds

- Groundnut
- Sesame
- Mustard
- Sunflower and Safflower
- Coconut
- Oilpalm

Unit-V :Fibres and Sugars

- Cotton
- Jute
- Mesta
- Sugarcane
- Sugar beet

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III Year Semester – VI

BREEDING OF FIELD CROPS
PRACTICAL

Observation on floral biology – anthesis and pollination – selfing and crossing techniques – observation on wild species – maintenance of crossing ledger – pedigree record – in following crops.

1. Rice, Wheat
2. Maize, Sorghum,
3. Pearl Millet, Finger Millet, Little Millet,
4. Kodo Millet, Barn Yard Millet, Proso Millet and Foxtail Millet.
5. Redgram Bengal Gram, Green Gram, Black Gram, Soybean, Lab – Lab.
6. Groundnut, Sesame, Mustard,
7. Sunflower, Safflower,
8. Coconut And Oilpalm
9. Cotton, Jute And Mesta
10. Sugarcane And Sugar Beet

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III Year Semester – VI

**INTRODUCTION TO AGRICULTURAL EXTENSION AND ENTREPRENEURSHIP
DEVELOPMENT
(THEORY)**

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 – VI
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 compositing.
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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III Year Semester – VI
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

Project work - II

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