# SEMESTER - I

# SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: I Course Title: Fundamentals of Agronomy Course No.of Hours:30 Hrs. Credits: 2

Code:AGRO101

## Objectives:

- To identify the various tillage implements.
- To explain about cultivation of rice crop.
- To identify the various herbicides available in India.

#### **Course Outcomes**

At the end of the course, students will be able to

**CO1:**Explain the history and development of agriculture in India.

- **CO2**: Explain crop production techniques and crop growth in relation to the environment.
- CO3: Outline the principles and practices of weed management.
- **CO4**: Discuss the classification, nomenclature, mode of action and selectivity of herbicides.
- **CO5**: Compare the traditional and technology-supported practices in agriculture.

## UNIT-I: (6Hrs.)

1.Definition of agriculture – meaning and scope of agronomy

2. History and development of agriculture in ancient India – agriculture in civilization era

3.National and International Agricultural Research Institutes in India

4.Agro-climatic zones of India – soils, land use pattern, major sources of irrigation and ground water potential

5.Agro-climatic zones of Andhra Pradesh – soils, land use pattern, major sources of irrigation and ground water potential

6.Tillage and tilth – objectives of tillage – characteristics of ideal seed bed – effect of tillage on soil properties – pore space, texture, structure, bulk density and color of the soil

# UNIT-II: (6Hrs.)

1. Types of tillage – preparatory tillage – factors affecting preparatory cultivation, after cultivation, puddling

2.Sowing – methods of sowing – time and depth of sowing for major agricultural crops – cereals, pulses and oilseeds

3. Crop stand establishment – factors affecting optimum stand establishment

4. Planting geometry – competition – types of competition, intra and inter plant competition – plant population – effect of plant population on growth and yield – optimum plant density and planting pattern

5. Soil fertility – soil fertility and soil productivity – fertility losses – maintenance of soil fertility – soil organic matter

6. Weed control – definition of weed – losses and uses of weeds – weed influence on crop production – methods of wed control

# UNIT-III: (6Hrs.)

1. Irrigation management – importance of irrigation – objectives of irrigation – methods of irrigation – drainage and its advantages

2. Cropping systems – monocropping – definition and principles of crop rotation – mixed cropping – intercropping – relay cropping – multistoried cropping – sole cropping and sequence cropping

3. Harvest maturity symptoms and harvesting of major agricultural crops – rice, maize, groundnut, sugarcane and pulses – maturity indices, method of harvesting, threshing and winnowing – harvest index

4. Introduction - weed definition - harmful and beneficial effects of weeds

5. Classification of weeds – classification based on morphology – life cycle – habitat – origin – association – special features and soil pH with examples.

6. Propagation of weeds – sexual – asexual – vegetative reproduction – dispersal of weed seeds and fruits – dispersal agents – wind and water – animal – man – manures –farm implements and silage – dispersal of vegetative propagules

# UNIT-IV: (6Hrs.)

1. Weed Biology – characteristic features of weeds – weed ecology – definition – persistence of weeds climatic – edaphic and biotic factors – crop weed association with some important crops like rice, maize, wheat, jowar, pulses, groundnut, sugarcane, cotton and tobacco.

2. Crop -weed competition - principles – factors - critical period of cropweed competition - allelopathy.

3. Methods of weed management – preventive weed control measures – physical / mechanical, cultural,

4. Chemical and biological methods of weed control – bioherbicides - integrated weed management

5. Herbicides – definition - advantages and limitations of herbicide usage in India- classification of herbicides based on chemical nature time and method of application

 Classes of herbicides based on – selectivity – spectrum – translocation – residual nature – soil sterilants and fumigants – types of formulations.

7. Nomenclature of herbicides - commonly available herbicides in India

adjuvants -definition, their use in herbicides application. - surfactants
stabilizing agents - solvents - humificants - stickers - activators compatibility agents - drift control agents etc.

## UNIT-V: (6Hrs.)

1. Mode of action of herbicides – important biochemical modes of action of herbicides interfearing with photosynthetic reactions – respiration -enzymatic inhibition etc – effects of sub lethal doses of herbicides on plants

2. Selectivity of herbicides – fundamental principles of selectivity differential rate of absorption - differences in morphology and growth habit of plants - rate of translocation.

3. Selectivity of herbicides - differential rate of deactivation of herbicides – metabolism - reverse metabolism – conjugation - protoplasmic resistance to the specific herbicide

4. Weed management in different crops and cropping systems - rice - nursery - upland rice - low land rice - wheat - sorghum - maize - red gram - blackgram - groundnut - sunflower.

5. Weed management in different crops and cropping systems – sugarcane – cotton - tobacco, Vegetables (tomato, onion, chilli and brinjal) and Orchards (mango, banana and citrus).

- 6. Our Journey in Agriculture and Vision for the Future
- 7. Traditional and Technically knowledge of agricultural crops

# References Text Books:

- 1. Yellamanda Reddy, T. and SankaraReddy, G.H. 2010. Principles of Agronomy.Kalyani Publishers, Ludhiana.
- 2. Crafts, A.S. and Robbins, W.W. 1973. Weed Control. *Tata McGraw-Hill Publishing Co. Ltd.*,New Delhi.
- 3. Gupta, O.P. 1984. Scientific Weed Management. Today and Tomorrow Printers andPublishers, New Delhi.
- Gupta, O.P. 2004. Modern Weed Management. Agro Bios (India), Jodhpur.

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: I Course Title: Fundamentals of AgronomyCourse Code Time: 3Hrs.Max. Marks: 100

Code: AGRO101

#### SECTION-A

#### Answer ALLquestions:20×1= 20 M

1.Father of tillage

- A. Darwin
- B. Newton
- C. Fleming
- D. Jethro TULL

#### 2. The term agronomy is derived from

- A. Latin
- B. Greek
- C. German
- D. French

#### 3. Directorate of wheat research is located at

- A. Orissa
- B. Delhi
- C. Karnal
- D. Kerala
- 4. M.O.P is
  - A. K2so4
  - B. K2so4.mgso4
  - C. Kno3
  - D. All of these
- 5.Weed which is used as green vegetable.
  - A. Amaranthusviridis
  - B. Panicumsps.
  - C. All of the above
  - D. both A&B
- 6.Drip irrigation is known as
  - A. Trickle irrigation
  - B. Line source of irrigation
  - C. both the above
  - D. none of these

- 7. Rabi season starts from
  - A. June-august.
  - B. oct-nov
  - C. April-May
  - D. July-Dec

8.Origin of chilli.

- A. Mexico
- B. Germany
- C. Peru
- D. Iran

9. I.C.A.R. is located at

- A. Punjab
- B. Chennai
- C. Delhi
- D. Goa

10) Weeds are controlled by how many methods.

- A. 5
- B. 4
- C. 3
- D. 2

11. \_\_\_\_\_\_zone consists of three distinct sub-zones of Jammu and Kashmir, Himachal Pradesh and Uttar Pradesh hills.
12.\_\_\_\_\_ is the physical condition of soil resulting from tillage 13.Which districts comes under Krishna godavari region\_\_\_\_\_.

14. \_\_\_\_\_ soil can be ploughed only within a narrow range of soil moisture and the power or draught required is high.

15.Examples of mixed cropping\_\_\_\_\_.

16. Scientific name of Ground nut \_\_\_\_\_.

17. Examples of contact herbicide\_\_\_\_\_.

18. Give an examples of weed which is used as leafy vegetable\_\_\_\_\_.

19. Expand 2, 4-D\_\_\_\_\_.

20. \_\_\_\_\_ Herbicide is used to control weeds in rice.

# SECTION-B

# Answer any FOUR questions: $4 \times 8 = 32$ M

21.Define Agriculture, write scope &importance of agronomy in agriculture.

22. Define tillage explain the effect of tillage on soil properties.

23.Define weed&write advantages &disadvantage.

24.Write the climatic zones of Andhra Pradesh.

25.Define sowing& explain sowing methods in agriculture.

26.Define cropping system&explain various cropping systems.

# SECTION-C

# Answer any FOUR questions:4×12 = 48 M

27. Explain the various methods of weed management.

28. Define herbicides and write advantages, limitations of herbicides.

29. Define irrigation explain various methods of irrigation

30. Define drainage explain advantages and disadvantages of irrigation.

31. Describe the classification of herbicides.

32. Define competition describe various types of competition

#### PRACTICAL SYLLABUS

Semester: I Subject: Agriculture and Rural Development **Course Title: Fundamentals of Agronomy-Practical** Course Code: AGRO101P No.of Hours: 30 Hrs. Credits: 1

#### **Objectives:**

- To identify the various tillage implements.
- To explain the cultivation of rice crop.
- To identify the various herbicides available in India.

## **Course Outcomes:**

- **CO1:** Students will understand to analyze the Crop production techniques and crop growth in relation to environment.
- **CO2**: Students will understand to describe the Zero and minimum tillage: their basics and application.
- **CO3**: Students will learn Precision agriculture and Precision farming, their concepts and application.

## **EXPERIMENTS:**

1. Study of tillage Implements: Fields.	(3 Hrs.)
2. Practice of puddling: Fields.	(3 Hrs.)
3. Study of seeding equipment - different methods	of sowing: Fields.
	(3 Hrs.)
4. Study of manures, fertilizers and green manure	crops / seeds. <b>(4 Hrs.)</b>
5. Study of inter-cultivation implements and practic	ce. <b>(4 Hrs.)</b>
6. Herbarium preparation of weeds.	(3 Hrs.)
7. Field tours: Water reservoir:	(10 Hrs.)
1 Krishna	

- 1. Krishna
- 2. Pattiseema Project (Polavaram)
- 3. Godavari

## Scheme of Evaluation:

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: ICourse Title: Fundamentals of Plant Biochemistry and Soil ScienceCourseCode:BICM101

No.of Hours:30 Hrs.

Credits: 2

## Objectives:

- To identify the building blocks of proteins and their assembly in macromolecules as well as interpret basic enzyme kinetic parameters.
- Toexplain about the conversion of light energy into chemical energy in photosynthesis.
- To identify Contrast the different mechanisms of carbon fixation in the plant kingdom.

# **Course Outcomes**

At the end of the course, students will be able to

**CO1:** Explain scope and importance of biochemistry in agriculture and structural classification of biomolecules

**CO2**: Summarize the properties and mechanism of enzyme activity. **CO3**:Outline the metabolism of biomolecules.

CO4: Classify rocks, minerals and soils and explain various aspects of soil.CO5: Discuss the importance of nitrogen fixation, role of phosphorous and organic matter in enhancing soil fertility.

# UNIT-I: (6Hrs.)

1. Introduction – Historical aspects of Biochemistry– Scope, impact, and importance of Biochemistry in agriculture.

2. Carbohydrates- Classification - Structures - Monosaccharides - Structural aspects.

3. Oligosaccharides and polysaccharides-Functions of carbohydrates

4. Lipids – Fatty acids – Structures and properties – Functions of lipids.

5. Lipids - Classification – Storage lipids and membrane lipids – Saponification, hydrogenation.

6 Amino acids – Structures - Classification – Zwitterions.

## UNIT-II: (6Hrs.)

1. Peptides – Oligopeptides – Cyclic and acyclic peptides.

2.Proteins –Importance - Classification - Properties of proteins – Isoelectric pH– Denaturation.

3.Proteins – Structural organization – Primary, secondary, tertiary, and quaternary structures and forces involved in stabilizing proteins.

4. Enzymes – Characteristics of enzymes – Chemical nature, speed, specificity, active site - activation energy – Mechanism of enzyme action.

Measurement of enzyme activity – Factors effecting enzyme activity
 Enzyme Inhibition.

6. Classification of enzymes.

## UNIT-III: (6Hrs.)

1. Nucleic acids-Functions-Structures of nitrogen bases-Nucleosides-Nucleotides in RNA and DNA.

2. Various types of DNA and RNA – Secondary structure of B-DNA and t-RNA.

3.Metabolism-Anabolism and Catabolism-Stages of respiration-Overall metabolic view of carbohydrates, proteins, and lipids.

4. Metabolism of carbohydrates – Glycolysis – Aerobic and anaerobic.

5. Tricarboxylic Acid (TCA) cycle AND Electron transport chain (ETC.)

6. Metabolism of lipids –Biosynthesis of fatty acids and oxidation of fatty acids.

## UNIT-IV: (6Hrs.)

1. Introduction – evolution of the earth – spheres of the earth atmosphere, hydrosphere and lithosphere – their characteristics – origin of soil – soil and soil components – mineral matter, organic matter, water and air – definition of soil and various concepts of soil – branches of soil science.

3. Rocks – classification of rocks based on mode of origin – igneous rocks, sedimentary rocks and metamorphic rocks – classification of rocks based on silica content – weatherability of rocks.

4. Minerals – primary, secondary, essential, and accessory minerals – primary minerals – quartz, feldspar, micas, pyroxenes, amphiboles, and olivine's – weatherability of primary minerals.

5. Soil profile – detailed description of a theoretical soil profile – differences between surface soil and sub soil.

#### UNIT-V: (6Hrs.)

1. Nitrogen fixation, denitrification, solubilization of phosphorus and biological control of plant diseases – promotion of plant growth promoting substances – harmful activities of soil organisms.

 Soil organic matter – various sources – composition – compounds in plant residues – their decomposability – humus – definition – synthesis of humus.

3. Importance of soil organic matter and humus – fractionation of soil humus – carbon cycle – carbon.

4. Important soil groups of India – alluvial soils, black soils, red soils, laterite soils and coastal sands.

#### ReferenceText Books:

- 1. Principles of Biochemistry-Lehninger
- 2. David L. Nelson, Michael M.Cox; W.H. Freeman.Lehninger Principles of Biochemistry, 6th Edition
- Biochemistry, Dr.U.Satyanarayana, Dr.U. Chakrapani, Books and Allied(P) Ltd, Kolkata

Subject: Agriculture and Rural DevelopmentSemester: ICourse Title:Fundamentals of Plant Biochemistry and Soil ScienceCourseTime: 3Hrs. Max. Marks: 100

#### SECTION-A

#### Answer ALLquestions:20×1 = 20 M

- 1. The general chemical formula of Carbohydrates is
  - A. (CH<sub>2</sub>O)<sub>2</sub>n
  - B. (CH<sub>2</sub>O)<sub>2</sub>2n
  - C. (CHO)n
  - D. CnH₂n
- 2. Non protein amino acid present in coenzyme-A is
  - A. Beta alanine
  - B. D-Phenyl alanine
  - C. Hydroxyl proline
  - D. N-acetyl glutamic acid
- 3. Which of the following tricarboxylic cycle?
  - A. Acetic acid
  - B. Succinic acid
  - C. Oxaloacetic acid
  - D. Citric acid
- 4. Name the two essential fatty acids?
  - A. Linoleate and linolenate
  - B. Oleic and linoleic
  - C. Lauric and myristic
  - D. Arachidonic and oleic
- 5.Which of the following enzyme catalyzes the first step of Glycolysis?
  - A. Hexokinase
  - B. Pyruvate kinase
  - C. Glucokinase
  - D. Phosphofructokinase
- 6. The product of light reaction of photosynthesis are
  - A. Hexose and oxygen
  - B. Hexose and ATP
  - C. ATP and NADPH
  - D. Hexoses and NADPH

- 7. Most of the soil organism is
  - A. Psychrophiles
  - B. Mesophiles
  - C. Thermophiles
  - D. All of the above

8. Quantity of soil to be taken for texture analysis

- A. 10g
- B. 20g
- C. 30g
- D. 40g

9. Identify the purine of nucleic acids in the following

- A. Cystine
- B. Thymine
- C. Uracil
- D. Adenine

10. Which fertilizer produce acidity in soil

- A. Ammonium sulfate
- B. Sodium nitrate
- C. Calcium ammonium nitrate
- D. Calcium nitrate

11. Carbohydrates are \_\_\_\_\_or \_\_\_\_\_ derivatives of polyhydric alcohols.

12. The sequence of amino acids in a protein is called its

13. Out of 200 different amino acids found in nature the number of amino acids present in protein\_\_\_\_\_.

14. The Sulphur containing amino acids\_\_\_\_\_.

15. Enzymes which are used in the cells which make them are said to be \_\_\_\_\_ enzymes.

16.Building blocks of nucleic acids are \_\_\_\_\_\_.

17. Most of the enzymes of TCA cycle in plant are cell located in

18. In Eukaryote cell of plant ETC occurs in\_\_\_\_\_.

19.Animal waste decay by the action of bacteria which create \_\_\_\_\_ and \_\_\_\_\_ products rich in nitrogen, and useful for plants to use again.

20. \_\_\_\_\_bacteria in the soil can break down the ammonia into the gaseous form of nitrogen, which is not available for use by plants or animals.

## SECTION-B

#### Answer any FOUR questions:

#### $4 \times 8 = 32$ M

21. Define Carbohydrates. Classification of carbohydrates in detail with structural examples in each class and function of carbohydrates.

22. Define enzymes. Describe the enzyme activity? What are the factors that affectenzyme activity?

23. Classify Basic Amino acids in details with structural examples in each class and properties of amino acids?

24. Classification of proteins basis of their functions, Chemical solubility and Structural.

25. Discuss about various organelles of plant cell with neat, labelled diagram.

26. Write about the influence of organic matter on soil physical and chemical properties?

# SECTION-C

#### Answer any FOUR questions:4×12 = 48 M

27. Describe glycolysis and TCA pathway? Mention the enzymes and coenzymes involved in the Two Pathways.

28. Describe the mechanism ETC in plant cell.

29. Types of soil? Significance of soil colour and Explain about beneficial effects of soil organisms.

30. Give an account on Structure DNA? What are the types of RNA and functions?

31. With the help of a neat diagram, explain role of nucleic acids in protein biosynthesis.

32. Describe the mechanism of Nitrogen fixation.

## PRACTICAL SYLLABUS

Subject: Agriculture and Rural Development Semester: I Course Title: Fundamentals of Plant Biochemistry and Soil Science-Practical Course Code:BICM101P No.of Hours:30 Hrs. Credits:1

# Objectives:

- To identify the building blocks of proteins and their assembly in macromolecules as well as interpret basic enzyme kinetic parameters.
- To Explain the conversion of light energy into chemical energy in photosynthesis
- To Contrast the different mechanisms of carbon fixation in the plant kingdom.

# Course Outcomes:

- **CO1:**Students willunderstand of Biochemistry as a discipline and milestone discoveries in life sciences that led to establishment of Biochemistry as separate discipline.
- **CO2**:Students will understand theFundamental properties of elements, their role in formation of biomolecules and in chemical reactions within living organisms.
- **CO3:**Students will understand plant cell structure, organization, and apply specific biochemical functions to compartments of the plant cell.
- **CO4**:Students will learn amino acid structures and relate their chemical properties to the synthesis and function of proteins and enzymes.
- **CO5**:Students willunderstand protein structural hierarchy and relate structure to function.

# **EXPERIMENTS:**

Experiment No.1-Determination of pH and use of pH meter. (5Hrs.) Experiment No.2-Preparation of molar, Normal solutions and Buffers.

(5Hrs.)

Experiment	No.3-Estimation	of	carbohydrates	(glucose)	by	DNS
method.					(5H	rs.)
Experiment No.4-Estimation of Proteins by Biuret method. (5Hrs					rs.)	
Experiment	No.5-Study types o	f so	il.		(5H	rs.)
Experiment No.6-Study of sampling collection, processing and storage.					age.	
					(5H	rs.)

# Scheme of Evaluation:

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: ICourse Title: Fundamentals of AgricultureEconomicsCourse Code: AECO141No. of Hours:30 Hrs.Credits: 2

## Objectives:

- To analyse Agricultural Crop Price determination.
- To analysetheMarket Structures.
- To analyse he practices followed in Agriculture.

# **Course Outcomes**

**CO1:**Apply concepts and terms of economics to the agricultural sector.

- **CO2**: Explain characteristics of wealth, welfare, needs and surplus and laws of marginal utility.
- **CO3**: Outline different aspects of demand and supply, essentials of market, pricing and competition.
- **CO4**: Summarize the concepts of national income, classification and cannons of taxation, features of public and private finance, sources of public revenue.
- **CO5**: Explain principles and meaning of public expenditure, concepts of inflation, types, causes and control of inflation.

# UNIT-I: (6 Hrs.)

- Economics meaning definitions subject matter of economics – traditional approach
  - a. consumption, production, exchange and distribution
- Modern approach microeconomics and macroeconomics methods of economic
  - a. investigation deduction and induction
- Agricultural economics definitions meaning importance of agricultural economics – branches of agricultural economics
- Agricultural production economics meaning definitions subject matter – objectives; Farm management – meaning – scope – definitions – objectives
- Agricultural finance meaning definitions micro vs macro finance –need for agricultural finance; Agricultural marketing – meaning – definition – importance of agricultural marketing
- 6. Basic terms and concepts in economics goods and services -

free and economic goods, utility – cardinal and ordinal approaches – characteristics of utility – forms of utility

## UNIT-II: (6Hrs.)

- Value definition characteristics; price meaning; wealth meaning - attributes of wealth - types of wealth - distinction between wealth and welfare; Wants - meaning characteristics of human wants
- Law of diminishing marginal utility statement assumptions of law – explanation – limitations of the law – importance
- Law of equi-marginal utility meaning assumptions explanation of the law – limitations of the law – practical importance
- 4. Consumer's surplus meaning assumptions explanation difficulties in measuring consumer's surplus importance
- 5. Demand meaning definition types of demand income demand, price demand andcross demand
- Demand schedule demand curve Law of demand contraction and extension, increase and decrease in demand

## UNIT-III: (6 Hrs.)

- Elasticity of demand meaning elastic and inelastic demand kinds of elasticity of demand – perfectly elastic, perfectly inelastic, relatively elastic, relatively inelastic and unitary elastic demand
- Price elasticity income elasticity and cross elasticity of demand
   practical importance of elasticity of demand
- Supply meaning definition Law of supply supply schedule - supply curve
- 4. Increase and decrease in supply contraction and extension of supply – factors affecting supply
  Elasticity of supply – kinds of elasticity of supply – perfectly elastic, perfectly inelastic, relatively elastic, relatively inelastic and unitary elastic – factors affecting elasticity of supply
- 5. Price determination equilibrium price and quantity determination of market price
- Markets definition essentials of market classification of market structure – perfect and imperfect markets

#### UNIT-IV: (6 Hrs.)

- 1. Characteristics of monopolistic competition monopoly and oligopoly
- National income concepts of national income gross domestic product, gross national product, net national product, net domestic product – national income at factor cost, personal income, disposable income
- Methods of measurement of national income product method, income method and expenditure method
- 4. Public finance meaning role and importance of public finance
   functions of the government differences between public finance and private finance
- 5. Public revenue meaning major and minor sources of public revenue
- 6. Tax meaning classification direct and indirect taxes methods of taxation – proportional, progressive, regressive and degressive taxation, agricultural taxation – other types of taxation – Value Added Tax (VAT)
- 7. Canons of taxation Adam Smith's canons of taxation equality, economy, certainty and convenience – other canons of taxation

## UNIT-V (6Hrs.)

- Public expenditure meaning need for public expenditure social and economic overheads, balanced regional growth, development of agriculture and industry, exploitation and development of mineral resources and subsidies and grants to provinces, local governments, and exporters
- Principles of public expenditure Principle of maximum social benefits Principle of economy, *i.e.*, wasteful expenditure should be avoided, Principle of sanction, *i.e.*, authorized expenditure, Principle of balanced budget, Canon of elasticity, *i.e.*,fairly flexible and Avoidance of unhealthy effects on production and distribution
- Inflation meaning definition related concepts of inflation deflation, disinflation, stagflation and reflation – measurement of inflation -consumer price index, wholesale price index, producer price index and GDP deflator

- 4. Types of inflation demand pull and cost push inflation comprehensive and sporadic inflation – suppressed and repressed inflation – creeping, walking, running and galloping inflation – mark up inflation
- 5. Causes of inflation factors causing increase in demand increase in money supply, increase in disposable income, increase in public expenditure, increase in consumer spending, cheap monetary policy, deficit financing and increase in exports, factors causing shortage of supply – shortage of factors of production, industrial disputes, natural calamities, artificial scarcities, increase in exports, lop-sided production, Law of diminishing returns and international factors
- Remedial measures to control inflation monetary measures credit control, demonetization of currency and issue of new currency – fiscal measures – reduction in unnecessary expenditure, increase taxes, increase in savings, surplus budgets and public debt.

# References Text Books:

1. Dewett, K.K. and Chand, A. 1979. Modern Economic Theory.

2. S. Chand and Co., New Delhi. Dewett, K.K. and Varma, J.D. 1986. *Elementary Economics.* 

3. S. Chand and Co., New Delhi. Jhingan, M.L. 1990. Advanced Economic Theory.Vikas

Publishing House, New Delhi.

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural Development Semester: I Course Title: Fundamentals of Agricultural Economics Course Code: AECO141 Time: 3Hrs. Max. Marks: 100

#### SECTION-A

#### Answer ALL questions: $20 \times 1 = 20$ M

- 1. The destruction of utility or use of commodities and services to satisfy human wants is called
  - A. Consumption
  - B. Production
  - C. Exchange
  - D. Distribution
- 2. It refers to sharing of wealth that is produced among the different factors of production
  - A. Consumption
  - B. Production
  - C. Exchange
  - D. Distribution
- 3. Micro economics also called as
  - A. Income theory
  - B. Price theory
  - C. Production theory
  - D. Art of theory
- 4. Father of economics
  - A. Alfred marshal
  - B. Lionel Robbins
  - C. Adam smith
  - D. J. M. keins
- It is defined as the science that deals with organization and operation of the farm in the context of efficiency and continuous protests is called
  - A. Production
  - B. Farm management
  - C. Cost of cultivation
  - D. Farm budgeting

6. \_\_\_\_\_ goods are those which can be used repeatedly during the production and consumption process over several times

- A. Mono period
- B. Poly period
- C. Both A &B
- D. None of the above
- 7. The excess of price which he would be willing to payrather than go without the thing over that which he actually does pay

\_\_\_\_\_

- A. Demand
- B. Supply
- C. Consumer surplus
- D. Producer surplus
- 8. Demand curve has a negative slope i.e., it slopes downwards from \_\_\_\_\_
  - A. Left to right
  - B. Right to left
  - C. Straight line
  - D. Horizontal line
- 9. Supply curve is
  - A. Downward slope
  - B. Straight line
  - C. Horizontal line
  - D. Upward slope
- 10. Demand is the degree of responsiveness of quantity of demand
  - of a good to a change in its price is called
    - A. Price elasticity
    - B. Income elasticity
    - C. Cross elasticity
    - D. Consumer surplus
- 11. There are two methods of economic investigation that are \_\_\_\_
- 12. Wealth definition given by\_\_\_\_\_
- 13. \_\_\_\_\_ expresses the relationship between supply and the factors.

14. \_\_\_\_\_\_is any place where the sellers of a particular good or service can meet with the buyers of that goods and service where there is a potential for a transaction to take place.

15. \_\_\_\_\_ it refers to the process by which total resource use is divided between private and social goods by which the mix of social goods is chosen, this is done by the budgetary policy.

16. \_\_\_\_\_ is exempt under the Indian Income Tax Act.

17. Adam Smith's was a pioneer in the field of taxation and made notable contributions popularly known as \_\_\_\_\_

18. \_\_\_\_\_A slowing in the rate of price inflation.

19. GDP Deflator\_\_\_\_\_

20. \_\_\_\_\_and \_\_\_\_\_ is another measure of direct control to check inflation.

## SECTION-B

#### Answer any FOUR questions: $4 \times 8 = 32$ M

21.Define and Law of Diminishing marginal utility, explain with neat labeled graphs?

22. Define Demand? Write about demand with graph?

23.Write about consumer's surplus with graph?

24.Explain about law of Equal marginal utility?

25.Define Macroeconomics and write the importance of micro and macroeconomics?

26. Write about goods classification?

## SECTION-C

## Answer any FOUR questions:

#### $4 \times 12 = 48 M$

27. Define Agricultural economics? Write the Aims and objectives of Agricultural economics?

- 28. Explain about public finance and public revenue?
- 29. Define supply? Explain about the law of supply with graph?
- 30.WriteCharacteristics of monopoly and oligopoly
- 31.What is public revenue? What are main sources for public revenue?
- 32. Write briefly about elasticity of demand?

## SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: ICourse Title: Fundamentals of HorticultureCourse Code: HORT181No. of Hours:30 Hrs.Credits: 2

## Objectives:

- Toidentify garden tools.
- Toidentify horticultural crops.
- Topreparedifferent types nursery beds.

## Course Outcomes

At the end of the course, students will be able to

- **CO1:**Define, classify and outline the climate and soil conditions for horticultural crops.
- **CO2:** Explain principles and methods of plant propagation, training and pruning.
- **CO3:** Summarize principles and steps in establishment of various orchards and types and purposes of gardens.
- **CO4:** Discuss unfruitfulness, pollination and fertilization.
- **CO5:**List medicinal and aromatic plants, spices and condiments and explain the role of plant bio regulators, irrigation and fertilizers in horticulture crops.

# UNIT-I: (6Hrs.)

- Definition of Horticulture Division of Horticulture Pomology, Olericulture, Floriculture, spices & Condiments, Medicinal and Aromatic plants, Ornamental and Landscape architecture and Post-Harvest Technology etc. Importance of horticulture in national economy and in human nutrition. Scope ofHorticulture
- Horticultural & Botanical classification Fruits, Vegetables, Ornamental plants, Spices and Plantationcrops
- Climate and soil for horticultural crops Temperature, Rainfall, Relative humidity, Wind, Soil organic matter, Soil pH, Soil air, soil Water etc.

# UNIT-II: (6Hrs.)

- Plant propagation methods sexual asexual and micro propagation.
   Plant Propagation structures Polyhouses, Net houses, Plastic tunnels and Mist chambers
- 2. Principles of orchard establishment selection of site Steps in establishment of orchard

clearing of the land – leveling – fencing – purpose of raising fence
live and non-live fences – good fence plant characters – examples
of live and non-live fences – wind breaks – roads – drains – tillage –
sowing green manure crops – marking plant positions – digging and
filling of pits – selection of plants from the nursery – lifting and
packing of plants – season of planting – planting and healinginn

- Principles and Methods of training and pruning training definition

   objectives of training fruit trees reasons for training methods of training central leader, open center and modified leader systems with merits and demerits
- 4. Pruning definition reasons for pruning objectives of pruning responses of plants to pruning activation of buds, dwarfing response, production of water shoots and delay in bearing methods of pruning thinning out, trimming, heading back, pollarding, pinching, disbudding and deblossoming seasons of pruning pruning and manuring care of pruned woods Juvenility and flower buddifferentiation

# UNIT-III: (6 Hrs.)

- Unfruitfulness in fruit trees causes environmental causes, nutritional causes, inherent causes, biological causes and cultural causes and theirremedies
- 2. Pollination, pollinizers, and pollinators
- 3. Fertilization and parthenocarpy

## UNIT-IV: (6 Hrs.)

- 1. Kitchen gardening
- 2. Garden types and parts
- 3. Lawn making

# UNIT-V: (6 Hrs.)

- 1. Medicinal & Aromaticplants
- 2. Spices andCondiments
- 3. Plant bio regulators growth regulators and plant hormones types of growth regulating substances – use of growth regulators in propagation – rooting of cuttings, induction of rooting in layering, union of rootstock and scion in grafting and budding, control of flowering, fruit set, fruit drop, parthenocarpy, fruit ripening, fruit size, quality and sex expression – preparation of growth regulators – powder, solution and lanolinpaste
- 4. Irrigation & fertilizers application method and quantity

## References Text Books:

- Adams, C.R. and M. P. Early. 2004. Principles of horticulture. Butterworth – Heinemam, Oxford University Press.
- Prasad and Kumar. 2014, Principles of Horticulture 2<sup>nd</sup>Edn. Agro bios (India)
- 3. Kumar, N.1997. Introduction to Horticulture, Rajalakshmi Publication, Nagercoil.

#### MODEL QUESTION PAPER

## Subject: Agriculture and Rural Development Semester: I Course Title: Fundamentals of Horticulture Course Code: HORT181 Time: 3Hrs. Max. Marks: 100

#### SECTION-A

#### Answer ALL questions:20×1 = 20 M

1. Which of the following branch deals with the raising of perennial trees meant for shade, avenue or ornamental purposes?

- A. Pomology
- B. Olericulture
- C. Arboriculture
- D. Plantation crops
- 2. Which of the following is the important source of vitamin -A.
  - A. Carrot
  - B. Lime
  - C. Lemon
  - D. All the above
- 3. Jammu & Kashmir comes under which climatic zone.
  - A. Tropical zone
  - B. Sub-tropical zone
  - C. Temperate zone
  - D. None of the above
- 4. Root stocks are usually propagated through.
  - A. Seeds
  - B. Stem cuttings
  - C. Root cuttings
  - D. All the above
- 5. Which of the following are the components of the soil.
  - A. Sand
  - B. Silt
  - C. Clay
  - D. All the above

- 6. Multiplication of the plants by seed is called as.
  - A. Sexual propagation
  - B. Asexual propagation
  - C. Both a & b
  - D. None of the above
- 7. Potatoes are propagated by.
  - A. Bulbs
  - B. Corms
  - C. Tubers
  - D. None of the above

8. Example of Rhizomes.

- A. Banana
- B. Ginger
- C. Strawberry
- D. Onion

9. In Semi-hard wood stem cuttings, which type of wood is preferred for propagation.

- A. Matured
- B. Partially matured
- C. Succulent
- D. None of the above

10. The angle made by the scaffold limb to the trunk or the secondary branch to the scaffold limb is

- A. Crotch
- B. Trunk
- C. Head
- D. Water shoot
- 11. Study of vegetables are called as \_\_\_\_\_.
- 12. Trimming is a method of \_\_\_\_\_.
- 13. The term fertilization was first discovered by \_\_\_\_\_.
- 14. The transfer of pollen from anther to stigma called as \_\_\_\_\_.
- 15. Development of fruits without fertilization is called as \_\_\_\_\_.
- 16. Coffee, Tea and Rubber are the examples of \_\_\_\_\_\_.

17. The state where the plants not capable of flowering and bearing is known as\_\_\_\_\_\_.

18. Arrangement of plants in the orchard is known as\_\_\_\_\_\_.

19. Example for auxins\_\_\_\_\_.

20. Spices add \_\_\_\_\_ to the food.

## SECTION-B

 $4 \times 8 = 32$  M

#### Answer any FOUR questions:

21. Definition of Horticulture and write down the branches of horticulture with examples.

22. Write down the importance and scope of Horticulture.

23. Explain different Horticultural zones of India.

24. Which environmental factors influence the Horticultural crop production? Explain briefly?

25. Write down the advantages and disadvantages of sexual and asexual propagation.

26. What is lay out? Explain different systems of planting with diagrams.

## SECTION-C

# Answer any FOUR questions: $4 \times 12 = 48$ M

27.Why we need to carry out the pruning and training operations and what principles need to be followed while training the plants?

28. Write down the steps in establishment and management of orchard?29. What is unfruitfulness in fruit trees, what are the causes and their remedies?

30. Define drainage explain advantages and disadvantages of irrigation.

31. Briefly discuss about fertilization and parthenocarpy?

32. Define and list out each of ten spices and condiments?

#### PRACTICAL SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: ICourse Title: Fundamentals of Horticulture-PracticalCourse Code: HORT181PNo.of Hours:30 Hrs.

Credits: 1

#### Objectives:

- To identify of garden tools.
- To identify of horticultural crops.
- To apply grafting and budding methods.

#### Course Outcomes:

**CO1**:Students will able to identify plant vegetative structure.

- **CO2**:Students will understoodto basic principles, processes and plant propagation methods.
- **CO3**:Students will understand how to propagate plant, manage and harvest a variety of plant.
- **CO4:**Students will understand how to propagate plant, manage and harvest a variety of plant.
- **CO5**:Students will understand recognize various crop harvesting, transportation, and processing.

#### **EXPERIMENTS:**

1.	Identification of garden tools.	(6 Hrs.)
2.	Identification of horticulturalcrops.	(6 Hrs.)
3.	Preparation of seed bed / nurserybed.	(6 Hrs.)
4.	Grafting &Budding.	(6 Hrs.)
5.	Transplanting and care of vegetableseedlings.	(6 Hrs.)

#### Scheme of Evaluation:

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

# SYLLABUS

Subject: Agriculture and Rural development Semester: I Course Title: Rural Sociology, Educational Psychology and Human Values Course Code: AEXT191 No. of Hours: 30 Hrs. Credits: 2

# Objectives:

- To learn importance of rural sociology in agricultural extension.
- To learn culture and different cultural concepts in agricultural extension.
- To learn personality development and leadership qualities.
- To learn principals of Ethics and Morality.

# Course Outcomes

At the end of the course, students will be able to

- **CO1:**Explain the relevance of rural sociology in agricultural extension, characteristics of rural society, classification and stratification of social groups.
- **CO2:** Outline cultural concepts and social values, classification and training of leaders.
- **CO3:** Summarize the meaning, scope and importance of educational psychology in agricultural extension.
- **CO4:**Explain meaning, definition and stepsof extension teaching and risk benefit analysis.
- **CO5:** Summarize the implications of competence and professional ethics, collegiality and loyalty.

# UNIT-I: (6Hrs.)

1. Sociology and rural sociology, extension education, agricultural extension - meaning and definitions

2. Importance of rural sociology in agricultural extension and their interrelationship

3. Characteristics of Indian, rural society - differences and relationships between rural and urban societies

4. Social group(s) - classification - formation and organization of groups role of social groups in agricultural extension

5. Social stratification - meaning - forms - class system and caste system

# UNIT-II: (6Hrs.)

1. Culture and different cultural concepts and their role in agricultural extension

2. Social values, social control and attitudes types and their role in agricultural extension

3. Leadership - meaning - classification of leaders - roles of a leader and different methods in selection of a leader

4. Training of leaders - lay and professional leaders - advantages and limitations in using local leaders in agricultural extension

5. Psychology and educational psychology - meaning - scope and importance

# UNIT-III (6Hrs.)

1. Intelligence - meaning - types - factors and importance in agricultural extension

2. Personality - meaning - types - factors and importance in agricultural extension

3. Perception, emotions, and frustration - meaning - types - factors and importance in agricultural extension,

4. Motivation - meaning - types of motives - theories of motivation importance of motivation in agricultural extension

5. Teaching, learning, learning experience and learning situation meaning and definition -elements of learning situation and its characteristics

# UNIT-IV: (6Hrs.)

1. Principles of learning and their implications in teaching - steps in extension teaching

2.Variety of moral issues (part-1): - Understanding the harmony in the society (society being an extension of the family), Integrity, work ethic, Courage, Empathy,

3.Variety of moral issues (part-2): -Self-confidence, Moral Autonomy, Concensensus and Controversy, Professional and Professionalism, Professional idea, and virtues.

4. Principles of Ethics and Morality (part-1): - Ethics as a Subset of Morality, Ethics and Organization, Employee, Duties and Rights.

5. Principles of Ethics and Morality (part 2): Discriminatory and Prejudicial employee practices, Understanding harmony in nature, Natural acceptance of human values.

6. Risk benefit analysis (part-1): - Reducing risk, the government regulators, approach to risk, handling ethical dilemmas at work.

# UNIT-V: (6Hrs)

1. Risk benefit analysis (part-2): - Market strategy and ethics, ethical practice in marketplace, ethics in finance, ethics in business and environment.

2. Collegiality and loyalty (part-1): - Respect of authority, collective bargaining, confidentiality, professional rights.

3. Collegiality and loyalty (part-2): -Intellectual property rights, multinational corporation and ethical investing, computer and ethics, management patterns

4. Competence and professional ethics: -

I. Ability to utilize the professional competence and augmenting universal human order

II. Ability to identify the scope and characteristic people friendly and eco-friendly production

III. Ability to identify and develop appropriate technologies and management and pattern for above production system

5. Strategy for transition from the present state to universal human order

I. At the level of individual- as socially and ecologically responsible technologies and managers

II. At the level of society- as mutually enriching institutions and organizations

6. Case studies of typical holistic technologies and management patterns.

# References Text Books:

- Adivi Reddy, A. 2001. Extension Education. Sri Lakshmi Press, Bapatla.
- 2. Chitamber, J.B. 1997. Introductory Rural Sociology. Wiley Eastern Limited, New Delhi.
- 3. Daivadeenam, P. 2002. Educational Psychology in Agriculture. Agrotech Publishing Academy, Udaipur.
- 4. Mangal, S.K. 2000. Educational Psychology. Prakash Brothers, Ludhiana.

#### **Model Question Paper**

Subject: Agriculture and Rural DevelopmentSemester: ICourse Title: Rural Sociology, Educational Psychology and Human ValuesCourse Code: AEXT191Time: 3Hrs.Max. Marks: 100

## SECTION-A

## Answer ALL questions:20×1 = 20 M

1. Extension education is informal education for the rural people with a view to----- rural society

- A. Maintain
- B. To guide
- C. Develop
- D. Control

2.Extension education makes use of social data as a basis for building up extension

- A. Programs
- B. Work
- C. Knowledge
- D. All the above

3. ----- is the main economic activity of rural people.

- A. Aquaculture
- B. Agriculture
- C. Business
- D. Industries

4. The chief character of rural life in ----- regarding to income education. .

- A. Costlier
- B. Holocentric
- C. Homogeneous
- D. Hetrogeneous
- 5. Density of population is -----in rural communities
  - A. Less
  - B. More
  - C. More or less
  - D. None of the above

- 6. Most of the people belongs to -----type of personalitie.
  - A. Introvert
  - B. Extrovert
  - C. Dominant
  - D. Ultimate
- 7. Freedom speech is an example of------ value.
  - A. Intermediate
  - B. Specific
  - C. Ultimate
  - D. Dominant.
- 8. Good manners are example for
  - A. Ritual
  - **B.** Tradition
  - C. Folkways
  - D. Convention
- 9. Example of professional leader is
  - A. Politicalleader
  - B. M.R.O
  - C. Inspector
  - D. Student leader

10. Sales man, politicians are possess------ type of intelligence.

- A. Mechanical
- B. Concrete
- C. Abstract
- D. Social.

11. Monogamy is an example for\_\_\_\_\_.

12. The last step in extension teaching is \_\_\_\_\_.

- 13. An ideal person will have \_\_\_\_\_intelligence.
- 14. Freedom of speech is example for\_\_\_\_\_.
- 15. This values are unlimited in number \_\_\_\_\_.
- 16. Give examples of positive Emotions \_\_\_\_\_.
- 17. Alphabets and numbers are related to \_\_\_\_\_.
- 18. Good manners examples are \_\_\_\_\_
- 19. Who is the author of introductory rural sociology\_\_\_\_\_.
- 20. Examples of Professional leader\_\_\_\_\_.

# SECTION-B

# Answer any FOUR questions: $4 \times 8 = 32$ M

- 21. Explain characteristics of Indian rural society.
- 22. Inter relationship between rural sociology and extension.
- 23. Describe the social control and write the importance of social control on extension education. Explain the role of leader in a group &in extension.
- 24. Explain the factors affecting intelligence in human behavior.
- 25. The five elements of a learning situation-explain with diagram.

26. Theories of motivation according to MASLOWS classification of needs explain with diagram.

# SECTION-C

# Answer any FOUR questions:4×12 = 48 M

- 27. Brief note on Elements of social of social groups?
- 28. Write importance of employee duties.
- 29.Importance of psychology in agriculture extension.
- 30. Write about characteristics of rigid caste system in Indian society.
- 31. Described about democratic leader.
- 32. What are the principals of Ethics and Morality.

# SYLLABUS

Subject: Agriculture and Rural Development Semester: ICourse Title: Vermicompost ProductionCourse Code: SDCVPNo. of Hours: 30Hrs.Credits:2

#### Objectives:

- To preparevermicompost pit.
- To preparevermicompost.
- To apply fertilizers to crops.

#### Course Outcomes

At the end of the course, students will be able to **CO1:**Identify raw materials needed for vermicomposting.

- CO2: Demonstrate the preparation and management ofvermicompost beds.
- **CO3:** Explain nutrient value of vermicompost and advantages and disadvantages of vermicomposting.

#### PRACTICAL

#### UNIT-I: (6 Hours)

- 1. Introduction to Vermicompost History, definition
- 2. Brief description methods of preparation of vermicompost

#### UNIT-II: (6 Hours)

- 1. Procedure for preparation of vermicompost by step by step
- 2. Materials used for vermicompost bed of greenhouses

#### UNIT-III: (6 Hours)

1. Maintenance of vermicompost bed

#### UNIT-IV: (6 Hours)

1. Nutrient value for vermicompost

#### UNIT-V: (6 Hours)

1. Advantages and Disadvantages in Vermicompost.

#### **Reference Text Books:**

- 1. Kurien, J., and Ramasamy, E.V. 2006. Vermicomposting of Taro (Colocasiaesculenta) with two epigeic earthworm species. Bioresource Technology 97(11):1324-1328.
- 2. Monroy, F., Aira, M., Dominguez, J., and Velando, A. 2006. Seasonal population dynamics of Eiseniafetida (Savigny, 1826) (Oligochaeta, Lumbricidae) in the field. *ComptesRendusBiologies* 329(11):912-915.
- 3. Nair, J., Sekiozoic, V., and Anda, M. 2006. Effect of pre-composting on vermicomposting of kitchen waste. *Bioresource Technology* 97(16):2091-2095.
- 4. Suthar, S. 2006. Potential utilization of guar gum industrial waste in vermicompost production. *Bioresource Technology* 97(18):2474-2477.

# SEMESTER - II

# SYLLABUS

# Subject: Agriculture and Rural Development Semester: II Course Title: Introductory Agro Meteorology and Climate Change Course Code: AGRO103

No. of Hours: 30 Hrs. Credits: 2

# Objectives:

- To study about climatic resources of a given area for effective crop planning
- To evolve weather based effective farm operations
- To study crop weather relationship
- To understand roles of agro meteorology in agriculture

# Course Outcomes

At the end of the course, students will be able to **CO1:**Explain the earth's atmosphere and weather variables.

CO2:Outline types of precipitation

- **CO3:** Summarize artificial rain making, monsoon mechanism and weather hazards.
- **CO4:** Relate weather conditions to agriculture.
- **CO5:** Discuss weather forecasting and impact of climate change on agriculture.

# UNIT-I: (6Hrs.)

1. Earth atmosphere, composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height

2. Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze.

# UNIT-II: (6Hrs.)

1. Atmospheric humidity, concept of saturation, vapour pressure, process of condensation, formation of dew, fog, mist, frost, cloud.

2. Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification.

# UNIT-III: (6Hrs.)

1. Artificial rainmaking; Monsoon, mechanism and importance in Indian agriculture. Weather hazards, drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold wave;

2. Agriculture and weather relations, modifications of crop microclimate, climatic normal for crop and livestock production.

# UNIT-IV: (6Hrs.)

1. Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, energy balance of earth;

2. Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, long wave and thermal radiation, net radiation, albedo

# UNIT-V: (6Hrs.)

1. Weather forecasting, types of weather forecast and their uses.

2. Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

# References Text Books:

 Radha Krishna Murthy, V.2016. Principles and practices of agricultural disaster management. B.S Publications, Koti, Hyderabad.
 Reddy, S.R.2014. Introduction to Agriculture and Agrometeorology. Kalyani Publishers, Ludhiana, Punjab.

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IICourse Title: Introductory Agro Meteorology and Climate ChangeCourse Code: AGRO103

Time: 3 Hrs.

Max. Marks: 100

#### SECTION-A

# Answer ALL questions: $20 \times 1 = 20$ M

- 1. Layer of ozone is present in
  - A. Stratosphere
  - B. Troposphere
  - C. Ionosphere
  - D. Mesosphere
- 2. Number of Agro climatic zones in Andhra pradesh are
  - A. 8
  - B. 9
  - C. 7
  - D. 6
- 3. According to planning commission agroclimatic region of the whole country has been divided into
  - A. 15
  - B. 14
  - C. 13
  - D. 12
- 4. Movement of air occur in the atmosphere up to height of
  - A. 10km
  - B. 15km
  - C. 16km
  - D. 17km
- 5. The process by which a cloud droplet first form is
  - A. Prespitation
  - B. condensation
  - C. Conversion
  - D. Non the the above
- 6. Tornadoes most often move toward what direction
  - A. East north
  - B. North west
  - C. North south
  - D. North east

- 7. High clouds tops generally are limited by the height of the
  - A. Tropo pause
  - B. Strato pause
  - C. Iono pause
  - D. Meso pause
- 8. The transfer of heat by molecule to molecule contact is
  - A. conduction
  - B. precipitation
  - C. Horizontal line
  - D. Convention
- 9. The first meteorology satellite was launched in the year
  - A. 1960
  - B. 1994
  - C. 1993
  - D. 1995
- 10. The cup anemometer rotates
  - A. West to east
  - B. North to south
  - C. North to east
  - D. North to west
- 11. In a volume of air near the earth's surface, \_\_\_\_ occupies
- 12. \_\_\_\_The amount of force exerted over an area of surface is\_\_\_\_\_
- Much of Tibet lies at altitudes over 18,000 feet where the pressure is about 500 mb. At such altitudes, the Tibetans are above roughly\_\_\_\_
- 14. The planet with a strong greenhouse effect, whose surface temperature averages 480°C (900°F) is:\_\_\_\_\_
- 15. In the stratosphere, the air temperature normally\_\_\_\_\_
- 16. The most abundant gas in the stratosphere is\_\_\_\_\_
- 17. Scientists are able to determine the air temperature in the thermosphere by\_\_\_\_\_
- The rate at which temperature decreases with increasing altitude is known as the\_\_\_\_\_
- 19. Meteorology is the study of\_\_\_\_\_

20. Where cold surface air replaces warm air, the boundary separating the different bodies of air is\_\_\_\_\_

#### SECTION-B

# Answer any FOUR questions: $4 \times 8 = 32$ M

21. Explain about agro climatic zones of AndhraPradesh?

22. Define silviculture and objectives of silviculture?

23. Explain Monsoon?mechanism and importance in Indian agriculture.

24. Explain Wind? Types of wind, daily and seasonal variation of wind speed?

25. Define Earth Atmosphere ? Composition, extent and structure of earth atmosphere?

26. Explain Atmospheric humidity? concept of saturation?

# SECTION-C

#### Answer any FOUR questions:

#### $4 \times 12 = 48$ M

27. Define Weather forecasting, types of weather forecast and their uses?

28. Define Agroforestry – definitions, importance, criteria of selection of trees in agroforestry

29. Explain Nature and properties of solar radiation, solar constant, depletion of solar radiation?

30. Define Precipitation, process of precipitation, types of precipitation and classification?

31. Explain about Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature?

32. Explain agro climatic zones of India?

# PRACTICAL SYLLABUS

# Subject: Agriculture and Rural Development Semester: II Course Title: Introductory Agrometeorology and Climate Change-Practical Course Code: AGRO103P

No. of Hours: 30 Hrs. Credits: 1

# Objectives:

- To study about climatic resources of a given area for effective crop planning.
- To evolve weather based effective farm operations.
- To study about crop weather relationship.
- To understand roles of Agro meteorology in agriculture.

# Course Outcomes:

- CO1:Students will understand about Earth atmosphere, composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height.
- **CO2:**Students will understand about Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, long wave and thermal radiation, net radiation, albedo.
- **CO3:**Students will understand about Atmospheric humidity, concept of saturation, vapour pressure, process of condensation, formation of dew, fog, mist, frost, cloud.
- **CO4:** Students will learn about Artificial rainmaking; Monsoon, mechanism and importance in Indian agriculture.
- **CO5:** Weather forecasting, types of weather forecast and their uses.

# **EXPERIMENTS**:

 Visit to Agrometeorological Observatory, site selection and layout plan for observatory. (3 Hrs.)
 Exposure to agrometeorological instruments and weather data recording. (4 Hrs.)
 Measurement of albedo and sunshine duration. (3 Hrs.)
 Computation of radiation Intensity using bright sun shine hours. (3 Hrs.)
 Tabulation of maximum and minimum air temperatures, trend and variation analysis for climate change of the region. (3 Hrs.) 6. Measurement of soil temperature and computation of soil heat flux. (4 Hrs.)
7. Determination of atmospheric pressure and vapour pressure. (3 Hrs.)
8. Determination of relative humidity. (3 Hrs.)

9. Determination of dew point temperature- Measurement of atmospheric

pressure and analysis of atmospheric conditions. (4 Hrs.)

# Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: IICourse Title: Fundamentals of GeneticsCourse Code: GPBR 111No. of Hours: 30 Hrs.Credits: 2

#### Objectives:

- To learn and apply concepts of modern transmission and molecular genetics.
- To study the purpose of the cell cycle
- To study about the mendals laws
- To study about different scientists and their contribution to the genetics.

#### Course Outcomes

At the end of the course, students will be able to **CO1:** Discuss details of cell cycle and structures of cell organelles.

**CO2:**Explain heredity and laws of inheritance in genetics.

- **CO3:** Compare gene interactions, recessive and dominant traits.
- **CO4:** Outline the concepts of karyotype, sex linkage and mutations.
- **CO5:** Summarize the central dogma of genetic material and genetic code.

#### UNIT-I: (6Hrs.)

1. Pre Mendelian concepts of heredity – Early history of heredity, inheritance of acquired traits, preformation theory, pangenesis and germplasm theory.

2. Chromosome - Structure of chromosome, types of chromosomes based on position of centromere.

3. Cell division - Cell cycle - Mitosis - Process of mitosis - Significance.

4. Meiosis - Process - Differences between mitosis and meiosis - Significance.

5. Mendelian principles of heredity – Terminology, Mendel's experiments-Reasons for selection of pea as experimental materialcharacters studied - Reasons for mendel's success.

6. Mendel's laws – Law of segregation – Law of independent assortment-Principle of dominance – Principle of unit characters – Exceptions to mendel's laws – Rediscovery of mendelian principles.

# UNIT-II: (6Hrs.)

1. Gene interaction - Nonepistatic interaction – Interaction of factors; epistatic interactions – Complementary epistasis, dominant epistasis.

2. Recessive epistasis, duplicate dominant gene action, dominant suppression or inhibitory gene action, duplicate genes with cumulative effect.

2. Multiple alleles – Characteristics of multiple alleles - Blood groups in humans, coat colour in rabbits, self incompatibility alleles in plants - pleiotropism, penetrance and expressivity.

4. Linkage – Definition – Classification of linkage – Characteristic features of linkage – Linkage groups.

5. Detection of linkage – Estimation of linkage - Importance of test cross in linkage studies - significance in plant breeding.

#### UNIT-III: (6Hrs.)

1. Chromosome mapping - point and

2. point test cross - Cytological maps and genetical maps -

3. Coincidence and interference.

4. Sex determination – Various mechanisms of sex determination – Chromosomal sex determination, genic balance mechanism of sex determination in Drosophila melanogaster, male haploidy, single gene effects etc.

5. Sex linkage – White eye colour in Drosophila, colour blindness and haemophilia in humans - sex influenced traits – Horns in sheep, baldness in humans, sex limited - Milk production in cattle, beard in man – Pseudohermaphrodites – Gynandromorphs. 6. Qualitative and Quantitative traits, Polygenes and continuous variations - Definition - Inheritance and their differences, multiple factor hypothesis.

#### UNIT-IV: (6Hrs.)

1.Nature and structure of genetic material - DNA and its structure - Watson and Crick's model - Function – Experiments to prove DNA as genetic material.

2. Replication of DNA - Modes of DNA replication - Semi-conservative DNA replication - Experimental proof.

3. Types of RNA - Messenger RNA, ribosomal RNA and transfer RNA - structure of tRNA, dfferences between DNA and RNA.

4. Tanscription and translational mechanism of genetic material - Genetic code – Properties of genetic code – Wobble hypothesis.

# UNIT-V: (6Hrs.)

1.Mutation - Classification - Gene mutations - Introduction - Definition -Types of mutations - Spontaneous and induced mutations - Point mutations - Characters of mutations - Xenia and metaxenia – Chimeras Types and their significance in plant breeding.

2. Methods of inducing mutations, Physical and chemical mutagens -Detection of sex linked lethals in Drosophila (CIB method given by Muller).

3. Molecular basis of mutations - Transitions, transversions and frame shift mutations - Importance of mutations in plant breeding.

#### References Text Books:

1. Pundhan Singh. 2006. Genetics. Kalyani Publishers, Ludhiana.

2. Singh, B.D. 2015. Fundamentals of Genetics. Kalyani Publishers, Ludhiana.

3. Gupta, P.K.2007. Genetics. Rastogi Publications, Meerut. 4. Khanna, V.K. 2002. Genetics Numerical Problems. Kalyani publishers. 2nd edition.

# MODEL QUESTION PAPER

Subject: Agriculture and Rural Development Course Title: Fundamentals of Genetics Time: 3 Hrs.		Semester: II Course Code: GPBR 111 Max. Marks: 100	
SECTION-A Answer ALL questi	ons:	20×1 = 20 M	
1 Introd A. L. da Vinci B. R. Hooke C. C. F Wolff D. R. Brown	uced the term CELL		
<ol> <li>Genetics was coin</li> <li>A. 1906</li> <li>B. 1905</li> <li>C. 1904</li> <li>D. 1903</li> </ol>	ned by Bateson in	Year	
<ol> <li>In plants, a cell is</li> <li>A. Nuclear env</li> <li>B. Cell wall</li> <li>C. Middle lame</li> <li>D. Cytoplasm</li> </ol>	s always surrounded by _ velop ella		
<ul> <li>4. Chloroplast conta</li> <li>A. Chlorophyll</li> <li>B. Chlorophyll</li> <li>C. DNA &amp; RNA</li> <li>D. All the above</li> </ul>	ins A B A		
5. Chromosomes dis A. 1875 B. 1876 C. 1877	scovered in the year	_	

D. 1878

6. Metacentric centromere assume \_\_\_\_\_ in shape

- A. V
- B. J or L
- C. J
- D. I

7. \_\_\_\_\_Proposed double helix structure

- A. Friedrich Meischer
- B. Watson and Crick
- C. E. Strasburger
- D. A.P.W Schimper
- 8. Chloroplast are bound by \_\_\_\_\_ unit membrane
  - A. Two
  - B. Three
  - C. Four
  - D. Five

9. The optimum temperature for renaturation is \_\_\_\_\_

- A. 15-17 C
- B. 20-25 C
- C. 22-26 C
- D. 20–26 C

10. Proposed the first Operational microscope in the year \_\_\_\_\_

- A. 1600
- B. 1678
- C. 1590
- D. 1595

11. The tendency of an offspring to resemble its parent is known as\_\_\_\_\_.

12. Who is known as the "Father of Genetics"\_\_\_\_\_.

13. The alternate form of a gene is\_\_\_\_\_\_.

14. The genotypic ratio of a monohybrid cross is\_\_\_\_\_\_.

15. The crossing of F1 to either of the parents is known

as\_\_\_\_\_.

16. "Law of segregation" is law of \_\_\_\_\_\_.

17. Homozygosity and heterozygosity of an individual can be determined by\_\_\_\_\_.

18. An exception to Mendel's law is\_\_\_\_\_.

19. Pea plants were used in Mendel's experiments because\_\_\_\_\_.

20. The smallest unit of genetic material which produces a phenotypic effect on mutation is\_\_\_\_\_\_.

#### SECTION-B

# Answer any FOUR questions: $4 \times 8 = 32$ M

- 21. Explain Mendelian principles of heredity?
- 22. Explain Protein synthesis and Central dogma?
- 23. Explain Methods of inducing mutations ?
- 24. Explain the Differences between Plant cell and Animal cell?
- 25. Explain about special types of Chromosomes?
- 26. Explain about Plant Cell wall?

# SECTION-C

#### Answer any FOUR questions:4×12 = 48 M

27. Explain Types of RNA?

28. Explain Meiosis - Process - Differences between mitosis and meiosis?

- 29. Explain Mutation Classification ?
- 30. Explain Qualitative and Quantitative traits?
- 31. Explain about Deoxy ribose Nucleic Acid (DNA) ?
- 32.Explain difference between Prokaryotic cell and Eukaryotic cell?

#### PRACTICAL SYLLABUS

Semester: II

Subject: Agriculture and Rural Development **Course Title: Fundamentals of Genetics-Practical** Course Code: GPBR 111P No. of Hours: 30 Hrs. Credits:1 **Objectives:** 

- To learn and apply concepts of modern transmission and molecular genetics.
- To study the purpose of the cell cycle.
- To study about the mendals laws.
- To study about different scientists and their contribution to the genetics.

# **Course Outcomes:**

CO1:Students will understandabout Pre Mendelian concepts of heredity.

**CO2:** Students will understandChromosome - Structure of chromosome, types of chromosomes.

**CO3:** Students will learn about Linkage.

**CO4**:Students will learn about Sex determination in plants.

**CO5**:Students will learn about Cell division, Cell cycle, Mitosis.

# **EXPERIMENTS:**

1. Study of microscope.	(3Hrs.)
2. Study of cell structure.	(3Hrs.)
3. Practice on meiotic cell division.	(4Hrs.)
4. Monohybrid and its modifications, Dihybrid and Trihybrid.	(4Hrs.)
5. Test cross and back cross.	(4Hrs.)
6. Epistatic interactions including test cross and back cross.	(4Hrs.)
7. Study of models on DNA and RNA structure.	(4Hrs.)
8. Epistatic interactions including test cross and back cross.	(4Hrs.)

# Scheme OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

# MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA–8 (Affiliated to Krishna University, Machilipatnam)

#### SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: IICourse Title: Fundamentals of Entomology- ICourse Code: ENTO131No. of Hours: 30 Hrs.Credits: 2

# Objectives:

- To study of insects and their relationship to humans and environment
- To study about types of reproduction
- To study about insect taxonomy
- To study about Body segmentation. Structure of Head, thorax and abdomen.

# Course Outcomes

At the end of the course, students will be able to CO1:Classify insecta and account for their abundance and dominance CO2: Explainthe morphology and anatomy of insects. CO3: Discuss the life cycle and endocrine systems of insects

**CO4:**Summarize the taxonomical features in various orders of insecta.

# UNIT-I: (6Hrs.)

1. History of Entomology in India. Factors for insect's abundance. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropodaupto classes.

2. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and moulting.

# UNIT-II: (6Hrs.)

1. Body segmentation. Structure of Head, thorax and abdomen.

2. Structure and modifications of insect antennae, mouth parts, legs, wing venation, modifications and wing coupling apparatus.

3. Structure of male and female genital organs. Metamorphosis and diapause in insects.

# UNIT-III: (6Hrs.)

1. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretory (Endocrine) and reproductive systems in insects.

2. Types of reproduction in insects. Major sensory organs like simple and compound eyes and chemoreceptors.

# UNIT-IV: (6Hrs.)

1. Systematics: Taxonomy-importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order.

2. Classification of class Insectaupto orders. basic groups of present day insects with special emphasis to orders and families of agricultural importance like Arthoptera: Acrididae, Tettigonidae, Gryllidae, Gryllotalpidae;

# UNIT-V: (6Hrs.)

1.Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Miridae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera:

2.Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Lymantridae, Saturniidae, Bombycidae;

3. Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Apionidae, Bruchidae, Scarabaeidae;

# References Text Books:

1. Chapman, R. F 2013 Insects: Structure and Function. Ed by Simpson, S. J. and Douglas, A. C. Cambridge Univ. Press, UK.

2. Richards, O.W. and Davies, R.G 1977. Imm's General Text Book of Entomology (Vol. I and II). Chapman and Hall, London.

3. Wigglesworth, V.B 2013. Insect Physiology. Springer (Originally published by Chapman and Hall, London, 1974).

4. Pant, N.C. and Ghai, S. 198. Insect Physiology and Anatomy. ICAR, New Delhi.

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural Development Course Title: Fundamentals of Entomology- I Time: 3 Hrs. Semester: II Course Code: ENTO131 Max. Marks: 100

# SECTION-A

#### Answer ALL questions: $20 \times 1 = 20$ M

1.Rageeni strain is related to

- A. Bee
- B. Silkworm
- C. Lac insect
- D. None of these
- 2. Number of nymphal stage is Acarina is
  - A. 3
  - B. 4
  - C. 5
  - D. 6

3. Excreta of the earth worm is

- A. Vermicompost
- B. Verni manure
- C. Vermicastin
- D. None of these
- 4. The process of leaving off the colony by the queen is known as
  - A. Absconding
  - B. Swarming
  - C. Supersdure
  - D. Queen excluder

5. The process of killing pupa without changing the cocoon shell is known as

- A. Stiffling
- B. denier
- C. dupion
- D. odonata

6. Which of the following statements is true about Entomology?

- A. The study of Birds
- B. The study of Insects
- C. The study of Microbes
- D. The study of Parasitic worms

7. Which of the following are the main characteristic features of an Insect?

- A. Pair of antennae
- B. Three pairs of legs
- C. Pair of wings
- D. All of the above

8. Which of the following is called the resting and inactive stage in the insect life cycle?

- A. The Egg stage
- B. The Larva stage
- C. The pupa stage
- D. The Adult stage

9. Which of the following is not a natural predator of BPH?

- A. Bugs
- B. Red ants
- C. Spiders
- D. All of the above

10. Insects, which feed on one type of food, are called \_\_\_\_\_.

- A. Polyphagous
- B. Monophagous
- C. Entomophagy
- D. None of the above

11. Which bacteria is responsible for staining of the cotton fiber\_\_\_\_\_

12. Scientific name of banana aphid is\_\_\_\_\_

13. The pest which attack both in field and storage of pulses is\_\_\_\_\_-

14. In paddy, the elongation of leaf sheath, when infested by gall fly (Orseollaoryzae) is due to a chemical known as\_\_\_\_\_

15. The bushy appearance with dead heart in sugarcane at 6th internode is due to\_\_\_\_\_

16. The last segment in the abdomen of male cockroach in addition of cerci will have a pair of\_\_\_\_\_

17. Example of an exopterygote insect order with a pupal instar in its life cycle\_\_\_\_-

18. Example of an insect order in which nymphs are called naids\_\_\_\_\_

19. Supra oesophagial ganglion is also called\_\_\_\_\_

20. The holes at the base of sorghum peduncle are due to\_\_\_\_\_

#### SECTION-B

# Answer any FOUR questions:4×8 = 32 M

- 21. Explain about Major sensory organs?
- 22. Explain Body segmentation of an insect?
- 23. Explain about Structure and modifications of insect antennae?
- 24. Explain Types of insect larvae and pupae of an insect?
- 25. Explain Dictyoptera: Mantidae, Blattidae; Odonata;?
- 26. Explain Structure and functions of insect cuticle and moulting?

# SECTION-C

#### Answer any FOUR questions:4×12 = 48 M

- 27. Explain Types of reproduction in insects?
- 28. Explain History of Entomology in India?
- 29. Explain Classification of class Insect aupto orders?
- 30. Explain about Study of characters of orders Orthoptera?

31. Explain about Systematics:Taxonomy-importance, history and development of an insect ?

32. Explain Relationship of class Insecta with other classes of Arthropoda. Morphology?

# PRACTICAL SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: IICourse Title: Fundamentals of Entomology- I PracticalCourse Code: ENTO131PNo. of Hours: 30 Hrs.Credits:1

# Objectives:

- To study about insects and their relationship to humans and environment
- To study about types of reproduction
- To study about insect taxonomy
- To learn about Body segmentation. Structure of Head, thorax and abdomen.

#### **Course Outcomes:**

- CO1: Students will learn about History of Entomology in India
- **CO2**: Students will understand about Structure and modifications of insect antennae, mouth parts, legs, wing venation, modifications and wing coupling apparatus.
- **CO3:** Students will learn about Types of reproduction in insects
- CO4: Students will learn about Insect Taxonomy
- CO5: Students will learn about Classification of class Insect up-to orders.

#### **EXPERIMENTS:**

1. Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Blister beetle. (7 Hrs.)

2. Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. **(8 Hrs.)** 

3. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper). **(8 Hrs.)** 

4.Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance. (7 Hrs.)

# Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: IICourse Title: Soil and Water Conservation EngineeringCourse Code: AENG151No. of Hours: 30 Hrs.Credits: 2

# Objectives:

- To study about natural resources management for sustainable agriculture.
- To study about management of land and water.
- To study about irrigation projects.

# **Course Outcomes**

At the end of the course, students will be able to CO1: Discuss types of soil erosion, and control measures. CO2: Explain the concept of irrigation water measurements. CO3: Outline different water harvesting techniques.

# UNIT-I: (6Hrs.)

1.Introduction to soil and water conservation and causes of soil erosion.

2. Definition and agents of soil erosion, water erosion - Forms of water erosion - Gully classification and control measures.

3. Soil loss estimation by universal soil loss equation - Soil loss measurement techniques.

# UNIT-II: (6Hrs.)

1. Principles of erosion control - Introduction to contouring, strip cropping.

2. Contour bund - Graded bund and bench terracing.

3. Wind erosion - Mechanics of wind erosion, types of soil movement - Principles of wind erosion control and its control measures.

4. Grassed water ways and their design.

# UNIT-III: (6Hrs.)

1. Introduction to irrigation - Classification of irrigation projects.

2. Importance of irrigation water measurements - Volumetric, area velocity, discharge methods - Weirs, orifice, flumes.

3. Open channel hydraulics - Discharge calculations.

# UNIT-IV: (6Hrs.)

1. Types of wells - Water lifting devices - Classification of pumps, their capacity, power requirement and discharge calculations.

2. Functional components and working principle of underground pipeline systems.

# UNIT-V: (6Hrs.)

1. Functional components of micro irrigation systems and its design like drip, sprinkler irrigation systems etc.

2. Water harvesting techniques - Lining of ponds, tanks and canal systems.

# **References Text Books**

1.Ghanshyam Das., 2012. Hydrology and Soil Conservation Engineering,

including Watershed Management. Second edition, PHI Learning Private Limited, New Delhi - 110001

2.Murthy, V. V.N., 2004. Land and Water Management Engineering. Kalayani Publishers, New Delhi

3.Michael A.M., 2007. Irrigation Theory and Practice. Second edition. Vikas Publishing House Pvt. Ltd.

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural Development Course Title: Soil and Water Conservation Engineering Course Code: AENG151	Semester: II
Time: 3 Hrs.	Max. Marks: 100
SECTION-A Answer ALL questions:	20×1= 20 M
1. A man can develop: A. 0.1 hp B. 0.5 hp C. 0.75 hp D. 1.0 hp	
<ul> <li>2. The average force that a bullock can exert:</li> <li>A. 1/5th of their body weight</li> <li>B. 1/10th of their body weight</li> <li>C. 1/20th of their body weight</li> <li>D. 1/25th of their body weight</li> </ul>	
<ul> <li>3. Medium size bullock can develop:</li> <li>A. 0.50 to 0.75 hp</li> <li>B. 0.75 to 1.0 hp</li> <li>C. 0.75 hp to 1.1 hp</li> <li>D. 1.0 to 1.5 hp</li> </ul>	
<ol> <li>The thermal efficiency of diesel engine varies bety</li> <li>A. 25 and 32 per cent</li> </ol>	ween:

- B. 32 and 38 per cent
- C. 32 and 40 per cent
- D. 40 and 45 per cent
- 5. The thermal efficiency of petrol engine varies between:
  - A. 25 and 32 per cent
  - B. 30 and 35 per cent
  - C. 32 and 38 per cent
  - D. 30 to 40 percent

- 6. The extra high speed engines used in knapsack sprayers are powered by:
  - A. Kerosene
  - B. Diesel
  - C. Petrol
  - D. Dual fuel

# 7. Broad base terrace is also known as:

- A. Bench terrace
- B. Channel terrace
- C. Drainage type terrace
- D. None of these
- 8. The velocity required to operate wind mill is more than:
  - A. 5 km ph
  - B. 10 km ph
  - C. 5 miles per hour
  - D. 10 miles per hour
- 9. Bench terracing is also called as:
  - A. Hill farming
  - B. Staircase farming
  - C. Erosion control farming
  - D. None of these
- 10. The power produced from a wind speed 6.4 to 37 km ph by windmill varies from:
  - A. 0.1 to 0.5 hp
  - B. 0.1 to 0.9 hp
  - C. 0.5 to 1 hp
  - D. 1 to 9 hp

II.Fillin the blanks:

11. Land leveling is not essential for irrigation with \_\_\_\_\_ method

12 The relative proportion of salt, silt and clay determine the soil

13. The \_\_\_\_\_ is a vertical section through soil mass

14. Archimedean screw is suitable to lift water from open water bodies to height ranging from \_\_\_\_\_

15. Water logging may occur due to following factor

16. The soil is more permeable, chances of water logging are

17. The soil moisture at field capacity varies from soil to soil but it range generally varies from \_\_\_\_\_

18. The moisture content at which the wilting is complete and the plant die is called \_\_\_\_\_

19. \_\_\_\_\_ actual area irrigated in a year from an outlet20. In water saving to the tune of \_\_\_\_\_ % is possible in drip irrigation system

#### SECTION-B

#### Answer any FOUR questions:4×8 = 32 M

21. Explain Wind erosion, Mechanics of wind erosion, types of soil movement?

- 22. Explain Types of wells?
- 23. Explain about Importance of irrigation water measurements?
- 24. Explain agents of soil erosion, water erosion
- 25. Explain about Open channel hydraulics
- 26. Explain about Water harvesting techniques

# SECTION-C

#### Answer any FOUR questions:4×12 = 48 M

27. Explain soil and water conservation and causes of soil erosion?

28. Explain irrigation - Classification of irrigation projects?

29. Explain Water lifting devices and classification of pumps, their capacity, power requirement and discharge?

30.Explain Principles of wind erosion control and its control measures.

31. Explain Forms of water erosion and Gully classification and control measures.

32. Explain Grassed water ways and their design.

# PRACTICAL SYLLABUS

Subject: Agriculture and Rural Development Semester: II Course Title: Soil and Water Conservation Engineering-Practical Course Code: AENG151P No. of Hours: 30Hrs. Credits: 1

#### Objectives:

- To study about natural resources management for sustainable agriculture
- To study about management of land and water
- To study about irrigation projects

#### Course Outcome:

- **CO1**: Students will understand to soil and water conservation and causes of soil erosion.
- **CO2:** Students will understand Wind erosion Mechanics of wind erosion, types of soil movement.

**CO3:**Students will understand Open channel hydraulics.

- **CO4:**Students will understand **S**oil loss estimation by universal soil loss equation.
- **CO5:** Students will understand Functional components of micro irrigation systems.

# **EXPERIMENTS:**

1.Practicing survey - Principles and educating to use pacing technique for measurement. (4 hrs.)

2.Area calculations through chain survey - GPS demo for tracking and area measurement. (4 hrs.)

3. Estimation of soil loss and calculation of erosion index. (3 hrs.)

4. Levelling concepts and practical utility in agriculture. (4 hrs.)

5.Water discharge measurements lab exercises for computing discharge. 12&13. Different irrigation pumps and their constructional differences. (4 hrs.)

- 6. Farm Pond construction and its design aspects. (3 hrs.)
- 7. Farm Pond and canal lining and its procedures. (4 hrs.)
- 8.Visit to nearby farm pond. (4 hrs.)

# Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

# SYLLABUS

# Subject: Agriculture and Rural DevelopmentSemester: IICourse Title: Fundamentals of Plant Pathology-I Course Code: PATH171No. of Hours: 30 Hrs.Credits: 2

# Objectives:

- To prevent and control disease of economic importance
- To preventing the introduction and spread of pests.
- To study different groups: fungi, bacteria, fastidious vesicular bacteria.
- To Study about Nematodes and General morphology and reproduction.

# Course Outcomes

At the end of the course, students will be able to **CO1:**Explain the scope and concepts of plant pathology.

CO2: Compare morphological and anatomical characters of fungi

**CO3:** Outline the rules of nomenclature and classification of fungi.

**CO4:** Identify viruses and classify plant parasites.

**CO5:** Explain different plant nematodes and characters.

# UNIT-I: (6Hrs.)

1. Importance of plant diseases, scope and objectives of Plant Pathology.

2. Important plant pathogenic organisms,

3.Different groups: fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them.

#### UNIT-II: (6Hrs.)

1. Diseases and symptoms due to abiotic causes. Fungi: General characters, definition of fungus, somatic structures,

2. Types of fungal thalli, fungal tissues, Modifications of Thallus, reproduction (asexual and sexual).

# UNIT-III: (6Hrs.)

1. Nomenclature, Binomial system of nomenclature, rules of nomenclature.

2. Classification of fungi. Key to divisions, sub-divisions, orders and classes. Bacteria and mollicutes: general morphological characters.

# UNIT-IV: (6Hr.)

1. Basic methods of classification and reproduction. Viruses: nature, architecture, multiplication and transmission. Study of phanerogamic plant parasites.

# UNIT-V: (6Hrs.)

1. Nematodes: General morphology and reproduction

2. Classification, symptoms and nature of damage caused by plant nematodes (Heterodera, Meloidogyne, Anguina etc.)

# References Text Books:

1. Alexopoulos, C.J., Mims C.W. and Blackwell M. 1996. Introductory Mycology.

2. Wiley Eastern Ltd., New York. Mandahar, C.L. 1987.

3. Introduction to Plant Viruses. S. Chand and Co., New Delhi.

4. Mehrotra, R.S. and Aneja, K.R. 1990. An Introduction to Mycology.

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural Development Course Title: Fundamentals of Plant Pathology-I Time: 3 Hrs.

Semester: II Course Code: PATH171 Max. Marks: 100 M

#### SECTION-A

#### Answer ALL questions:20×1= 20 M

- 1. Deficiency of which of these leads to interveinal chlorosis
  - a) Magnesium
  - B) Calcium
  - C) Nitrogen
  - D) Coblt
- 2. Little leaf disease is due to deficiency of
  - a) Nitrogen
  - B) Manganese
  - C) Sodium
  - D) Zinc
- 3. Mycotoxin Produced By Aspergillus Flavus
  - A) Phytoalexin
  - B) Dystrophin
  - C) Amphylotoxin
  - D) Aflatoxin
- 4. Boll Rot Of Cotton Is Caused By
  - A) Agaricus
  - B) Penillin
  - C) Puccinia
  - D) Rhizopus
- 5. Pucciniagraministritici occurring on the wheat crop is also names as
  - A) orange rust
  - B) black rust
    - C) green rust
  - D) Yellow rust

6. Downy mildew disease is caused by

- A) albugo
- B) Puccinia
- C) All above
- D) None of the above

7. Which disease of plant is known as rig disease

- A) Citrus canker
- B) Black arm
- C) Wilt of potato
- D) None of the above
- 8. Bunchy top of banana plant disease is caused due to
  - A) Bacteria
  - B) fungus
  - C) virus
  - D) none

9. Which one of the following cannot be dected by ELISA technique?

- A. viroid
- B) fungus
- C) bacteria
- D) virus

10. Suicidal germination takes place in

- A) Bacteria
- B) actinomycetes
- C) fungi
- D) earthworm
- 11. Exclusion of plant disease by legislation is known as\_\_\_\_\_

12. First of all microscope discovered by\_\_\_\_\_

- 13. First plant parasitic bacteria was reported by\_\_\_\_\_
- 14. First plant parasitic nematode discovered was\_\_\_\_\_
- 15. First plant parasitic nematode was reported by\_\_\_\_\_
- 16.Flag smut of sweat could be controlled by\_\_\_\_\_

17.Flag smut of wheat is caused by\_\_\_\_\_

18.Foot rot of papaya is caused by\_\_\_\_\_

19.Fungi, which can grow on living host plant, are called\_\_\_\_\_

20. Fungi which can grow only on living host plant are called\_\_\_\_\_

# SECTION-B

# Answer any FOUR questions:

 $4 \times 8 = 32$  M

21. Explain Contributions of any four Scientists?

22.Explain methods of sexual reproduction?

23. Define mycology? Explain important Phytopathogenic organisms?

24. Explain Nematodes: General morphology and reproduction

25. Explain classification, symptoms and nature of damage caused by plant nematodes?

26. Explain Diseases and symptoms due to abiotic causes. Fungi?

# SECTION-C

# Answer any FOUR questions:

# $4 \times 12 = 48$ M

27. Explain Basic methods of classification and reproduction?

28. Explain Nomenclature, Binomial system of nomenclature, rules of nomenclature.

29. Explain Importance of plant diseases, scope and objectives of Plant Pathology.

30. Define Plant Pathology? Explain about importance of plant pathogens?

31. Explain types of Reproduction in Fungi?

32. Explain General characteristics and types of Fungi?
### PRACTICAL SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: IICourse Title: Fundamentals of Plant Pathology-I PracticalCourse Code: PATH171PNo. of Hours: 30 Hrs.Credits: 1

# Objectives:

- To prevent and control disease of economic importance.
- To preventing the introduction and spread of pests.
- To study about different groups: fungi, bacteria, fastidious vesicular bacteria.
- To study about Nematodes and General morphology and reproduction.

# Course Outcomes:

**CO1:**Students will understand Importance of plant diseases, scope and objectives of Plant Pathology.

- **CO2**:Students will learn about Diseases and symptoms due to abiotic causes. Fungi: General characters, definition of fungus, somatic structures.
- **CO3:** Students will understand Nomenclature, Binomial system of nomenclature, rules of nomenclature.
- **CO4**:Students will understand Basic methods of classification and reproduction.
- **CO5:** Students will understand Nematodes: General morphology and reproduction.

### **EXPERIMENTS:**

- 1. Study of vegetative structures of fungi and their modifications.(3 Hrs.)
- 2. Study of reproductive (sexual and asexual) structures of fungi.(4 Hrs.)
- 3. Study of Pythium and Phytophthora. (4 Hrs.)
- 4. Study of Albugo. (3 Hrs.)
- 5. Study of imperfect fungi Aspergillus, Penicillium and Pyricularia.

(4 Hrs.)

6. Study of imperfect fungi – Fusarium, Rhizoctonia and Sclerotium. (4 Hrs.) 7. Isolation of phytopathogenic bacteria (locally available diseased plant material) and study of colony characteristics and Gram's staining.

(4 Hrs.)

8. Demonstration of mechanical transmission of plant viruses. (4 Hrs.)

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

# Scheme OF EVALUATION

Subject: Agriculture and Rural Development Semester: IICourse Title: Zero Budget Natural FarmingCourse Code: SDCZNNo. of Hours: 30 Hrs.Credits: 2

# **Objectives:**

- To improve the livelihoods of Farmers.
- To understand about livelihoods from agriculture and allied sectors.
- To reducing or zero use of chemical fertilizers.
- To know the Usage of cow dung and cow urine and plant extracts for improving the soil texture.

### **Course Outcomes**

At the end of the course, students will be able to

**CO1:**Explain the methods of preparation of zero budget natural farming, nutritive value and advantages and disadvantages.

**CO2:** Identify the materials used to make natural fertilizers.

**CO3:** Demonstrate procedure for the preparation of natural fertilizers.

CO2: Students will learn abouton farm farmer trainings.

**CO3:** Students will understand aboutOrganic certification.

**CO4:**Students will understand aboutZBNF input shops.

# PRACTICAL

### UNIT-I: (6 Hours)

1. Introduction to ZBNF - History, definition

2. Brief description methods of preparation of ZBNF

# UNIT-II: (6 Hours)

1. Procedure for preparation of Natural Fertilizers by step by step

2. Materials used for Natural Fertilizers

# UNIT-III: (6 Hours)

1.Key elements and strategy of ZBNF

# UNIT-IV: (6 Hours)

1. Nutrient values for used in ZBNF

# UNIT-V: (6 Hours)

1. Advantages and Disadvantages in ZBNF

# Reference Text Books:

- 1. 1975 (in English) 1978 re-presentation The One-Straw Revolution: An Introduction to Natural Farming.
- 2. \* "Life and Death in the Field | Final Straw Food | Earth | Happiness". www.finalstraw.org. Retrieved 2017-04-16.
- Floyd, J.; Zubevich, K. (2010). "Linking foresight and sustainability: An integral approach". Futures. 42: 59– 68. doi:10.1016/j.futures.2009.08.001.
- A Hanley, Paul (1990). "Agriculture: A Fundamental Principle" (PDF). Journal of Bahá'í Studies. 3 (1). Archived from the original (PDF) on March 27, 2013. Retrieved April 28,2014.
- Colin Adrien MacKinley Duncan (1996). The Centrality of Agriculture: Between Humankind and the Rest of Nature. McGill-Queen's Press - MQUP. ISBN 978-0-7735-6571-5.
- 6. A Trees on Organic Farms, Mirret, Erin Paige. North Carolina State University, 2001
- Stephen Morse; Michael Stockin (1995). People and Environment: Development for the Future. Taylor & Francis Group. ISBN 978-1-85728-283-2.
- 8. Elpel, Thomas J. (November 1, 2002). Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills. ISBN 1892784122.
- 9. What Does Natural Farming Mean? Archived 2011-07-20 at the WaybackMachineby Toyoda, Natsuko

Subject: Agriculture and Rural Development Semester: IICourse Title: Seed Bed PreparationCourse Code: CERSBPNo. of Hours: 30Hrs.Credits: I

# **Objectives:**

- To prepare the Field.
- To learn about preparation of seed bed.
- To understand about Seed bed treatment.
- To understand about different methods of sowing.

### Course Outcomes:

- **CO1**: Students will understand about seed bed.
- CO2: Students learn about Preparation of beds.
- **CO3**: Students will learn about Design criteria and constructional details of seed bed.
- **CO4:** Students will understand uses of seed bed.

# PRACTICAL

# UNIT-I: (6 Hours)

- 1. Introduction to seed bed History, definition
- 2. Brief description methods of preparation of field

# UNIT-II: (6 Hours)

- 1. Procedure for preparation of seed bed by step by step
- 2. Materials used for seed bed of greenhouses

# UNIT-III: (6 Hours)

1. Different types of seed bed

### UNIT-IV: (6 Hours)

1. Seed bed treatment

# UNIT-V: (6 Hours)

1. Advantages and Disadvantages in seed bed

# Reference Text Books:

1.Holzworth, L.K., Wiesner, L.E., and Bowman, H.F. Grass and Legume Seed Production inMontana and Wyoming. Special Report No. 12. Revised 1990. 31p.

2.Montana State University, Extension Service. Montana Interagency Plant Materials Handbookfor Forage Production, Conservation, Reclamation, and Wildlife. EB 69. June 1990. Pgs. 175-185.

3.Ogle, D., St. John, L, Cornwell, J., Stannard, M., and Holzworth, L. 2008. Technical Note 10.Pasture and Range Seedings: Planning-Installation-Evaluation. USDA-Natural Resources

# SEMESTER - III

Subject: Agriculture and Rural Development Semester: III Course Title: Crop Production Technology – I (Cereals, Millets and Pulses) Course Code: AGRO 201

No. of Hrs:30

Credits: 2

# Objectives

- To study about the understand the principles and practices that underpin modern crop practises
- To study about Optimize and manipulate crop scheduling.
- To study about Exploit understanding in plant sciences.
- To study about to implement best practises.

# Course Outcomes

At the end of the course, students will be able to

**CO1:**Explain importance and special features of cereal crops in Andhra Pradesh.

**CO2**:Outline the agronomical conditions for the cultivation of agricultural cereal crops.

**CO3:**Summarize agronomical conditions to grow millet crops.

**CO4:** Discuss the agronomical conditions necessary for the cultivation of pulses and lentils.

**CO5:** List the agronomical characteristics of various agricultural field crops.

# Theory

# UNIT I (6Hrs)

1.Cereals – Importance and special features of cereals - Rice- Origin - geographical distribution – nutritional value – area, production and productivity in India and Andhra Pradesh

2. Economic importance - soil and climatic requirements

3. Classification of rice plant types - growth Stages of rice -different types of rice ecosystems

4. Land Preparation –physico – chemical and biological changes under submerged soils

5. Crop establishment techniques in rice - Climate resilient technologies

6. Nutrient management with special emphasis on nitrogen dynamics, micro nutrients -INM

### UNIT II (6hrs)

1. Water management in rice under different rice ecosystems

2. Weed management including weed management in rice nurseries - IWM

3. Harvesting -Yield attributes - yield - post harvest operations - milling of rice

4. Value added products of rice – export potential - rice grain classification, cropping systems in rice 11. Wheat- Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance - soil and climatic requirements - zones of wheat cultivation - growth Stages - Classification

5. Land Preparation - seeds and sowing - nutrient management - water management - weed management - climate resilient technologies

6. Harvesting -yield attributes – yield - post harvest operations – wheat based cropping systems – value addition

# UNIT III (6hrs)

 Barley – Origin- geographical distribution - economic importanceclassification - area, production and productivity in India and Andhra Pradesh - soil and climatic requirements --varieties - cultural practices
Harvesting -Yield attributes - yield

2. Maize- Origin- geographical distribution - economic importance area, production and productivity in India and Andhra Pradesh- soil and climatic requirements - growth stages - Classification of maize

3. Land Preparation – zero tillage - seeds and sowing - nutrient management - water management - weed management - climate resilient technologies21

4. Harvesting - yield attributes – yield - post harvest operations - value addition - cropping systems 18. Millets- Economic importance - constraints and strategies for increasing the production of millets - climate resilient technologies

5. Jowar- Origin - geographical distribution - economic importance area, production and productivity in India and Andhra Pradesh - soil and climatic requirements - zones of jowar cultivation - growth Stages -Land Preparation - seeds and sowing

### UNIT IV (6hrs)

1. Nutrient management - water management - weed management harvesting- yield attributes - yield - post harvest operations - value addition- sorghum effect, mid-season corrections - cropping systems 2. Pearl millet - Origin - geographical distribution - economic importance - area, production and productivity in India and Andhra Pradesh- soil and climatic requirements -growth Stages - land preparation - seeds and sowing - Nutrient management - sater management - weed management - harvesting- yield attributes - yield post harvest operations - value addition - cropping systems

3. Finger millet- Origin - geographical distribution - economic importance - area, production and productivity in India and Andhra Pradesh- soil and climatic requirements, growth Stages - land preparation, seeds and sowing - nutrient management - water management - weed management - harvesting - yield attributes - yield - post harvest operations - value addition - cropping systems

4. Proso millet, Little millet and Kodo millet – Origin - geographical distribution - economic importance - adaptations, soil and climatic requirements - growth Stages - land preparation - seeds and sowing - nutrient management - water management - weed management - harvesting - yield attributes – yield - post harvest operations

5. Foxtail millet, Barnyard millet- Origin - geographical distributioneconomic importance – Adaptations - soil and climatic requirements growth Stages- land preparation- seeds and sowing- nutrient management - water management - weed management- harvesting yield attributes – yield - post harvest operations

6. Pulses- Economic importance - constraints for achieving higher productivity of pulses, strategies for improving the pulse production in India - climate resilient technologies

7. Pigeonpea- Origin - geographical distribution - economic importancearea, production and productivity in India and Andhra Pradesh - soil and climatic requirements - growth Stages - land Preparation - seeds and sowing - varieties - nutrient management - water management weed management - harvesting- yield attributes - yield - post harvest operations - cropping systems

### UNIT V (6hrs)

1. Greengram – Origin - geographical distribution - economic importance - area, production and productivity in India and Andhra Pradesh - soil and climatic requirements growth stages - land Preparation- seeds and sowing – varieties nutrient management -water management- weed management- harvesting- yield attributes – yield post harvest operations - cropping systems

2. Blackgram – Origin- geographical distribution, - economic importance - area, production and productivity in India and Andhra Pradesh - soil and climatic requirements - growth stages - land Preparation - seeds and sowing – varieties-nutrient management water management- weed management - harvesting- yield attributes – yield - post harvest operations - cropping systems

3. Bengalgram - Origin - geographical distribution- economic importance- area, production and productivity in India and Andhra Pradesh - soil and climatic requirements- growth stages -types of chick pea -land preparation - seeds and sowing- varieties- nutrient management- water management- weed management-harvesting- yield attributes – yield - post harvest operations - cropping systems

4. Lentil, peas- Origin- geographical distribution - economic importance- area, production and productivity in India and Andhra Pradesh - soil and climatic requirements- growth stages-types of lentil and peas - land Preparation - seeds and sowing - varieties- nutrient management- water management- weed management-harvesting- yield attributes - yield - post harvest operations - cropping systems

5. Horsegram- Origin- geographical distribution - economic importance - area, production and productivity in India and Andhra Pradesh - soil and climatic requirements- growth stages - land Preparation- seeds and sowing – varieties-nutrient management- water management- weed management- harvesting- yield attributes – yield - post harvest operations - cropping systems

6. Cowpea- Origin - geographical distribution- economic importance area, production and productivity in India and Andhra Pradesh - soil and climatic requirements - growth Stages - land preparation- seeds and sowing- varieties - nutrient management- water management- weed management-harvesting- yield attributes - yield - post harvest operations - cropping systems

# References Text books

- 1. Rajendra Prasad. 2006. Text book of field crops production. ICAR, New Delhi.
- 2. Reddy, S.R. and Reddi Ramu. 5th edition. 2016. Agronomy of field crops. Kalyani publishers, Ludhiana.
- 3. Gururaj hunsigi and Krishna, K.R. 2007. Scientific field crop production. Oxford &IBH Publishing Co.Pvt.LTD.
- 4. De Datta, S.K.1981. Principles and practices of rice Production. John Wiley and Sons, New York

# MODEL QUESTION PAPER

Subject: Agriculture and Rural Development Semester: III Course Title: Crop Production Technology – I (Cereals, Millets and Pulses) Course Code: AGRO 201 No. of Hrs:30 Credits: 2

Time: 3Hrs

SECTION-A

# Answer ALL questions

1. Common bread wheat is ( )

- A) Triticum vulgare
- B) Triticum spherococcum
- C) Triticum aestivum
- D) Triticum durum
- 2. The variety resistant to pre harvest sprouting in green gram is ()
  - A) Pusa 105
  - B) LGG460
  - C) LGG450
  - D) PDM-54
- 3. Bird's foot millet is ()
  - A) kodomillet
  - B) foxtail millet
  - C) pearlmillet
  - D) fingermillet
- 4. Avarodhi is the variety of ()
  - A) Green gram
  - B) Bengal gram
  - C) Horse gram
  - D) Red gram
- 5. The following one is known as Table pea ()
  - A) Chickpea
  - B) Cowpea
  - C) Gardenpea
  - D) Fieldpea
- 6. Scientific name of Korra is ()
  - A)Setaria italica
  - B)Paspalum scorbiculatum
  - C)Panicum millare
  - D)Panicum miliaceum

Credits: 2 Max. Marks: 100

 $20 \times 1 = 20 M$ 

- 7. Removal of very fine bran is called as ()
  - A) whitening
  - B) milling
  - C) curing
  - D) husking

8. The following one is a Rabi Rice fallow variety in blackgram ()

- A) Pant-U19
- B) DPV-88
- C) LBG-645
- D) WBG-26

# 9. The following crop is called as camel crop ()

- A) cowpea
- B) sorghum
- C) pearlmillet
- D) redgram
- 10. An example for broad leaved dicot weed ( )
  - A) Echinochloa colonum
  - B) Echinochloa crussgeli
  - C) Eclipta alba
  - D) Cyperus rotendus
- 11. ..... crop is harvested in october.
- 12. The kind of crop grown only for sale profit is .....
- 13. ..... is used to till the soil in agriculture.
- 14. In ..... type of irrigation, water is sprayed on the plants using rotating sprinkler.
- 15. Threshing can be done using the machine.....
- 16. Large grasses cultivated for their nutritious seeds are called.....
- 17. Preparation of soil involves ..... and ..... it.
- 18. The agricultural implement used to sow seeds is called .....
- 19. Allowing a field to remain free of crops for one or more seasons is called field...... it allows the field to regain.....
- 20. ..... Bacteria fixed nitrogen in root nodules of leguminous plants.

### SECTION-B

# Answer any FOUR questions

 $4 \times 8 = 32$  M

- 21. What are Millets? Write the characteristics and importance of Millets.
- 22. Explain the types and classification of Maize.
- 23. What are Pulses? Explain the contraints for low yields of pulses in India
- 24. What are New Plant Types? Briefly explain the features of NPT's.
- 25. Explain the growth stages and its duration of Rice
- 26. Explain the crop production practices for Pearlmillet

# SECTION-C

# Answer any FOUR questions

 $4 \times 12 = 48$  M

- 27. Write about the value added products of Rice.
- 28. Explain the growth stages of Jowar
- 29. What is a weed? Mention the types of weeds found in Rice fields.
- 30. Explain the classification of wheat.
- 31. Write the differences between Desi and kabuli types of chickpea.
- 32. Explain the crop production practices for Redgram

### Subject: Agriculture and Rural Development Semester: III Course Title: Crop Production Technology – I - Practical Course Code: AGRO 201P No. of Hrs:30

# Credits:1

# Objectives

- To study about the understand the principles and practices that underpin modern crop practises
- To study about Optimize and manipulate crop scheduling.
- To study about Exploit understanding in plant sciences.

# **Course Outcomes**

**CO1**:Students will understand about Introduction and development of agriculture.

**CO2**:Students will understand aboutNutrient management with special emphasis on nitrogen dynamics, micro nutrients -INM

CO3: Students will learn about Harvesting -Yield attributes - yield post harvest operations

CO4: Students will understand about Land Preparation - seeds and sowing - nutrient management - water management - weed management - climate resilient technologies

**CO5:** Students will understand about Maize- Origin- geographical distribution

# **EXPERIMENTS**

1. Raising of rice nurseries including SRI nursery for mechanical transplanting

- 2. Transplanting of rice
- 3. Identification of seeds /crops and calculation of seed rate
- 4. Land preparation and layout of student plots
- 5. Sowing of crops in student plots
- 6. Study of the effect of seed size on germination and seedling vigour
- 7. Identification and management of weeds in cereals and pulses
- 8. Fertilizer application (top dressing and foliar feeding of nutrients)
- 9. Agronomic characters of cereal crop varieties
- 10. Agronomic characters of millet crop varieties
- 11. Agronomic characters of pulse crop varieties

# SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

Subject: Agriculture and Rural DevelopmentSemester: IIICourse Title: Fundamentals of Plant BreedingCourse Code: GPBR211No. of Hrs:30Credits: 2

# Objectives

- To study Genetics in relation to plant breeding.
- To study identifying the characteristics of self and cross pollinated crops
- To study about determine breeding methodology for plants.
- To study about basic statistical analysis related to plant breeding.

# Course Outcomes

At the end of the course, students will be able to

**CO1:**Explain historical development, concepts, nature and role of plant breeding and modes of reproduction.

**CO2**:Discuss plant introduction and centres of origin/diversity.

**CO3:**List and explain the different plant breeding methods.

**CO4:**Summarize the development of resistance and tolerance mechanisms.

# THEORY

# UNIT I: (6hrs)

1 Historical developments, concept, nature and role of plant breeding, major achievements and future prospects - Definition, aim, objectives, history and developments of plant breeding, scientific contributions of eminent scientists - Landmarks in plant breeding - Scope of plant breeding.

2 Modes of reproduction and apomixis - Asexual reproduction (vegetative reproduction and apomixis) and sexual reproduction - Their classification and significance in plant breeding.

3 Modes of pollination - Classification of crop species on the basis of mode of pollination- self-pollination - mechanisms promoting selfpollination - Genetic consequences of self-pollination - Cross pollination - Mechanisms promoting cross pollination - Genetic consequences of cross pollination - Often cross pollinated crops. 4 Self- incompatibility - Classification - Heteromorphic, homomorphic, gametophytic and sporophytic systems of incompatibility - Advantages and disadvantages - Utilization in crop improvement.

5 Male sterility- Genetic consequences, cultivar options - Different types – Genetic, cytoplasmic and cytoplasmic genetic male sterility – Inheritance and maintenance- utilization of male sterile lines in hybrid seed production – Their advantages and disadvantages.

6 Domestication, acclimatization and introduction - Plant introduction - Primary introduction and secondary introduction - Plant introduction agencies in India - National Bureau of Plant Genetic Resources (NBPGR) and its activities - Procedure of plant introduction - Merits and demerits of plant introduction.

7 Centre of origin/diversity - Centres of diversity – Centres of origin – Classification – law of homologous series – Types of centres of diversity – Germplasm collections – Genetic erosion – Main reasons of genetic erosion – Extinction - Gene sanctuaries - Introgression – Gene banks – Types of gene banks.

# UNIT II (6hrs)

1. Breeding methods in self pollinated crops - Modes of selection -Selection - Natural and artificial selection - Basic principles of selection - Basic characteristics and requirements of selection -Selection intensity - Selection differential, heritability (narrow and broad sense) - Genetic advance as per cent of mean.

2 Mass selection – Procedure for evolving a variety by mass selection – Modification of mass selection – Merits, demerits and achievements.

3 Pure line selection - Johannsen's pure line theory and its concepts and significance – Origin of variation in pure lines – Characters of pure lines – Progeny test, genetic basis of pure line selection – General procedure for evolving a variety by pure line selection – Merits, demerits and achievements – Comparison between mass and pure line selection.

4 Hybridization techniques - Hybridization - Aims and objectives -Types of hybridization - Pre-requisites for hybridization - Procedure / steps involved in hybridization.

5 Handling of segregating population - Pedigree method – Procedure – Merits, demerits and achievements. 13 Bulk method – Procedure – Merits, demerits and achievements – Comparison between pedigree and bulk methods - Single seed descent method – Merits and demerits. UNIT III (6hrs)

1 Backcross method of breeding-Its requirements and applications – Procedure for transfer of single dominant gene - Procedure for transfer of single recessive gene – Merits, demerits and achievements comparison between pedigree and backcross method.

2 Multiline concept - Definition – Characteristics of a good multiline – Development of multiline varieties – Achievements.

3 Concepts of population genetics and Hardy - Weinberg Law - Hardy Weinberg Law – Factors affecting equilibrium frequencies in random mating populations - Selection without progeny testing – Selection with progeny testing - Merits and demerits of progeny selection – Line breeding- achievements.

4 Recurrent selection – Different types – Detailed procedure of simple recurrent selection and other recurrent selection methods – Conclusion on the efficiency of different selection schemes.

5 Heterosis - Heterosis and hybrid vigour – Luxuriance – Heterobeltiosis – Brief history– heterosis in cross pollinated and self pollinated species – Manifestations of heterosis

6 Genetic basis of heterosis – Dominance, over dominance and epistasis hypotheses – Objections and their explanations – Comparison between dominance and overdominance hypotheses – Physiological basis of heterosis

### UNIT IV (6hrs)

1 Inbreeding depression - Brief history – Effects of inbreeding – Eegrees of inbreeding depression – Procedure for development of inbred lines and their evaluation.

2 Development of inbred lines and hybrids - Exploitation of heterosis – History of hybrid varieties – Important steps in production of single and double cross hybrids – Brief idea of hybrids in maize, pearl millet, sunflower and rice.

3 Composite and synthetic varieties - Production procedures – Merits, demerits and achievements – Factors determining the performance of synthetic varieties – Comparison between synthetics and composites.

4 Breeding methods in asexually propagated crops, clonal selection and hybridization - Characteristics of asexually propagated crops – Characteristics of clones –Clonal selection – Procedure – Advantages and disadvantages – Problems in breeding asexually propagated crops – Genetic variation within a clone – Clonal degeneration – Achievements – Comparison among clones, purelines and inbreds -Breeding of annual asexually propagated species through hybridization – Interspecific hybridization.

5 Wide hybridization and pre-breeding - History – Objectives – Barriers for the production of distant hybrids– Techniques for production of distant hybrids – applications of wide hybridization in crop improvement – Sterility in distant hybrids – Limitations and achievements -use of gene pools to develop intermediate breeding material.

6 Polyploidy in relation to plant breeding - Polyploidy – Autopolyploids – Origin and production – Morphological and cytological features– Applications in crop improvement – Limitations– Allopolyploidy – Morphological and cytological features– Applications in crop improvement – Limitations.

7 Mutation breeding - Methods and uses - Mutation breeding -Procedure of mutation breeding - Applications - Advantages, limitations and achievements.

### UNIT V (6hrs)

1 Breeding for important biotic and abiotic stresses - Disease resistance – Mechanisms of disease resistance in plants (disease escape, tolerance, resistance, immunity and hypersensitivity) – Genetic basis of disease resistance – Gene for gene hypothesis – sources of disease resistance – Breeding methods for disease resistance – Achievements.

2 Insect resistance – Mechanism of insect resistance in plants (non preference, antibiosis, tolerance and avoidance) – Nature of insect resistance – Genetics of insect resistance – Horizontal and vertical resistance – Sources of insect resistance – breeding methods for insect resistance – Problems in breeding for insect resistance – Achievements.

3 Drought resistance – Mechanisms of drought resistance (drought escape, avoidance, tolerance, and resistance) – Features associated with drought resistance – Sources of drought resistance – Breeding methods for drought resistance – Limitations – achievements - Resistance to water logging – Effects of water logging - Mechanism of tolerance – Ideotype for flooded areas.

4 Salt tolerance – Response of plants to salinity – Symptoms – Mechanisms of salt tolerance – Breeding methods for salt tolerance – Problems – Achievements. Cold tolerance – Chilling resistance – Effects of chilling stress on plants – Mechanism of chilling tolerance – Sources of chilling tolerance – Selection criteria.

5 Biotechnological tools - DNA markers and marker assisted selection - Definition and classification of DNA markers and applications.

6 Participatory plant breeding - Definition – Goals – Methodology – Advantages and limitations.

# References text books

- 1. Phundan Singh, 2014. Essentials of Plant Breeding. Kalyani Publishers, New Delhi.
- 2. Singh, B.D. 2015. Plant Breeding: Principles and Methods. Kalyani Publishers, New Delhi.
- 3. Gupta, S.K. 2010. Plant Breeding Theory and Techniques.Wiley India Pvt. Ltd. New Delhi.
- 4. Allard, R.W. 2010. Principles of Plant Breeding. John Wiley and Sons, New York.
- 5. Poehlman, J.M. and Borthakur, D. 1995. Breeding of Asian Field Crops. Oxford and IBH Publishing Co., New Delhi.
- Sharma, J.R. 1994. Principles and Practice of Plant Breeding.Tata McGraw Hill, Publishing Company Ltd., New Delhi. GPBR 311 CROP IMPRO

# MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IIICourse Title: Fundamentals of Plant BreedingCourse Code: GPBR211Time: 3 HrsMax. Marks: 100

# SECTION-A

### **Answer ALL questions**

### $20 \times 1 = 20 M$

1. In \_\_\_\_\_ the embryo develops from embryo sac without pollination

- A) Apomixis
- B) Aposory
- C) parthenogenesis
- D) A & B

# 2. \_\_\_\_\_ is also known as mass method

- A) Pedigree
- B) pure line
- C) mass selection
- D) Bulk method

3. How many back crosses should be made to get a disease resistant crop

- A) 6
- B) 5
- C) 8
- D) 7

4. In \_\_\_\_\_ the pollen grains fail to germinate on the stigma of the flower

- A) Male sterility
- B) Pollen sensitivity
- C) Self incompatability
- D) Both a and b

5. When the individuals of closely related are subjected to mating leads to\_\_\_\_\_

- A) Inbreeding
- B) inbreeding depression
- C) inter specific
- D) inter generic

6. \_\_\_\_\_ is produced by crossing in all combinations of number of lines that combine well with each other

- A) Composite variety
- B) synthetic var
- C) hybrid var
- D) germplasm complexes

7. Breeding schemes similar to recurrent selection were first suggested by\_\_\_\_

- A) Hayes & amp; garber
- B) East & amp; jones
- C) Both a & b
- D) None
- 8. In \_\_\_\_\_ host specificity is found
  - A) Vertical resistance
  - B) Horizontal resistance
  - C) Vertifolia effect
  - D) Both a &

9. The term mutation is derived from \_\_\_\_\_

- A) Greek
- B) Italian
- C) latin
- D) persian

10. In polygenic traits the phenotypic effect is recognised in

\_\_\_\_\_generation

- A) 1 st , in group
- B) 2 nd , as individuals
- C) 3 rd , in group
- D) 3 rd , as individuals
- 11. \_\_\_\_\_Term ideotype was proposed by in 1968.
- 12. Gene-for-gene hypothesis was given by Flor in Flax rust caused by\_\_\_\_\_ organism.
- 13. Complete failure of vertical resistance is called\_\_\_\_\_
- 14. An example of complete stem parasitic weed is \_\_\_\_\_
- 15. Mechanism by which plant develops drought resistance through maintaining favourable water balance is \_\_\_\_\_
- 16. International Crops Research Institute for Semi-Arid and Tropics is situated at \_\_\_\_\_
- 17. Common name of striga is\_\_\_\_\_

- The mechanism of adverse effect of plant on development of insect pests which feeds on resistant plant is known as
- 19. The concentration of will increase in leaves of plants when \_\_\_\_\_subjected to draught.
- 20. Vertical resistance shows type of variation.

### SECTION-B

# Answer any FOUR questions

 $4 \times 8 = 32$  M

- 21. Write about the bulk method and single seed descent method?
- 22. Write the procedure of plant introduction & amp; functions of NBPGR & amp; their stations?
- 23. Explain Emasculation and hybridization techniques in cross pollinated crops
- 24. Explain Development of inbred lines and hybrids?
- 25. Explain about Genetic basis of heterosis?
- 26. Explain about Breeding for important biotic and abiotic stresses?

# SECTION-C

### Answer any FOUR questions

### $4 \times 12 = 48$ M

- 27. Write about mechanisms of disease resistance? What is gene for gene hypothesis?
- 28. Define mutation? Write the procedure for the oligogenic & amp; polygenic traits of mutation breeding?
- 29. Write the procedure for simple and reciprocal recurrent selection?
- 30. Write detailed account on male sterility & amp; different types of male sterility?
- 31. Write in detail about the self incompatability?
- 32. Difference between pedigree and back cross method?

### Subject: Agriculture and Rural Development Semester: III **Course Title: Fundamentals of Plant Breeding-Practical** Course Code: GPBR211P No. of Hrs:30

# Credits:1

# Objectives

- To study Genetics in relation to plant breeding.
- To study about identifying the characteristics of self and cross pollinated crops
- To study about determine breeding methodology for plants.

# **Course Outcomes**

**CO1:** Students will understand about Historical developments, concept, nature and role of plant breeding

CO2:Students will understand about Modes of reproduction and apomixes, Asexual reproduction (vegetative reproduction and apomixis) and sexual reproduction

**CO3**:Students will understand about Modes of pollination, Classification of crop species

**CO4:** Students will understand about Hybridization techniques,

Hybridization

**CO5:** Students will understand about Handling of segregating population, Pedigree method, Procedure

# **EXPERIMENTS**

1 Plant Breeder's kit.

2 Study of germplasm of various crops.

3 Emasculation and hybridization techniques in self-pollinated crops rice, groundnut.

4 Emasculation and hybridization techniques in self-pollinated crops greengram, sesame.

5 Emasculation and hybridization techniques in cross pollinated crops maize, castor.

6 Emasculation and hybridization techniques in often cross-pollinated crops - cotton, redgram.

7 Consequences of inbreeding on genetic structure of resulting populations.

8 Study of male sterility systems.

# SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

Subject: Agriculture and Rural Developments Semester: III Course Title: Fundamentals of Entomology II (Insect Ecology & Concepts Of IPM) Course Code: ENTO231 No. of Hrs:15 Credits: 1

# Objectives

- To study influence of ecological factors on insect development.
- To study about the components of integrated pest management.
- To study about classification of insects.
- To study about classification of insecticides.

### Course Outcomes

At the end of the course, students will be able to

**CO1:**Explain biotic and abiotic factors affecting insect ecology **CO2:**Outline the methods of integrated pest management, surveillance and forecasting and principles of host-plant resistance.

**CO3**:Summarize pest management tools and different methods of pest control.

**CO4:**Explain different formulations of insecticides and application techniques.

# THEORY

# UNIT I (4hrs)

1 Insect Ecology- Introduction, Autecology and Synecology-Population-Community Ecosystem – Agro-ecosystem -Environment and its components. Abiotic factors - Temperature-Its effect on the development, fecundity distribution, dispersal and movement of insects - Adaptations of insects to temperature - Thermal constant-Day degrees. Moisture- Adaptation of insects to conserve moisture. -Humidity- Its effect on development, fecundity and colour of body -Rainfall - Its effect on emergence, movement and oviposition of insects.

2 Light – Phototaxis - photoperiodism - Its effect on growth, moulting activity or behaviour, oviposition and pigmentation - Use of light as a factor of insect control; Atmospheric pressure and its effect on behaviour. Air currents - Effect on dispersal of insects – Edaphic factors.

3 Biotic factors – Food - Classification of insects according to nutritional requirements - Other organisms - Inter and Intra specific associations - Beneficial and harmful associations of parasitoids based on site of attack, stage of host, duration of attack, degree of parasitism and food habits. Effect of biotic factors - Competition, natural and environmental resistance

4 Concepts of Balance of life in nature- Biotic potential and environmental resistance. - Factors contributing to increase or decrease of population - Causes for outbreak of pests in agroecosystem.

# UNIT II (3hrs)

1 Practices, Scope and Limitations of IPM - IPM - Definitions, Concepts- Economic Threshold Level (ETL) - Economic Injury Level (EIL) and General Equilibrium Position (GEP) - Modified Equilibrium Position (MEP)- Components/tools of IPM

2 Pest surveillance and pest forecasting – Definition - Importance in IPM – Advantages - Components of pest surveillance, types of forecasting (short term and long-term forecasting and their advantages) – Insect pests – Definitions of negligible, minor and major pests; Different categories of pests – Regular, occasional, seasonal, persistent, sporadic, epidemic and endemic pests with examples.

3 Host-plant resistance- Principles of host plant resistance – Ecological resistance – Phenological asynchrony, induced resistance and escape – Genetic resistance – Mono, oligo and polygenic resistance – Major gene resistance (vertical/specific/ qualitative) and minor gene resistance (horizontal/nonspecific/quantitative) – Host- plant selection process- host habitat finding, host finding, host recognition, host acceptance and host suitability- Mechanisms of Genetic resistance-Non-preference (antixenosis), antibiosis and tolerance – Transgenic plants.

# UNIT III (3hrs)

1 Components/tools of IPM: Cultural control- Normal and special cultural practices which incidentally control the pests and agronomic practices recommended specifically against the pests with examples. 2 Mechanical control- Different mechanical methods of pest control with examples. 3 Physical control – Use of inert carriers against stored product insects - steam sterilization – Solarization - Solar radiation - Light traps -Flame throwers etc.; Legislative measures - Importance of quarantine -Examples of exotic pests - Different legislative measures enforced in different countries including India.

# UNIT IV (2hrs)

1 Biological control - Types of biological control – Introduction, augmentation and conservation – Advantages and disadvantages of biological control. Parasite – Parasitoid - Parasitism - Grouping of parasites based on nature of host, stage of host, site of parasitisation, duration of attack, degree of parasitisation and food habits – Kinds of parasitism – qualities/attributes of an effective parasitoid. Predators – Predatism – qualities of insect predator – Differences between predator and parasite.

2 Microbial control - Important groups of microorganisms - Bacteria, viruses and fungi used in pest control and their mass multiplication techniques - Transgenic plant pathogens – Bacteria, fungi and viruses -Entomopathogenic nematodes – Important species - Mode of infectivity and examples.

3 Chemical control - Importance and ideal properties of insecticide -Classification of insecticides based on origin, mode of entry, mode of action and toxicity with list of insecticides - Toxicity evaluation of insecticides - Acute or chronic toxicities, oral and dermal toxicities -LC50 (Median Lethal Concentration), LD50 (Median Lethal Dose), ED50 (Median Effective Dose), LT50 ((Median Lethal time), KD50 (Median Knockdown Dose) and KT50 (Median Knock Down Time) – Bioassay methods.

### UNIT V (3hrs)

1 Formulations of insecticides - Dusts, granules, wettable powders, water dispersible granules, solutions, emulsifiable concentrates, suspension concentrates, concentrated insecticide liquids, fumigants, aerosols, gels, micro encapsulations, tablets, baits and mixtures of active ingredients – Advantages and disadvantages of chemical control 2 Recent methods of pest control - Repellents (physical and chemical), Antifeedants - importance of antifeedants and limitations of their use – Attractants - Sex pheromones - List of synthetic sex pheromones - Use in IPM - Insect hormones – Gamma irradiation –Genetic control – Sterile male technique.

3 Application techniques of spray fluids- High volume, low and ultra-low volume sprays - Compatibility of pesticides - Phytotoxic effects of insecticides - Safe use of pesticides - Symptoms of poisoning - First aid and antidotes for important groups of insecticides. Insecticide Act 1968-Important provisions - Insecticide resistance, resurgence and residues - Maximum Residue Limits (MRL) – Acceptable Daily Intake (ADI) – Safe waiting periods.

### References text books

1. Vasantharaj David, B. and Rama Murthy V.V. 2016. Elements of Economic Entomology, Popular Book Depot, Coimbatore.

2. Vasantharaj David, B and Aanathakrishnan, T.N. 2006. General and Applied Entomology. Tata McGraw-Hill Publishing House, New Delhi.

3. Metcalf, R.L. and Luckman, W.H. 1982. Introduction to Insect Pest Management. Wiley Inter Science Publishing, New York.

4. Atwal, A. S. and Bains, S.S. 1989. Applied Animal Ecology. Kalyani Publishers, New Delhi

5. Yazdani, S.S. and Agarwal, M.L. 1979. Elements of Insect Ecology. Narosa Publishing House, New Delhi.

6. Dhaliwal, G.S. and Ramesh Arora 2001. Integrated Pest Management: Concepts and Approaches, Kalyani Publishers Ludhiana

# MODEL QUESTION PAPER

Subject: Agriculture and Rural Developments Semester: III Course Title: Fundamentals of Entomology II (Insect Ecology & Concepts Of IPM) Course Code: ENTO231

Time: 3 Hrs

# SECTION-A

# Answer ALL questions

Max. Marks: 100

 $20 \times 1 = 20 \text{ M}$ 

1. By The Introduction Of Chlorine In 3 Position Of Methyl Parathion Aromatic Radical, The Insecticide Obtained Is:

- A. Ethyl parathion
- B. Malathion
- C. Chlorthion
- D. Fenitrothion

2 Cane killing weed (Striga sp.) in sugarcane is:

- A. weed
- B. pest
- C. disease
- D. None of these

3. Directorate of Plant Protection, Quarantine and Storage started in:

- A.1940
- B.1946
- C.1950
- D.1952
- 4. Cut worm is a pest of:
  - A. Arhar
  - B. Cowpes
  - C. Maize
  - D. Gram

5. In which order females have no pupal stage but males have:

- A. Mellophaga
- B. Strepsiptera
- C. Epemeroptera
- D. Dictyoptera
- 6. Which type of special reproduction is found in aphid?
  - A. Polyembryong
  - B. Paedogenesis
  - C. Parthenogenesis
  - D. Viviparity

7. Indiscriminate use of pesticides and cultivation of high yielding crop varieties often leads to:

A. A minor disease or insect pest problem becoming serious threat

- B. Destruction of natural enemies of pests
- C. Appearance of pesticides resistant pest strains
- D. All of the above
- 8. In case of rotary type of duster the air current is developed by:
  - A. Bellows
  - B. Fans
  - C. Self-propelling jacket
  - D. Self-propelling blades
- 9. Integrated Pest Management (IPM) aims at:
  - A. Keeping pest populations below injurious levels
  - B. Increasing natural enemies of the pest
  - C. Strengthening the host
  - D. Billing the pests
- 10.Who is often referred to as the 'Father of Animal Classification'?
  - A. Aristotle
  - B. Carolus Linnaeus
  - C. Wallace
  - D. Hugo de Varies.
- 11. dasineuralini is pest of:\_\_\_\_\_
- 12. Insect haemocoel consists of the following sinuses. Choose the odd one:\_\_\_\_\_
- 13. Insect haemolymph has no gas transport system except
- 14. Insect having prolegs in larval stage:\_\_\_\_\_
- 15. Insecticide having antagonistic effect with NPV\_\_\_\_\_\_

16.Inscticides approved by\_\_\_\_\_

17. Insects feeding on plants of several genera within a family are called:\_\_\_\_\_

18. Integrated Pest Management (IPM) aims at:\_\_\_\_\_\_

19. International Congress of Zoology (1901) advised that scientific names should be printed in:\_\_\_\_\_

20. Expand IPM\_\_\_\_\_

# SECTION-B

# Answer any **FOUR** questions

- 21. Explain about Formulations of insecticides?
- 22. Explain about Application techniques of spray fluids?
- 23. Explain Microbial control and Important groups of microorganisms
- 24. Explain Insecticide Act 1968 and Important provisions?
- 25. Explain about Insect Ecology?
- 26. Explain about Importance and ideal properties of insecticide?

# SECTION-C

# Answer any FOUR questions

 $4 \times 12 = 48$  M

27. Explain about Recent methods of pest control in IPM?

28. Explain about Application techniques of spray fluids?

29. Explain about Principles of host plant resistance in IPM?

30. Explain about Classification of insecticides based on origin, mode of entry, mode of action?

31. Explain about Microbial control –and Important groups of microorganisms

32. Explain about Components/tools of IPM?

 $4 \times 8 = 32$  M

Subject: Agriculture and Rural Developments Semester: III **Course Title: Fundamentals of Entomology II-Practical** Course Code: ENTO231P No. of Hrs:30

# Credits:1

# Objectives

- To study about influence of ecological factors on insect development.
- To study about the components of integrated pest management.
- To study about classification of insects.

# **Course Outcomes**

**CO1:** Students will understand about Biotic and biotic factors affecting insect ecology

**CO2**:Students will understand about pest survei lliance pest forecasting recent methods.

CO3:Students will understand about Beneficial insect and their mass multiplication

**CO4:** Students will understand about Atmospheric pressure and its effect on behavior.

**CO5**:Students will understand about Insect Ecology

# **EXPERIMENTS**

1 Sampling techniques for the estimation of insect population in different crops

2 Study of distribution patterns of insects in crop ecosystems

3 Techniques for the estimation of insect damage in different crops

4 Pest surveillance through light traps, pheromone traps and forecasting of pest incidence

5 Acquaintance of insecticide formulations

6 Calculation of doses/ concentrations of different insecticidal formulations

7 Compatibility of pesticides with other agrochemicals and phytotoxicity of insecticides

8 Acquaintance of mass multiplication techniques of important predators - Cryptolaemus.

9 Acquaintance of mass multiplication techniques of the egg parasitoid, Trichogramma

10 Acquaintance of mass multiplication techniques of Ha NPV and SI NPV  $% \left( {{\left( {{{\left( {{{\left( {{{}} \right)}} \right)}} \right)}} \right)} \right)$ 

# SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks
Subject: Agriculture and Rural DevelopmentSemester: IIICourse Title: Fundamentals of Plant Pathology-IICourse Code: PATH271No. of Hrs:15Credits: 1

#### Objectives

- To study about Pathogenesis
- To study about living entities that cause diseases in plants
- To study about mechanism by which the diseases causing agents
- To prevent and control of plant disease of economic importance

#### **Course Outcomes**

At the end of the course, students will be able to

**CO1:**Explain the history, concepts, patterns of survival and dispersal of plant pathogens.

**CO2**:Outline the phenomenon of infections and pathogenesis.

**CO3**:Summarize the principles of plant disease management and different defence mechanisms.

**CO4:**Explain methods of eradication for phytopathogens

## THEORY

## UNIT I (4hrs)

1. History of Plant Pathology with special reference to Indian workcontributions of Anton de Bary, Woronin, Oscar Brefeld, Marshal Ward, Millardet, Butler, Mundkur, Stakman, Dastur, Mehta, Sadasivan.

2. Terms and concepts used in plant Pathology - disease - disorder pathogen - parasite - pathogenicity - pathogenesis - sign - symptom syndrome - biotroph - hemibiotroph - perthotroph (necrotroph) inoculum - inoculum potential - infection - incubation period predisposition - hypersensitivity - epidemic - endemic and sporadic diseases.

3. Survival of plant pathogens - kinds of inoculum - primary and secondary inoculum - pattern of survival - infected host (main host, alternate host and collateral host) - saprophytic survival outside the host (soil, root inhabitants and rhizosphere colonizers) dormant spores or structures (seed borne, soil borne and on infected plant parts).

4. Dispersal of plant pathogens - active dispersal - seed, soil and plant parts, passive dispersal - air, water, members of animal kingdom (agents with examples), fungi and phanerogamic parasites.

## UNIT II (3)

1. Phenomenon of infection - process of infection - pre-penetration, penetration and post-penetration. Pre-penetration in fungi (spore germination, germ tube growth, formation of specialized structures like appressorium and rhizomorphs), bacteria and virus. Penetration indirect penetration through wounds or natural openings like stomata, hydathodes and lenticels - direct penetration through plant surface (cutinized and non cutinized surfaces) by chemical or mechanical methods.Post penetration - colonization of the host.

2. Pathogenesis - role of enzymes, toxins, growth regulators and polysaccharides in plant diseases with examples. Enzymes - cutinases, pectinases, cellulases, lignases, proteases and lipases.

3. Toxins - pathotoxins, phytotoxins and vivotoxins - selective (host specific) and non-selective (host non-specific) toxins. Growth regulators - growth promoting substances (auxins, gibberellins and cytokinins) and growth inhibiting substances and polysaccharides.

## UNIT III (2)

1. Defense mechanisms in plants - pre-existing structural defense mechanisms - waxes, thick cuticle and epidermal cell wall - structure of natural openings, internal structural barriers – postinfectional structural defense - histological defense (cork layer, abscission layer, tyloses and gum deposition) and cellular defense (hyphal sheathing) structures.

2. Biochemical defense mechanisms - pre-existing biochemical defense mechanisms - inhibitors released by the plant in its environment (protocatechuic acid and catechol) and inhibitors present in the plant cell (phenolic compounds - chlorogenic acid) – post infectional defense mechanisms - phytoalexins, hypersensitive reaction - defense through plantibodies.

3. General principles of plant disease management - importance general principles - avoidance of the pathogen (selection of pathogen free propagating material and seed, selection of field, choice of time of sowing and disease escaping varieties), - exclusion - plant quarantine and inspection, quarantine rules and regulations.

## UNIT IV (3hrs)

1. Eradication - cultural methods of eradication (rouging, eradication of alternate and collateral host, crop rotation, manure and fertilizer management, mixed cropping, sanitation, summer ploughing, soil amendments, time of sowing, seed rate and plant density, irrigation and drainage).

 Physical methods of eradication- solarization and hot water treatment; Biological methods - role of biological control - mechanisms
 competition, antibiosis, hyperparasitism, Systemic Acquired Resistance (SAR) and Induced Systemic Resistance (ISR).

 Important fungal and bacterial biocontrol agents (Trichodermaspp, Psuedomonasfluorescens, Bacillus subtilis and Ampelomycesquisqualis) - Plant Growth Promoting Rhizobacteria (PGPR) against phytopathogens.

## UNIT V (3hrs)

1. Contact and systemic fungicides against lower fungi, downy mildews, powdery mildews, rusts, smuts, coloured fungi, leaf spots and blights. Chemicals for soil drenching.

2. Mode of action and Formulations of fungicides, Antibiotics and their formulations.

3. Introduction to botanicals and other non-chemical preparations used in the disease management in organic and natural farming systems.

## References text books

- 1. Agrios, G.N. 2005.Plant Pathology. Elsevier Academic Press, New York.
- 2. Chaube, H.S. and Ramji Singh. 2001. Introductory Plant Pathology. International Book Distribution Co., Lucknow. 136
- 3. Mehrotra, R.S. 1980. Plant Pathology. Tata McGraw-Hill Publishing Co. Ltd., NewDelhi.
- Singh, R.S. 2002. Introduction to Principles of Plant Pathology. Oxford & IBH Publ. Co.Pvt. Ltd., New Delhi.
- 5. Vidyasekharan, P. 1993. Principles of Plant Pathology. CBS Publishers and Distributors, New Delhi.

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural Development Semester: III Course Title: Fundamentals of Plant Pathology II Course Code: PATH 271

Time: 3 Hrs.

#### Max. Marks: 100

#### SECTION-A

#### Answer ALL questions

 $20 \times 1 = 20 \text{ M}$ 

1. Fungi, Which Can Grow On Living Host Plant, Are Called

- A. Obligate saprophyte
- B. Obligate parasite
- C. Facultative parasite
- D. Saprophytes
- 2. Brown spot of maize is caused by:
  - A. Sclerosporasorghi
  - B. Physoderuszeamaydis
  - C. Alternariasolani
  - D. Cercosporaperfonats
- 3. Botulism is caused by species of:
  - A.Bacillus
  - B.Pseudomonas
  - C.Agrobacterium
  - D.Clostridium
- 4. Leaf roll of potato is transmitted by:
  - A. M. persicae
  - B. M. pseudosolani
  - C. M. circumflexum
  - D. All above

5. Bacterial leaf blight of rice caused by Xanthomonasoryzae can be identified by:

- A. Wilting of the plant
- B. Yellowing of leaves
- C. Ooze test
- D. Defoliation
- 6. Cocci are:
  - A. Spiral shaped
  - B. Spherical shaped
  - C. Rod shaped
  - D. None of the above

7. Powdery mildew fungi belong to the family:

- A. Erysiphaceae
- B. Hypocereaceae
- C. Hypomycetaceae
- D. Nectriaceae
- 8. Meloidogyne belongs to group of:
  - A. Ecotoparasite
  - B. Endoparasite
  - C. Semi-ectoparasite
  - D. Semi-endoparasite
- 9. In fermentation industry, pasteurization is done at \_\_\_\_\_ temperature:
  - A. 90.7 C
  - B. 100.0 C
  - C. 62.8 C
  - D. 80.0 C

10.Yellow pigment in the culture is produced by:

- A. Pseudomonas
- B. Xanthomononas
- C. Erwinia
- D. Agrobacterium
- 11. The nematodes are\_\_\_\_\_
- 12. Bacterial cell division mainly by \_\_\_\_\_
- 13. Rice blast pathogen perfect stage is\_\_\_\_\_
- 14. Downy mildew of pea caused by\_\_\_\_\_

15. Black heart is a physiological disorder of \_\_\_\_\_

16. The major storage fungi that effects the food grain is\_\_\_\_\_

17. Which one of the following microbial agents is being commercially exploited as biocontrol agent \_\_\_\_\_

18. Which Penicillium species used in 'Cheese' making \_\_\_\_\_

19. Application of potash increases\_\_\_\_\_

20. Viruses contain\_\_\_\_\_

## SECTION-B

# Answer any FOUR questions

21.Discuss in detail about different periods of plant pathology and scope of Plant Pathology in Agriculture.

22. Differentiate between the following:-

- a) Soil inhabitants and Soil invaders.
- b) Passive invaders and Active invaders.
- c) Host specific toxins and non-host specific toxins.
- d) Contact fungicides and systemic fungicides.

23. What is the first link in disease cycle? Explain about the different sources ofpathogens?

24. Write short notes on the following:-

- a) Penetration.
- b) Cellulose.
- c) Colonization.
- d) Phytotoxins.

25. Describe about the role of biochemical factors in host defence mechanisms?

26. Define fungicides? What are the different formulations of fungicides available commercially in market?

## SECTION-C

# Answer any FOUR questions

 $4 \times 12 = 48$  M

27. Give examples of the following and their uses:-

- a) Biocontrol agents.
- b) Inanimate agents.
- c) Phytoalexins.
- d) Growth inhibiting substances.

28. What is plant disease management and its principles and explain aboutAvoidance and Exclusion?

- 29. Explain about Eradication cultural methods of eradication?
- 30. Explain botanicals and other non-chemical preparations used in t the disease management in organic and natural farming systems?
- 31. Explain about General principles of plant disease management?
- 32. Explain Mode of action and Formulations of fungicides?

# $4 \times 8 = 32 \text{ M}$

Subject: Agriculture and Rural Development Semester: III **Course Title: Fundamentals of Plant Pathology-II-Practical** Course Code: PATH271P No. of Hrs:30

Credits:1

## Objectives

- To study Pathogenesis
- To study about living entities that cause diseases in plants
- To study about mechanism by which the diseases causing agents

## **Course Outcomes**

CO1: Students will understand about Survival of plant pathogens and kinds of inoculum primary and secondary inoculum, pattern of survival **CO2**:Students will understand aboutToxins - pathotoxins, phytotoxins and vivotoxins, selective (host specific) and non-selective (host nonspecific) toxins

CO3:Students will understand aboutDispersal of plant pathogens active dispersal

CO4: Students will understand aboutDefense mechanisms in plants pre-existing structural defense mechanisms

## **EXPERIMENTS**

1. Acquaintance with various laboratory equipment.

2. Preparation of culture media Potato Dextrose Agar (PDA) for fungi and Nutrient Agar (NA) for bacteria.

- 3. Isolation of fungal and bacterial pathogens.
- 4. Preservation of disease samples dry and wet methods.
- 5. Demonstration of Koch's postulates for fungi.
- 6. Demonstration of Koch's postulates for bacteria.
- 7. Study of different groups of fungicides and antibiotics.

8. Preparation of fungicides - Bordeaux mixture, Bordeaux paste and cheshunt Compound.

9. Methods of application of fungicides - soil application.

10. Methods of application of fungicides - seed treatment.

## SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

Subject: Agriculture and Rural DevelopmentSemester: IIICourse Title: Farm Machinery and PowerCourse Code: AENG251No. of Hrs:15Credits: 1

## Objectives

- To study about difference between EC engine and constructional details of IC engine.
- To study about Air cleaning and maintenance
- To study about secondary tillage implements and its constructional details
- To study about Familiarization with seed metering mechanism and its calibration.

## Course Outcomes

Upon completion of the course, students will be able to

**CO1:**Explain the working principles of different farm engines.

**CO2**:Outline the ignition and power transmission system of I.C engines.

**CO3:**Summarize ploughing,sowing,plant protection,harvesting and threshingequipment andseed cum fertilizer drills.

**CO4:**Explain dusters and tractor mounted equipments.

## THEORY

## UNIT I (3Hrs)

1. Farm power – Source of different farm power, advantages and disadvantages.

2. Internal combustion engine - Different components and their functions -Working principle of four stroke and two stroke cycle engine - Comparison between diesel and petrol engine - Difference between four and two stroke engines.

3. Terminology related to engine power - IHP, BHP, FHP, DBHP, compression ratio, stroke bore ratio, piston displacement, and mechanical efficiency - Numerical problems on calculation of IHP, BHP, C.R., stroke bore ratio, piston displacement volume.

4. Fuel supply and cooling system of I.C. engine – Types, components and their functions, working principle of forced circulation cooling system. **UNIT II (2Hrs)** 

1. Ignition and power transmission system of I.C engine – Types, components and their functions, working principle of battery ignition system.

2. Lubrication system of I.C. engine – Types, purpose, components and their functions, working principle of forced feed system - Tractors classification, types, points to be considered in selection of tractors, estimating the cost of operation of tractor power.

3. Tillage - Primary and secondary tillage - M.B. plough – Functions, constructional features, operational adjustments and maintenance.

#### UNIT III (5Hrs)

1. Disc plough – Functions, constructional details, operational adjustments and maintenance.

2. Numerical problems on M.B. plough and disc plough.

3. Harrows – Types, functions, operation of disc harrows - Cultivators – Rigid and spring loaded tynes - Puddlers, cage wheel, rotovators -Intercultural implements – Hoes and weeders for dry and wetland cultivation.

#### UNIT IV (2Hrs)

4. Sowing equipment - Seed cum fertilizer drills – Types, functions, types of metering mechanisms, functional components, calibration - Paddy transplanters.

5. Harvesting equipment – Sickles, self-propelled reaper, alignment and registration - Combines, functions of combines.

6. Plant protection equipment – Types of sprayers, constructional features of knapsack sprayer, hand compression sprayer, foot sprayer, rocker sprayer and power sprayer, care and maintenance of sprayers.

#### UNIT V (3Hrs)

1. Dusters – Hand rotary and power operated dusters, care and maintenance of dusters.

2. Tractor mounted equipments for land development and soil conservation – Functions of bund former, ridger, and leveling blade.

3. Threshing equipment and principles of combine harvester

#### **References Text Books**

1. JagadishwarSahay - Elements of Agricultural Engineering.

2. Surendra Singh. Farm Machinery - Principles and Applications. ICAR Publication.

3. S.C. Jain and C.R. Rai. Farm Tractor – Maintenance and Repair. Standard Publishers, 1705-B, NaiSarak, Delhi – 110006

4. Ojha, T. P. and Michael, A.M. Principles of Agricultural Engineering. Vol. I, Jain Brothers, 16/893, East Park Road, Karol Bagh, New Delhi – 110005

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IIICourse Title: Farm Machinery and PowerCourse Code: AENG251Time: 3 Hrs.Max. Marks: 100

SECTION-A

20×1= 20 M

Multiple Choice Questions

Answer **ALL** questions

- 2. A man can develop
  - A) 0.1 hp
  - B) 0.5 hp
  - C) 0.75 hp
  - D) 1.0 hp
- 3. The average force that a bullock can exert
  - A) 1/5th of their body weight
  - B) 1/10th of their body weight
  - C) 1/20th of their body weight
  - D) 1/25th of their body weight
- 4. Medium size bullock can develop
  - A) 0.50 to 0.75 hp
  - B) 0.75 to 1.0 hp
  - C) 0.75 hp to 1.1 hp
  - D) 1.0 to 1.5 hp
- 5. The thermal efficiency of diesel engine varies between
  - A) 25 and 32 per cent
  - B) 32 and 38 per cent
  - C) 32 and 40 per cent
  - D) 40 and 45 per cent
- 6. The thermal efficiency of petrol engine varies between
  - a) 25 and 32 per cent
  - b) 30 and 35 per cent
  - c) 32 and 38 per cent
  - d) 30 and 40 per cent
- The extra high-speed engines used in knapsack sprayers are powered by
  - a) Kerosene
  - b) Diesel
  - c) Petrol
  - d) Dual fuel

- 8. Broad base terrace is also known as
  - a) Bench terrace
  - b) Channel terrace
  - c) Drainage type terrace
  - d) None of the above
- 9. The velocity required to operate wind mill is more than:
  - a) 5 km ph
  - b) 10 km ph
  - c) 5 miles ph
  - d) 5 miles ph

10. Bench terracing is also called as \_\_\_\_\_

- a) Hill farming
- b) Staircase farming
- c) Erosion control farming
- d) None of these
- 11. The power produced from a wind speed 6.4 to 37 km ph by windmill varies from?
  - a) 0.1 to 0.5 hp
  - b) 0.1 to 0.9 hp
  - c) 0.5 to 1 hp
  - d) 1 to 9 hp

11.Mechanization possibility is strongly influenced by\_\_\_\_\_

12. The application of engineering and technology in agricultural operations to do a better way to improve productivity\_\_\_\_\_

13. When ploughing one hectare of land once by bullocks having 15 cm., furrow width, has to walk about (km)\_\_\_\_\_

14. The field capacity (ha/day) of traditional implements is about\_\_\_\_\_

15. Farmers depends upon the animal drawn implements (%) about\_\_\_\_\_

16. Energy efficient equipments are:\_\_\_\_\_

17. Tractor drawn rotovator is energy efficient equipments; it saves time (%)\_\_\_\_\_

18. Selection and use of farm machinery mainly depends upon:\_\_\_\_\_

19. Most of the farmers use threshers, which are operated by\_\_\_\_\_

20. Harvesting and threshing consumes, the total energy (%) for farming about\_\_\_\_\_

#### SECTION-B

#### Answer any **FOUR** questions

21. What is Farm power and write advantages and disadvantages?

22. What is Tillage write about Primary and secondary tillage?

23. Write functions, constructional details, operational adjustments and maintenance of disc plough?

24. Write short notes on Sowing equipment?

25. What are hand rotary and power operated dusters and explain about them?

26. What is fuel supply and cooling system of I.C. engine and write types, components?

#### SECTION-C

#### Answer any **FOUR** questions

#### $4 \times 12 = 48$ M

27. Write about Plant protection equipment and Types of sprayers?

28. Explain about harrows Types, functions, operation of disc harrows?

29. Write about Tractor's classification, types?

30. Briefly explain about Harvesting equipment?

31. Explain about types, components and their functions, working principle of forced circulation cooling system?

32. Explain about Intercultural implements like Hoes and weeders for dry and wetland cultivation

#### $4 \times 8 = 32$ M

Subject: Agriculture and Rural DevelopmentSemester: IIICourse Title: Farm Machinery and Power-PracticalCourse Code: AENG251PNo. of Hrs:30Credits:1

## Objectives

- To study about difference between EC engine and constructional details of IC engine.
- To study about Air cleaning and maintenance
- To study about secondary tillage implements and its constructional details

## Course Outcomes

**CO1:** Students will understand Internal combustion engine, Different components and their functions

**CO2**:Students will learn Ignition and power transmission system of I.C engine

**CO3:** Students will understand Sowing equipment, Seed cum fertilizer drills

**CO4**:Students will understand Comparison between diesel and petrol engine

**CO5:**Students will understand Types of sprayers, constructional features of knapsack sprayer, hand compression sprayer, foot sprayer, rocker sprayer and power sprayer, care and maintenance of sprayers.

## PRACTICALS

1. Showing the difference between EC engine and constructional details of IC engine.

2. Dismantling the IC engine and explaining the functional aspects of components.

3. Air cleaning and maintenance - Engine cooling and maintenance.

4. Familiarizing with lubrication and fuel supply system of an engine.

5. Familiarizing with clutch – Gearbox - Differential and final drive along with brake steering hydraulic control of tractor.

6. Familiarization with primary tillage implements like M. B. Plough, disc plough and its adjustments.

7. Study of secondary tillage implements and its constructional details -Emphasis on disc harrow, spike tooth harrow, blade harrow, rotavator, power harrow

- 8. Familiarization with seed metering mechanism and its calibration.
- 9. Study on planters and transplanters.

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

## SCHEME OF EVALUATION

# Subject: Agriculture and Rural DevelopmentSemester: IIICourse Title: Production Technology for Vegetables and SpicesCourse Code: HORT281

No. of Hrs:15 Cred

#### Credits: 1

## Objectives

- To study about production technology of vegetables and spices
- To know importance of vegetables and spices crops
- To understand the scientific cultivation methods of vegetables and spices
- To study classification of vegetables

#### Course Outcomes

At the end of the course, students will be able to

**CO1**:Classify and explain the importance of vegetables and spices in human nutrition and national economy.

**CO2**:Outline the agronomical practices for vegetables, fruits and spices.

**CO3**:Summarize physiological disorders of vegetables, fruits and spices

**CO4:**Explain disease and pest control and in vegetables, fruits and spices and seed production techniques.

## THEORY

## UNIT I (4hrs)

 Importance of vegetables and spices in human nutrition and national economy – Classification of vegetables - 1) Botanical 2) Based on Hardiness 3) Parts Used 4) Method of culture 5) Season.

2. Tomato- Botanical Name – Family – Origin – Area – Production-Improved varieties and cultivation practices such as time of sowing -Sowing - Transplanting techniques - Planting distance - Fertilizer requirements - Irrigation - Weed management - Harvesting - Yield -Storage - Physiological disorders - Disease and pest control and seed production.

3. Brinjal and Chilli - Botanical name – Family - Origin - Area -Production - Improved varieties and cultivation practices such as time of sowing - Sowing - Transplanting techniques - Planting distance - Fertilizer requirements - Irrigation - Weed management - Harvesting -Yield - Storage - Disease and pest control and seed production.

4. Okra and Leafy vegetables (Amaranthus and Gogu) - Botanical name – Family - Origin - area - Production - Improved varieties and cultivation practices such as time of sowing - Sowing - Planting distance - Fertilizer requirements - Irrigation - Weed management -Harvesting - Yield - Storage - Disease and pest control and seed production.

#### UNIT II (3hrs)

1. Cucurbits – Flowering, sex expression, sex ratio - Cucumber, Ridge gourd, Bitter gourd, Bottle gourd- Botanical name – Family - Origin -Area - Production - improved varieties and cultivation practices such as time of sowing - Sowing - Planting distance - Fertilizer requirements -Irrigation - Weed management - Harvesting - Yield - Storage -Physiological disorders - Disease and pest control and seed production.

2. Melons – Watermelon and Muskmelon - Botanical name – Family -Origin - Area - Production - Improved varieties and cultivation practices such as time of sowing - sowing - Planting distance - Fertilizer requirements - Irrigation - Weed management - Harvesting - Yield – Production of seedless watermelons - Storage - Physiological disorders - Disease and pest control and seed production.

3. Cole crops- Cabbage and Cauliflower -Botanical name – Family -Origin - Area - production - Improved varieties and cultivation practices such as time of sowing - sowing - Planting distance - Fertilizer requirements - Irrigation - Weed management - Harvesting - Yield – Storage - Physiological disorders - Disease and pest control and seed production.

#### UNIT III (3hrs)

1. Peas and beans (Cluster bean, French bean, Dolichos) - Botanical name – Family - Origin - Area - Production - Improved varieties and cultivation practices such as time of Sowing - sowing - Planting distance - Fertilizer requirements - Irrigation - Weed management - Harvesting - Yield –Storage - Physiological disorders - Disease and pest control and seed production.

2. Root crops (Carrot and Radish) - Botanical name – Family - Origin -Area - Production - Improved varieties and cultivation practices such as time of sowing - Sowing - Planting distance - Fertilizer requirements -Irrigation - Weed management - Harvesting - Yield - Storage -Physiological disorders (splitting, forking and cavity spot) - Disease and pest control and seed production.

3. Tapioca and Sweet potato - Botanical name – Family - Origin - Area - Production - Improved varieties and cultivation practices such as time of sowing - Sowing - Planting distance - Fertilizer requirements -Irrigation - Weed management - Harvesting - Yield - Storage -Physiological disorders - Disease and pest control and seed production.

#### UNIT IV (3hrs)

1. Perennial vegetables – Drumstick and Curry Leaf- Botanical name – Family - Origin - Area - Production - Improved varieties and cultivation practices such as time of sowing - Sowing - Planting distance -Fertilizer requirements - Irrigation - Weed management - Harvesting -Yield - Storage - Physiological disorders - Disease and pest control and seed production.

2. Bulb crops – Onion and Garlic - Botanical name – Family - Origin -Area - Production - Improved varieties and cultivation practices such as time of sowing - Sowing - Planting distance - Fertilizer requirements -Irrigation - Weed management - Harvesting - Yield - Storage -Physiological disorders - Disease and pest control and seed production.

3. Black pepper - Botanical name – Family - Origin - Introduction -Varieties - Climate- Soil – Systems of cultivation -propagation -Planting - Shade regulation - Training and pruning - Fertilizer requirements - Irrigation - Intercultural operations - Harvesting – Processing - Yield - Pests and diseases.

#### UNIT V (2hrs)

4. Cardamom - Botanical name – Family - Origin - Introduction - Varieties - Climatesoil –Systems of cultivation - Propagation - Planting
- Shade regulation – Fertilizer requirement - Irrigation - Intercultural operations - Harvesting – Processing - Yield - Pests and diseases.

5. Ginger and Turmeric – Botanical name – Family - Origin -Introduction - Varieties - Climate- Soil – Systems of cultivation -Propagation - Planting - Mulching – Fertilizer requirement - Irrigation - Intercropping - intercultural operations - Harvesting – Processing - yield - Pests and diseases – Preservation of seed rhizomes.

6. Cinnamon - Coriander and Fenugreek- Botanical name – Family -Origin - Area - Production - Improved varieties and cultivation practices such as time of sowing sowing - Transplanting techniques - Fertilizer requirements - Irrigation - Intercultural operations - Harvesting - Pests and Diseases

#### References text books

1. PranabHazra, A. Chattopadhyay, K. Karmakar and S. Dutta. 2010. Modern Technology in Vegetable Production. New India Publishing Agency, New Delhi.

2. Neeraj Pratap Singh, .2007. Basic Concepts of Vegetable Science. International Book Distributing Co. New Delhi. Academic Press, New Delhi.

3. Nempal Singh, Singh, D.K., Singh, Y.K. and Virendra Kumar. 2006. Vegetable Seed Production Technology. International Book Distributing Co. Lucknow.

4. Prem Singh Arya and S. Prakash 2002. Vegetables Growing in India. Kalyani publishers, New Delhi 5. Bose, T. K, Kabir, J., Maity T. K., Parthasarathy V. A., and Som M. G., 2002. Vegetable Crops Vol. II & III NayaProkash, Kolkata. 6. Shanmugavelu, K.G., N. Kumar and K.V. Peter 2005. Production Technology of Spices and Plantation Crops. Agrobios (India), Jodhpur.

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IIICourse Title: Production Technology for Vegetables and SpicesCourse Code: HORT281Time: 3 HrsMax. Marks: 100

#### SECTION-A

Answer ALL questions

 $20 \times 1 = 20 M$ 

1. Parents of Arkajyothi of water melon \_\_\_\_\_ A. IIHR-20 X Crimpson sweet B.IIHR-21 X Sugar baby C. IIHR-21 X Crimpson sweet D. IIHR-20 X Sugar baby 2. Drumstick is a native of \_\_\_\_\_ A .Asia B .southern India C.China **D.Tropical America** 3. Diploid chromosome number of cauliflower \_\_\_\_\_ A.12 B.18 C.16 D. 22 4. Carrot belongs to family \_\_\_\_\_ A. Solanaceae B. Cucurbitaceae C. Malvaceae D.Apiaceae 5. Scientific name of radish\_\_\_\_\_ A. Raphanus sativus B. H.canabinus C. H.indica D. None of the above 6. Example of monecious vegetable crops A .cucumber B. chilli C. okra D. All the above

7. Ridge gourd contains delightous compound called as

- A. Lutin
- B. Luffiein
- C. Lactin
- D. None of the above

8. PusaHimjyothi is the variety of \_\_\_\_\_\_

- A. Cabbage
- B. water melon
- C. Amaranthus
- D. Cauliflower

## 9. Seed rate of pole type variety in French bean

- A. 25-30kg/ha
- B. 35-40kg/ha
- C. 30-32kg/ha
- D. 20-30kg/ha

10. SL-120 variety of tomato released by \_\_\_\_\_

- a) IIHR
- b) IARI
- c) IVRI
- d) None of the above

11.The Horticulture word came from two Latin words where 'Hortus' and 'Colere' means\_\_\_\_\_

12. \_\_\_\_\_is the branch of horticulture that is concerned with the production, processing and storage of fruits.

13. The fruits that are under exploited fruits or minor fruits are \_\_\_\_\_

14. Olericulture is also known as \_\_\_\_\_

15 \_\_\_\_\_Is the branch of agriculture which deals with the features that involves utilization of vegetables, fruits and other plants.

16. Which of the following branch of horticulture do commercial cultivation of flowering plants that are economically important flowers\_\_\_\_\_

17. Which of the following is a large woody plant with main trunk and branches arise from upper part of main trunk

18. The woody ornamental plants inclu\_\_\_\_\_

19. Which branch is responsible for the cultivation, management and study of herbs, shrubs, vines and woody plants \_\_\_\_\_

20. Example of monecious vegetable crops

#### SECTION-B

## Answer any FOUR questions

 $4 \times 8 = 32$  M

- 21. Explain Production technology of onion?
- 22. Answer the following
  - I) Importance and uses of Bitter gourd
  - II) Cimate and soil conditions of bitter gourd
  - III) Time of sowing and spacing of bitter gourd
- 23. Write short notes on the following
  - I) Harvesting and Yield of Tomato
  - II) Manures and Time of sowing in brinjal
  - III) Write down any four varieties of cluster bean along with their characteristics?
- 24. Answer the Following
  - I) Intercultural operations and harvesting of muskmelon.
  - II) Seed rate and spacing of muskmelon.
  - III) Harvesting and yield of water melon.
- 25. Explain production technology of drumstick?
- 26. Explain production technology of cardamom?

## SECTION-C

## Answer any FOUR questions

 $4 \times 12 = 48$  M

- 27. Explain production technology of sweet potato?
- 28. Explain production technology of black pepper?

29. Explain Importance of vegetables and spices in human nutrition and national economy?

30. Explain the Classification of vegetables?

31. Explain Improved varieties and cultivation practices such as time of sowing sowing, Transplanting techniques of cinnom?

32. Explain about Improved varieties and cultivation practices such as time of sowing, Sowing, Planting distance, Fertilizer requirements, Irrigation, Weed management ,Harvesting

Subject: Agriculture and Rural DevelopmentSemester: IIICourse Title: Production Technology for Vegetables and Spices-PracticalCourse Code: HORT281P

No. of Hrs:30

Credits:1

#### Objectives

- To study about production technology of vegetables and spices
- To know importance of vegetables and spices crops
- To understand the scientific cultivation methods of vegetables and spices
- To study classification of vegetables

## **Course Outcomes**

**CO1**:Students will understand aboutorigin, and area climate, soil, improved varieties and cultivation practices

**CO2:** Students will understand aboutPhysiological disorders Disease and pest control and seed production.

**CO3:** Students will learn abouttransplanting techniques, Planting distance, Fertilizer requirements Irrigation, Weed management, Harvesting, Yield, Storage

**CO4:** Students will understand aboutOkra and Leafy vegetables (Amaranthus and Gogu) Botanical name, Family, Origin , area - Production

**CO5:** Students will understand about Importance of vegetables and spices in human nutrition and national economy

## EXPERIMENTS

- 1. Identification of vegetables and their seeds.
- 2. Identification of spices crops and their seeds.
- 3. Nursery raising techniques of vegetable crops.
- 4. Direct seed sowing and transplanting.
- 5. Study of morphological characters of different vegetables.
- 6. Study of morphological characters of different spices.
- 7. Physiological disorders of vegetable crops.
- 8. Intercultural operations in vegetable crops.
- 9. Fertilizers application methods.
- 10. Seed extraction methods in vegetables.

## SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

Subject: Agriculture and Rural DevelopmentSemester: IIICourse Title: Agricultural Finance and Co-OperationCourse Code: AECO241No. of Hrs:15Credits: 1

## Objectives

- To Determine most profitable level of capital use.
- To know the Optimum allocation of limited amount of capital among different enterprises.
- To Analyse of progress and performance of cooperatives using published data.
- To Analyse of progress and performance of commercial banks and RRBs during using published data.

## **Course Outcomes**

**CO1:**Explain the concepts of agricultural finance, principles of credit and credit analysis.

**CO2**:Outline social control and nationalisation, lead bank schemes and crop loan systems.

**CO3:**Outline the meaning and scope of financial inclusion and schemes and agencies for financing.

**CO4:**Summarize the role of various international bodies and features of crop insurance and agricultural projects.

**CO5:** Explain the objectives, functions and role of cooperatives in the agricultural sector.

## THEORY

## UNIT I (3Hrs)

1. Agricultural Finance - Meaning, definition, nature and scope - Significance - Micro and macro finance - Capital and credit problems, need and their importance in Agriculture.

2. Credit - Meaning and definition - Classification of credit based on different criteria with examples.

3. Credit analysis - Economic feasibility tests - 3 R's of credit analysis -Returns to investment - Repayment capacity - Meaning, causes of poor repayment capacity of farmers, suggestions to improve repayment capacity - Risk bearing ability - Meaning, sources of risk, means to strengthen RBA.

4. Five Cs of credit – Character – Capacity – Capital - Condition and Common sense - Seven Ps of credit - Principle of Productive purpose -Principle of personality - Principle of productivity - Principle of phased disbursement - Principle of proper utilization - Principle of payment and Principle of protection.

#### UNIT II (4Hrs)

1. Social control and nationalisation - Meaning, objectives and their importance - Privatisation of commercial banks - Need and importance for institutional sources and structure of agricultural lending from different sources.

2. Lead bank scheme - Origin, objectives, functions - District credit plan - Regional Rural Banks (RRBs) - Origin, objectives, functions — RRBs in Andhra Pradesh.

3. Crop loan system - Objectives, importance, features of crop loan system - Scale of finance - Meaning and estimation and role of district level consultative committee - Term loans – Objectives and meaning of unit costs, fixation of unit costs and NABARD guidelines.

#### UNIT III (3Hrs)

1. Financial inclusion - Meaning and importance - Micro finance - Meaning, importance, agencies providing microcredit banks, NBFCs, NGOs, and Govt. agencies - SHGs and their role in microfinance and bank linkages - Micro finance lending and control act in Andhra Pradesh - Objectives and important features.

2. Schemes for financing weaker sections - Differential interest rate (DIR) - Integrated rural development programme (IRDP) -Swarnajayanti gram swarozgaryojana (SGSY) - Self-help groups (SHGs) etc., Srinidhi, MUDRA.

3. Higher financing agencies - Reserve Bank of India (RBI) - Objectives and functions and role in agricultural development and finance. National Bank for Agricultural and Rural Development (NABARD) -Origin, functions, activities and role in agricultural development.

## UNIT IV (3Hrs)

1. World Bank (WB) - Objectives and functions -World Bank group institutions - role and functions of International Bank for Reconstruction and Development (IBRD) - International Development Agency (IDA) -International Finance Corporation (IFC), MIGA, ISID. 2. Crop insurance - Meaning and its advantages and limitations in application -Agricultural insurance company of India - Objectives and functions - Indemnity - Meaning, premiums and claims - Prime Minister's FasalBhimaYojana (PMFBY) - Salient features - Weather based crop insurance - Salient features and its importance.

3. Agricultural project - Meaning, characteristics of agril. projects, project cycle and explanation of different phases of project cycle - Basic guidelines for preparation of project reports.

#### UNIT V (2Hrs)

1. Co-operation - Meaning, Scope, importance and definition - Principles - Objectives of co-operation, significance of cooperatives in Indian agriculture.

2. Brief history of cooperative movement development in India - Recent developments in Indian cooperative movement - Short comings of Indian co-operative movement and remedies.

3. Agricultural Cooperative institutions in India - co-operative credit structure in India and Andhra Pradesh – Objectives and functions of state level (APCOB), district level (DCCB) and Village level (PACS) cooperative societies - Functions of marketing, consumer societies, multi-purpose cooperatives, farmers' service cooperative societies, dairy cooperatives - Andhra Pradesh mutually aided Co-operative Societies Act (1995) - Role of International Cooperative Alliance (ICA), National cooperative Union of India (NCUI), National Cooperative Development Council (NCDC).

#### **References Text Books**

 Johil S.S. and C.V. Moore. 1970. Essentials of Farm Financial Management. Today and Tomorrow Printers and Publishers, New Delhi.
 John, J. Hamptron.1983. Financial Decision Making: Concepts, Problems and Cases, of India. New Delhi.

3. Mamoria, C.B. and R.D. Saksena. 1973. Co-operatives in India. Kitab Mahal, Allahabad,

4. Mamoria, C.B. and Saxena. Agricultural Problems in India. Kitab Mahal, Allahabad

5. Mukhi, H R. 1983. Cooperation in India and Abroad. New Heights Publishers, New Delhi.

#### References Books

1. Muniraj, R. 1987. Farm Finance for Development, Oxford & IBH Publishing Company Ltd., New Delhi,

2. Subba Reddy, S. and P. Raghuram. Agricultural Finance and Management. Oxford & Publishing Company Private Ltd., New Delhi, 2005

 Subba Reddy, S., Raghu Ram., P., Sastry, T.V.N and Bhavani Devi,
 2016. Agricultural Economics. Oxford & IBH Publishing Company Private Ltd., New Delhi.

4. Pandey, U.K. Agricultural Finance in India.

5. William, G. Murray and Nelson Aarson, G. Agricultural Finance. The Iowa State University Press, Ames, Iowa state University press Ames, IOWA.

6. www.rbi.org 12. www. nabard. Org

7. <u>www.wb.org</u>

## MODEL QUESTION PAPER

Subject: Agriculture and Rural Development Semester: III

Course Title: Agricultural Finance and Co-Operation

Course Code: AECO241

Time: 3Hrs

Max. Marks: 100 M

## SECTION-A

## Answer ALL questions

 $20 \times 1 = 20 \text{ M}$ 

Multiple Choice Questions

- 1. In India, NABARD does not provide refinance to
  - A) Scheduled commercial bank
  - B) Regional rural banks
  - C) Export-import bank
  - D) State land development banks
- 2. The Rural Infrastructure Development Fund (RIDF) has been created under
  - a) Reserve bank of India
  - b) NABARD
  - c) Ministry of Agriculture
  - d) Ministry of Rural development
- 3. The best use of limited resources is studied under the law of \_\_\_\_\_
  - a) Substitution
  - b) Opportunity cost
  - c) Diminishing returns
  - d) All the above
- 4. Combination of crop production and milk production activities is an example of \_\_\_\_\_
  - a) Competitive
  - b) Complementary
  - c) Supplementary
  - d) None of the above
- 5. When TPP is maximum, the MPP will be
  - a) Maximum
  - b) Zero
  - c) Minimum
  - d) None of the above

- 6. Agricultural finance mainly concerns with \_\_\_\_\_
  - a) Utilization of funds
  - b) Acquisition of funds
  - c) Utilization and Acquisition of funds both
  - d) None of the above
- 7. co-operatives for tribes are called as \_\_\_\_\_
  - e) Multi-purpose societies
  - f) Savita
  - g) Lead Bank
  - h) Large agriculture multi-purpose Cooperative Societies
- 8. A farmer can increase his farm income by \_\_\_\_\_
  - a) Increasing production
  - b) Reducing cost of production
  - c) Both A and B
  - d) None of the above
- 9. The regulated market has been established by \_\_\_\_\_
  - a) Central government
  - b) District Municipal Corporation
  - c) State government
  - d) Panchayats
- 10. What is the most important source of money lending to farmers in rural areas?
  - a) Rural Banks
  - b) Local money lender
  - c) Nationalized banks
  - d) Cooperative agencies

11.The International Co-operative Alliance appointed a sub-committee in\_\_\_\_\_ for the first reformulation of Principles of Co-operative Sector.
12. For the second reformulation of Principles of Co-operative Sector, The International Cooperative Alliance appointed a sub-committee in\_\_\_\_\_

13. The International Co-operative Alliance revised the co-operative principles for the third time in its Manchester Congress in \_\_\_\_\_

14. \_\_\_\_\_has been compared to a "State within A State"
15\_\_\_\_\_plays an equalizing role as a welfare factor in a capitalistic economy.

16. \_\_\_\_\_. is a voluntary and democratic association of human beings, based on equality of control, opportunity, distribution and

mutuality for the promotion of their common interests as producers or consumers.

17\_\_\_\_\_ serves as an organizational instrument for the economically weaker producers-farmers, artisans or workers and consumers for strengthening themselves and protecting themselves against the exploitation by the stronger.

18. . The word\_\_\_\_\_literally means to work together or act together.

19. The I.C.A appointed a Commission in\_\_\_\_\_to ascertain how far the principles of the Rochdale as defined by I.C.A in 1937 are observed today and the reasons for any non-observance.

20. \_\_\_\_\_\_is based on the principle of self interest, maximization of profits and exploitation.

#### SECTION-B

#### Answer any **FOUR** questions

 $4 \times 8 = 32$  M

21. Define credit and write about classification of credit?22. Write about objectives and functions World Bank (WB)?

23. What is crop insurance? Write its advantages and limitations in application?

24. Write NABARD functions, activities and role in agricultural development?

25. Write short notes on schemes for financing weaker sections?

26. Briefly discus about history of cooperative movement development in India?

## SECTION-C

Answer any FOUR questions

#### $4 \times 12 = 48 \text{ M}$

27. Define Agricultural Finance? Write about Micro and macro financeCapital and credit problems, need and their importance in Agriculture?28. List out Agricultural Cooperative institutions in India and explainabout them?

29. What are the schemes for financing weaker sections list out and explain about them?

30. Write about five C's of credit?

31. Write role and functions of International Bank for Reconstruction and Development (IBRD) - International Development Agency (IDA) -International Finance Corporation (IFC), MIGA?

32. Write objectives and important features of Micro finance lending and control act in Andhra Pradesh?

Subject: Agriculture and Rural Development Semester: III Course Title: Agricultural Finance and Co-Operation-Practical Course Code: AECO241P

No. of Hrs:30

Credits:1

## Objectives

- To Determine the most profitable level of capital use.
- To know the Optimum allocation of limited amount of capital among different enterprises.
- To Analyse the progress and performance of cooperatives using published data.

## Course Outcomes

**CO1**:Students will understand Definitions of agricultural finance and meaning and significance of micro and macro finance.

**CO2:**Students will understand Credit analysis.

**CO3:** Students will understandSocial control and nationalisation.

**CO4:**Students will understand Origin, objectives, functions of RRBs in Andhra Pradesh.

**CO5:** Students will understand World Bank (WB) - Objectives and functions

## EXPERIMENTS

- 1. Estimation of credit requirement of farm business A case study.
- 2. Estimation of scale of finance Unit costs and KCC.
- 3. Determination of most profitable level of capital use.
- 4. Analysis of progress and performance of priority sector lending by commercial banks, Cooperatives, RRBs and non-institutional sources using published data. Working out different repayment plans with examples.
- 5. Lump sum repayment /straight-end repayment Variable or quasi variable repayment.
- 6. Amortized decreasing repayment plan and amortized even repayment plan.
- 7. Estimation of indemnity for crop insurance claims.

- 8. Visit and study of a commercial bank to acquire firsthand knowledge of their management, schemes and procedures of lending and sanction of loans.
- 9. Visit and study of a cooperative bank PACS/ DCCB to acquire firsthand knowledge of their management, schemes and procedures of lending and sanction of loans.
- 10. Visit and study of a cooperative society dairy/ consumers to acquire firsthand knowledge of their management, schemes and activities.

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### SCHEME OF EVALUATION

# Subject: Agriculture and Rural Development Semester: III Course Title: Fundamentals Of Agricultural Extension Course Code: AEXT291

No. of Hrs:30 Credits: 2

## Objectives

- To study Audio-visual aids Meaning, importance
- To study about Planning and preparation of extension literature Leaflet, folder, pamphlet, booklet, news stories and success stories.
- To study learn about Farmers' Training Centre (FTC).
- To study about Extension teaching methods

## **Course Outcomes**

At the end of the course, students will be able to

**CO1:**Explain the concepts and development of different types of extension education.

**CO2:** List and explain agriculture extension development programmes of GoI and new trends in agricultural extension.

**CO3**:Summarize different systems and schemes for community and rural development.

**CO4:**Examine programmes for social justice, women development and explain training in rural leadership, extension administration and also for professional qualification.

CO5:Outline different extension systems, communication models,

agricultural journalism, innovation and adoption processes.

## THEORY

## UNIT I (6Hrs)

1. Education - Meaning, definition and Types – Formal, non-formal and informal education.

Extension Education – Meaning, definition, concepts - Characteristics, scope and process.

- 2. Objectives and principles of extension education.
- 3. Extension programme planning Meaning, process, principles.
- 4. Extension programme planning Steps in programme development.
- 5. Extension systems in India.

6. Extension efforts in pre-independence era – Sriniketan, Marthandam, Sevagram, Firka Development Scheme, Gurgaon Experiment, etc.

## UNIT II (6hrs)

1. Extension efforts in post-independence era - Etawah pilot project, Nilokheri experiment etc.

2. Extension/Agriculture development programme launched by ICAR/Govt. of India – IADP, IAAP and HYVP.

3. Extension / Agriculture development programme launched by ICAR / Govt. of India – SFDA, MFAL and T & V System.

4. a) Extension / Agriculture development programme launched by ICAR / Govt. of India, KVK, ORP and ND.

b) IVLP.

5. a) Extension / Agriculture development programmes launched by ICAR / Govt. of India – NATP, ATMA, SREP, ATIC. b) NAIP.

6. New trends in agriculture extension – Privatization extension and cyber extension / e-extension.

## UNIT III (6hrs)

1. New trends in agriculture extension – Market led extension, farmerled extension, expert systems, etc.

2. Community development – Meaning, definition, concept and principles - Philology of C.D.

3. Rural development - Meaning, definitions, concept, characteristics, objectives, importance and problems in rural development.

4. Rural development launched by Govt. of India – National Extension Service (NES), Panchayat Raj Systems/ Democratic Decentralization and Panchayat Raj – Need.

5. Rural development launched by Govt. of India – Three tiers of Panchayat Raj system – Powers, functions and organization set up -Mandal system in Andhra Pradesh.

6. Social justice and poverty alleviation programmes – ITDA, IWDP and NERP.

## UNIT IV (6hrs)

1. Social justice and poverty alleviation programmes – IRDP, JRY, SGRY, SGSY and MGNREGP.

2. Women development programmes – ICDS, DWCRA, RMK, MSY, ANTWA and IKP.

3. Participatory Rural Appraisal (PRA)

4. Rural leadership - Meaning, definition and concept, types of leaders in rural context, roles of leaders and different methods in selection of a leader.

5. Training of leaders – Lay and professional leaders, advantages and limitations in using local leaders in Agricultural Extension.

6. Extension administration - Meaning, definition and concept, principles and functions - Monitoring and evaluation – Meaning, definition and concept, objectives - Types and importance and monitoring and evaluation of extension programmes.

7. Transfer of technology - Concept and models and capacity building of extension personnel farmers – Training – Meaning, definition, types of training – Pre-Service training - In-service, orientation, induction training, refresher training and training for professional qualification. **UNIT V (6hrs)** 

1. Training of farmers, farm women and rural youth – Farmers' Training Centre (FTC) - Objectives – Training organized - District Agricultural Advisory and Transfer of Technology Centre (DAATTC) – Objectives.

2. Extension teaching methods - Meaning, classification, individual, group and mass contact methods, media mix strategies and communication - Meaning and definition

 Functions of communication, models – Aristotle, Shannon, Weaver, Berlo, Schramm, J.P. Leagans, Rogers and Shoemaker, Litterer, Westley – Macleans and barriers to communication.

4. Agriculture journalism – Meaning – Scope – Importance -Characteristics of News – Factors determining the News value – Types of News and sources of News.

5. Diffusion and adoption of innovation - Meaning, definition, concepts and process and stages and Models of adoption process - Five (5) and Seven (7) stage models - Attributes of innovation - Relative advantage, compatibility, complexity, trialability - observability and predictability.

6. Innovation – Decision process – Meaning – Stages (Knowledge, persuasion, decision, implementation and confirmation) - Decision process – Meaning – Stages (Knowledge, persuasion, decision, implementation and confirmation) - Concepts - Dissonance – Rejection – Active rejection and passive rejection - Discontinuance – Replacement and disenchantment discontinuance – Over adoption – Rate of adoption and innovativeness.

7. Adopter categories and their characteristics - Factors influencing adoption process – Social, personal and situational.
#### References Text Books

- Adivi Reddy, A. 2006. Extension Eduation. Sree Lakshmi Press, Bapatla.
- Dahama, O.P. and Bhatnagar, O.P. 1999. Extension and Communication for Development. Oxford & IBH Private Limited, New Delhi/Mumbai.
- Ganesh, R., Mohammad Iqbal and Ananda Raja. 2003. Reaching the Unreached – Basics of Extension Education. Associate Publishing Company, New Delhi.
- 4. Jalihal, K.A. and Veerabhadraiah, V. 2007. Fundamentals of Extension Education and Management in Extension. Concept Publishing House, New Delhi.
- 5. Ray, G.L. 2006. Extension Communication and Management. NayaProkash/Kalyani Publishers, Kalkatta/Ludhiana.
- 6. Rayudu, C.S. 1997. Communication. Himalaya Publishing House, New Delhi.
- 7. Rogers, E.M. 2003. Diffusion of Innovation. Free Press, New Delhi.
- 8. Soma Sundaram, T. 1977. Producing Agricultural Information Materials. Kansas State University, USA and APAU, Hyderabad.

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IIICourse Title: Fundamentals of Agricultural ExtensionCourse Code: AEXT291Time: 3 Hrs.Max. Marks: 100SECTION-AAnswer ALL questions $20 \times 1 = 20$  M

1. Who is known as father of extension education?

- (a). J. P. Leagans.
- (b). Albert Mayer.
- (c). A. H. Saville.
- (d). E. Brunner.
- 2. Father of extension education in India is?
- (a). JawaharLal Nehru.
- (b). B. K. Roy.
- (c). Dr. K. N. Singh.
- (d). Non of the above.

3. Total numbers of basic paradigms in agricultural extension are?

- (a). 3.
- (b). 4.
- (c). 5.
- (d). 6.

4. Training and Visit system started in..

- (a). 1974.
- (b). 1973.
- (c). 1976.
- (d). 1975.

5. ICAR took part in agricultural extension in the year..

- (a). 1954.
- (b). 1964.
- (c). 1974.
- (d). 1984.

6. Agricultural extension has been described as..?

- (a). A system of out-of-school education for rural people.
- (b). A system of night school education for rural people.
- (c). A system of school education for rural people.
- (d). All of the above.

7. Which is related with agriculture extension.

- (a). Lorence act 1974.
- (b). Smith lever act 1914.
- (c). Hue act 1789.
- (d). Mayer act 1956.
- 8. Main objective of agricultural extension during colonial period was?
- (a). Supporting cultivation of fruit crops.
- (b). Supporting cultivation of flower crops.
- (c). Supporting cultivation of crops like rubber and indigo.
- (d). Supporting cultivation of vegetable crops.
- 9. Generation of agricultural extension can be divided in..?
- (a). 5 generation.
- (b). 3 generation.
- (c). 2 generation.
- (d). 4 generation.
- 10. Current generation of agricultural extension is?
- (a). 4th.
- (b). 3rd.
- (c). 2nd.
- (d). 5th.

11. R stands for\_\_\_\_\_ in SMCR model of communication.

12.\_\_\_\_\_is a suitable group contact method for developing skill.

13. Electronic media are referred to as\_\_\_\_\_ contact methods.

- 14. A laggard is otherwise called as \_\_\_\_\_a person.
- 15. The full form of IVLP is\_\_\_\_\_\_.
- 16. The Gurgaon Experiment was conducted \_\_\_\_\_\_in the year

17. In type of leadership, the entire decision rests on\_\_\_\_\_ the leader.

18. The word Evaluation has been originated from a Latin word\_\_\_\_\_.

19. A Plan of work is the listing of all by which \_\_\_\_\_\_objectives are to be achieved.

20. Privatized Extension Service was first tried in

the\_\_\_\_\_country.

#### SECTION-B

Answer any FOUR questions

 $4 \times 8 = 32$  M

21. Define Education and Types education?

- 22. Eplain about Transfer of technology?
- 23. Explain about Handling and use of audio visual equipments?
- 24. Explain about Group discussion?
- 25. Explain Training of farmers?
- 26. Explain about Functions of communication?

# SECTION-C

Answer any FOUR questions

 $4 \times 12 = 48$  M

- 27. Write Social justice and poverty alleviation programmes?
- 28. Explain Adopter categories and their characteristics?
- 29. What Diffusion and adoption of innovation?
- 30. Explain Agriculture journalism?
- 31. Explain Planning and preparation of extension literature?
- 32. Explain about KVK?

# Subject: Agriculture and Rural Development Semester: III Course Title: Fundamentals of Agricultural Extension-Practical Course Code: AEXT291P

No. of Hrs:30

Credits:1

# Objectives

- To study Audio-visual aids Meaning, importance
- To study about Planning and preparation of extension literature Leaflet, folder, pamphlet, booklet, news stories and success stories.
- To learn about Farmers' Training Centre (FTC).

# Course Outcomes

**CO1:** Students will understand about Education, Meaning, definition and Types

**CO2:** Students will understand Objectives and principles of extension education.

**CO3:** Students will understand Extension efforts in pre-independence era

**CO4**:Students will learn about Extension / Agriculture development programme launched by ICAR / Govt. of India

**CO5:** Students will understand New trends in agriculture extension

# EXPERIMENTS

1. Audio-visual aids – Meaning, importance and classification -Selection, planning, preparation, evaluation, presentation and use of audio-visual aids – Charts.

2. Selection, planning, preparation, evaluation, presentation and use of audio-visual aids – Charts, posters, flip charts, flash cards, plannel graphs.

3. Selection, planning, preparation, evaluation, presentation and use of audio-visual aids – Power point slides.

4. Planning and preparation of extension literature – Leaflet, folder, pamphlet, booklet, news stories and success stories.

5. Handling and use of audio visual equipments such as public address equipment (PAE) system and still camera and digital camera and Liquid

Crystal Display (LCD) Projector. 6. Group discussion - Simulated exercise

7. Visit to KVK.

8. Visit to Farmers' Training Centre (FTC).

9. Visit to District Agricultural Advisory and Transfer of Technology Centre (DAATTC).

10. Visit to study organization and functioning of DRDA, DWMA, ATMA, JDA Office and other development departments at district level. 13. Visit to a village to exercise PRA techniques

### SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

Subject: Agriculture and Rural Developments Semester: III **Course Title: Economics for Rural Development** Course Code: AERD 201 No. of Hrs:30 Credits: 2

#### Objectives

- To enable the students to understand Rural Environment.
- To enrich the students about components of the Rural Economy.
- To enable the students to understand occupational structure.

### **Course Outcomes**

At the end of the course, students will be able to

**CO1:**Explain the nature, scope and development of rural economics.

**CO2:** Outline the features of rural resources management in India.

**CO3:**Explain the different aspects of rural demography.

**CO4**:Outline the nature and structure of rural occupations and the concept of work participation rates.

**CO5:**Examine the phenomena of rural poverty and unemployment.

# THEORY

# Unit I (6Hrs)

Introduction to Rural Economics. Nature and Scope of Rural approach Economics. Inter-disciplinary of Rural Economics -Pre Components-Structure and Characteristics and Postindependence.

# **Unit II**: (6Hrs)

Rural Resources Management in India, Rural Resources –Nature-Types and Magnitude - Rural Resources, Management and Development, Application of Technology in Rural Development - Problems and prospects.

# **Unit III**:(6Hrs)

Rural Demography - Population Size - Sex and Age Composition-Density of Population, Population Problems and Challenges - Family Welfare Measures in Rural India.

# Unit IV : (6Hrs)

Rural Occupational Structure - Nature of Rural Occupations -Occupational Distribution in Rural India – The Concept of Work Participation Rates.

# Unit V: (6Hrs)

Rural Poverty and Unemployment - Rural Poverty-Meaning, Estimates, Causes and Consequences. Unemployment - Meaning, Types, Magnitude of Rural Unemployment, - Causes and Consequences.

# **References Text Books**

- 1. Vasant Desai: Rural Development in India, Himalaya Publishing House, Mumbai, 2012.
- 2. Dutt and Sundaram- Indian Economy, S.Chand Publications, New Delhi, 2013-07-02.
- 3. Mishra,S.K. and PuriV.K. Economics of Development and Planning, Himalaya Publishing House, Mumbai, 2012.
- 4. Mukundan, N.-Rural Development and Poverty eradication in India.
- 5. Katar Singh -Rural Development –Principles, Policies and Management.

# MODEL QUESTION PAPER

Subject: Agriculture and Rural Developments Semester: III Course Title: Economics for Rural Development Course Code: AERD 201 Time: 3 Hrs. Max. Marks: 100

# SECTION-A

### Answer ALL questions

#### $20 \times 1 = 20 \text{ M}$

- 1. Which among the following is an initiative taken for the development of rural India?
  - (A) Human Capital Formation
  - (B) Land Reforms
  - (C) Poverty Alleviation
  - (D) All of these
- 2. What was the growth rate of agricultural output during 2007-12?
  - (A) 32% per annum
  - (B) 6% per annum
  - (C) 1.5% per annum
  - (D) 5% per annum
- 3. When was the National Bank for Agricultural and Rural Development set up?
  - (A) 1962
  - (B) 1972
  - (C) 1982
  - (D) 1992
- 4. Which of the following is an institutional source of rural credit?
  - (A) Moneylenders
  - (B) Regional Rural Banks
  - (C) Traders
  - (D) Landlords
- 5. Which source of credit had emerged to fully integrate the formal credit system into the overall rural social and community development?
  - (A) Self-help Groups
  - (B) Regional Rural Banks
  - (C) Commercial Banks
  - (D) Land Development Banks

- 6. Which among the following is a process that involves the assembling, storage, processing, transportation, packaging, grading, and distribution of different agricultural commodities across the country?
  - (A) Agricultural Management
  - (B) Agricultural Banking
  - (C) Agricultural Diversification
  - (D) Agricultural Marketing
- 7. Which Indian state has been held as a success story in the efficient implementation of milk cooperatives?
  - (A) Punjab
  - (B) Gujarat
  - (C) Uttar Pradesh
  - (D) West Bengal
- 8. What is the name of the vegetable and fruit market in Andhra Pradesh?
  - (A) Apni Mandi
  - (B) Hadaspar Mandi
  - (C) Rythu Bazars
  - (D) Uzhavar Sandies
- 9. How much do the "inland sources" contribute to the total fish production in India?
  - (A) 64 percent
  - (B) 39 percent
  - (C) 50 percent
  - (D) 75 percent
- 10. Which status has been accorded to the retail chains and supermarkets for selling organic food?
  - (A) Eco Status
  - (B) Sustainable Status
  - (C) Nutritional Status
  - (D) Green Status
- 11. In which state the percentage of people living below poverty line is the largest\_\_\_\_\_
- 12. A person living in Urban area is considered to be below poverty if his monthly income if below \_\_\_\_\_
- 13. \_\_\_\_\_ is the mean distance below the poverty line expressed as a proportion of poverty\_\_\_\_\_

14. "A circular constellation of forces tending to act and react upon one another in such a way to keep a poor country in a state of poverty" is a description of \_\_\_\_\_

15. Relative poverty reveals the \_\_\_\_\_ of income.

- 16. According to 1999 2000 prices, \_\_\_\_\_ % of India's population lived below poverty line.
- 17. According to the World Bank Report \_\_\_\_\_% of India live below poverty line.
- 18. \_\_\_\_\_ poverty is found even in the rich countries.
- 19. As per the newspaper reports, Standard & Poor's (S&P) has
- 20. Life expectancy at birth according to 2011 census is

\_\_\_\_·

# SECTION-B

# Answer any FOUR questions $4 \times 8 = 32$ M

- 21. Explain three non-farm areas of employment for rural population.
- 22. Why is it important to develop proper storage facilities in rural areas?
- 23. Why is agricultural diversification essential for sustainable livelihoods?
- 24. Explain the importance of selfhelp groups (SHGS) in rural areas.
- 25. What do you understand by the term 'distress sale'?
- 26. How are credit and marketing significant for the progress of agriculture?

# SECTION-C

Answer any FOUR questions 4×12 = 48 M

- 27. Mention any two non-farm activities which should be developed in rural areas.
- 28. Why is rural development important in India?
- 29. Why does a farmer need risk management and insurance?
- 30. What is contribution of marine and inland sources to total fish production?
- 31. Explain Introduction to Rural Economics?
- 32. Explain Rural Poverty and Unemployment in India?

Subject: Agriculture and Rural Development Semester: III Course Title: ECO-PHYSIOLOGY Course Code: CPHY261 No. of Hrs:15 Credits: 1 Objectives

- To study about relation between environment and the functioning of the live organisms
- To study about how life process depend on the environment at different levels.
- To study about connection between life process in the context.
- To study about different life conditions in different environment.

# Course Outcomes

At the end of the course, students will be able to

**CO1:**Explainconcepts and components of ecophysiology and its influence on crop distribution.

**CO2**:Outline the impact of different environments on biotic and abiotic components.

**CO3**:Distinguish betweeniconic and osmotic balance and types of competition in agriculture cropping.

**CO4:** Explain the scope of allelopathy and phyto-remediation in agriculture

**CO5**:Summarize the sources, effects of pollution, global warming on agricultural field crop productivity.

**CO6:** Examine aspects of controlled environment and different models of environment management.

# THEORY

# UNIT I (4hrs)

- Ecophysiology Introduction Definition Importance in agriculture and horticulture – Ecosystem – Definition of ecosystem, ecotypes and ecads – Biosphere and ecosystem – Sub divisions of biosphere – Pathways of energy in the biosphere – Concept of ecosystem – Components of ecosystem – Basic structure of ecosystem.
- Different types of ecosystem Freshwater, marine, forest and crop ecosystem – Energy in ecosystem – Productivity – Primary production – Secondary production – Types of food chains.

- Global climates and crop distribution Influence of climate on crop distribution (rice, wheat, maize, sorghum and sugarcane) – Important climatic regions of the world – Agro-climatic zones of India – Crop distribution in India and Andhra Pradesh.
- Environment Definition Components Biotic and abiotic environments – Biotic environment – Biotic factors and anthropic factors – Abiotic environment – Climatic, edaphic, physiographic and pyric factors – Climatic factors – Radiation – Effect of radiation on plant functions –Classification of ultraviolet (UV) radiation – Effects of UV-B radiation.

# UNIT II (3hrs)

- Abiotic environment Climatic factors Precipitation Forms of precipitation – Effect of water deficit and water logging on plant processes – Temperature – Cardinal temperature – Effects of temperature on plant processes – Temperature injuries – High temperature and low temperature stress – Classification of plants based on heat resistance and cold resistance – Heat units.
- Edaphic factors Classification of plants based on adaptation to different soil types – Halophytes and salt stress tolerance mechanisms.
- 3. Physiographic factors Altitude of the place, steepness of the slope, direction of mountain chain and exposure of the slope to light and wind Effects of topographic factors on vegetation Wind effect on physiological processes Pyric factors sources and type of fires Effects of fire on vegetation and environment management of fires and rejuvenation of crops.

# UNIT III (3hrs)

- Biotic factors Herbivores (grazing effect), symbiosis (Mycorrhiza and Rhizobium associations), insectivorous plants, epiphytism and parasites - Anthropic factors – Industrialization – Shifting cultivation – Crop improvement.
- 2. Physiological approaches for climate resilient agriculture.
- Competition Ecological succession Dominance and subordination – Types of competition – Inter-specific, intraspecific and intra-plant competition – Monoculture and polyculture – Multistoried cropping system – Mutual shading.

# UNIT IV (2hrs)

- Allelopathy Definition Concept Sources of allelopathic chemicals in crop and weed species – Natural products identified as allelopathic chemicals – Mode of action – Scope for allelopathy.
- Phyto-remediation Definition Concept Applications in agriculture and industry.
- Pollution Air pollution Sources Physiological effects on plants and its Management - Water pollution – Sources – physiological effects on plants and its Management - Soil pollution – Sources – Physiological effects on plants and its Management

# UNIT V (3hrs)

- Global warming Greenhouse effect Causes of global warming – Methane, carbon dioxide, chlorofluoro carbons' (CFC), nitrous oxide (NO) gas and ozone – Impact of global warming on climate and agricultural productivity – Measures to reduce build-up of greenhouse gases.
- Controlled environment Purposes Types Designs of structure – Commercial applications.
- Carbon dioxide fertilization Definition Concept Importance – Sources – Methods of CO2 fertilization – Effects on crop yields and limitations - Eco physiological models - Concept – Models for different environmental management.

# **References Text books**

- Agrwal, A. K. and Deo, P.P. 2013. Plant Ecology. Agrobios (India) Jodhapur
- 2. Varshneya, M. C and Balakrishna Pillai, P. 2006. Textbook of Agricultural Meteorology. ICAR, New Delhi
- Lenka, S., Lenka, N.K., Kundu, S and Subba Rao, A. 2013. Climate change and Natural Resources Management, New India Publishing Agency, India
- 4. Prasad and Kumar. 2010. Green House Management for Horticulture Crops. Agrobios, Jodhpur.
- 5. Schulze, E.C., Beck, E and Muller-Hohenstein, K. 2005. Plant Ecology. Springer Science & Business Media, New York City

- B) Rain
- C) Hail
- D) Sleet
- 7) Example of chilling sensitive plant
- A) Rice
- B) peanuts
- C) Valencia
- D) algae
- 8) Base temperature for rice
- A) 10-15 °C
- B) 4-5 °C
- C) 8-10 °C
- D) 15-20 °C
- 9) Plants growing in acid soils are known as
- A) Halophytes
- B) Psammophytes
- C) Lithophytes
- D) Oxalophytes
- 10) The following plants fall under heat sensitive plants
- A) Submerged vascular plants
- B) BGA
- C) bacteria
- D) fungi
- 11. The natural residence of every organism is known as\_\_\_\_\_
- 12. What is the name of the feature that allows organisms to survive in the conditions of its habitat\_\_\_\_\_
- 13. Shelford'slaw of tolerance is named after\_\_\_\_\_
- 14. Shelford's law of tolerance suggests that organisms with a wide tolerance limit for environmental factors show\_\_\_\_\_
- 15. Wide variety of living organisms is called\_\_\_\_\_
- 16. Animal adopt a similar state like sleep to reduce their metabolic rate, it is called\_\_\_\_\_
- 17. Hyenas and Vultures are \_\_\_\_\_.
- 18. A mutual relationship between two organisms, where both of them are benefitting from watch other is called\_\_\_\_\_
- 19. Which is not a feature ofheliophyte \_\_\_\_\_
- 20. Which of the following is not a feature of 'r' selected

species\_\_\_\_\_

#### SECTION-B

#### Answer any FOUR questions

#### $4 \times 8 = 32$ M

- 21. Classify the plants based on soil types and write in detail.
- 22. Write the importance of eco-physiology in Agriculture and Horticulture.
- 23. Explain about Global warming and Greenhouse effect
- 24. Explain about Physiological approaches for climate resilient agriculture.
- 25. Explain controlled environment Purposes and Types.
- 26. Explain about Pollution, Air pollution and Physiological effects on plants and its Management

### SECTION-C

### Answer any FOUR questions

 $4 \times 12 = 48$  M

- 27. Write about the halophytes and salt tolerant mechanisms in plants.
- 28. Write about biosphere and its components.
- 29. Write in detail about crop ecosystem.
- 30. Write the classification of environmental factors and effects of UV-B radiation on plants.
- 31. Write about the effect of water deficit on vegetation
- 32. Discuss the effects of temperature on plant processes.

# PRACTICAL SYLLABUS

Subject: Agriculture and Rural Development Semester: III **Course Title: Eco-Physiology-Practical** Course Code: CPHY261P No. of Hrs:30 Credits:1

# Objectives

- To study about relation between environment and the functioning of the live organisms
- To study about how life process depend on the environment at different levels.
- To study about connection between life process in the context.

# **Course Outcomes**

**CO1**:Students will understand about Basic principles of physiology and environment

**CO2**:Students will learn about control mechanism and environment.

**CO3**:Students will understand about impact of different environments on life processes

CO4: Students will understand about Iconic and osmotic balance **CO5**:Students will understand about water, cell membrane channels and transport

**CO6:** Students will understand about Respiration and circulation.

# **EXPERIMETS**

1. Hydrophytes - Morphological and anatomical adaptations to Excess

2. Mesophytes - Morphological and anatomical adaptations to mesic conditions

3. Xerophytes - Morphological and anatomical adaptations to Water deficit

- 4. Effects of light and shade on crop growth
- 5. Influence of different soils on crop growth
- 6. Analysis of competition in crop plants
- 7. Measurement of microclimate in contrast crop canopies
- 8. Effect of dust pollution on crop growth
- 9. Effect of soil pollution on crop growth

# SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

Subject: Agriculture and Rural Development	Semester: III
Course Title: Bee Keeping	
Course Code: SDCBK	
No. of Hrs:30	Credits: 0+2
Course Outcomes: Attheendofthecourse, the students will be able to	
CO1. Identify suitablespeciesandracesofbeesforBeekeeping	
CO2. Identify the different types of tools/equipments required fo management	r insect and diseases
CO3. Summarize theBeehivesinascientificway	
CO4 Analyze the different harvest procedures and marketing	
Syllabus	
UNIT-I	
IntroductiontoBeeKeeping	
History,Presentscenario&scope	
Selectionofbeespecies&races	
Identificationofflora andlocationofsite	

#### UNIT-II

Procurementofbeeboxand othertools Building&divisionof combandcolony Manageinsectsanddiseases

#### UNIT-III

Knowledgethescientificmethodsofbeekeeping BeeBoxesMaintenance

#### UNIT-IV

Rawproductionatdifferentlifestagesof bees Collection andpreservationofhoney **UNIT-V** Harvest, process and market the produce

# SEMESTER - IV

Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Crop Production Technology–II (Oil Seeds, Fiber,<br/>Sugar, Tobacco And Fodder Crops)Course Code: AGRO202No. of Hrs:30Credits: 2

Objectives

- To study about Land preparation and layout of plots
- To study about Different types of sowing methods
- To Identify plant characteristics of oil seeds, fiber, sugar crops and fodder crops
- To Collect post-harvest data on the crop.

#### **Course Outcomes**

At the end of the course, students will be able to

**CO1:**Explain the cultivation of oil seed crops and their importance in Indian economy.

**CO2**:Outline the cultivation of fibre crops and their importance in Indian economy.

**CO3:** Summarize agronomical practices for sugar and tuber crops and their contribution to the Indian economy.

**CO4:** Discussfarming practices for tobacco crops and their significancein the Indian economy.

**CO5:** Explain the cultivation of forage crops and their importance.

#### Theory

#### UNIT -1 (6 Hours)

1. Importance of oilseed crops- edible and non – edible oils – nutritional value importance in Indian economy- constraints in oilseed production.

2. Need for improvement of productivity and production of oilseeds climate resilient technologies- Groundnut – Origin - geographical distribution -area, production and productivity in India and Andhra Pradesh- economic importance

3. Soil and climatic requirements - types - growth stages - land Preparation -seeds and sowing- seed treatment-seed rate-spacingseason-time and method of sowing varieties 4. Water management -weed management- yield attributes -yieldharvesting, postharvest operations- quality considerations -cropping systems - value addition in groundnut.

5. Soybean-Origin - geographical distribution and productivity in India and Andhra Pradesh - economic importance- soil and climatic requirements Land preparation - seeds and sowing-seed viability - seed treatment-seed rate spacing-season-time and method of sowingvarieties -nutrient management- water management

6. Sunflower – Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance- soil and climatic requirements Land preparation - seeds and sowing-seed treatment-seed rate-spacing-season-time and method of sowing-varieties -nutrient management-water management-weed management - yield attributes -yield- harvesting- post harvest operations- quality considerations – seed production-seed setting problems and measures-cropping systems.

#### UNIT -II(6 Hours)

1. Sesame – Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance- soil and climatic requirements Land preparation - seeds and sowing- seed treatment-seed rate-spacing-season-time and method of sowing-varieties - nutrient management- water management- weed management yield attributes -yield- Harvesting - post harvest operations- Quality considerations - cropping systems.

2. Rapeseed and mustard – Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance- soil and climatic requirements-Land preparation - seeds and sowing- seed treatment-seed rate spacing-season-time and method of sowing- varieties.

3. Nutrient management- water management- weed management yield attributes – yield- Harvesting – post harvest operations- quality considerations – cropping systems.

4. Safflower – Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance- soil and climatic requirements Land preparation - seeds and sowing- seed treatment-seed rate-spacing-season time and method of sowingvarieties - nutrient management- water management weed management - yield attributes -yield- harvesting - post harvest operations quality considerations - cropping systems.

5. Castor – Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance- soil and climatic requirements Land preparation - seeds and sowing- seed treatment-seed rate-spacing-season time and method of sowing-varieties –nipping- nutrient management- water management- weed management - yield attributes –yield- harvesting – post harvest operations- quality considerations – cropping systems.

6. Linseed- Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance- soil and climatic requirements Land preparation - seeds and sowing- seed treatment-seed rate-spacing-season pyra /utera, time and method of sowing- varieties - nutrient management- water management- weed management - yield attributes -yield- harvesting - post harvest operations- quality considerations - cropping systems.

7.Niger - Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance- soil and climatic requirements Land preparation - seeds and sowing- seed treatment-seed rate-spacing-season time and method of sowingvarieties - nutrient management- water management weed management - yield attributes -yield- harvesting - post harvest operations quality considerations - cropping systems. Fibre crops: Cotton, Jute and Mesta

#### UNIT-III (6 Hours)

1. Cotton- Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importanceclassification- soil - climatic requirements- land preparation - seeds and sowing- seed treatment-seedrate spacing-season-time and method of sowing.

2. Varieties/ Bt cotton - growth stages – branching- nutrient management - water management- weed Management- topping- bud and boll shedding

3. Yield attributes -yield- harvesting-defoliants-mechanized harvesting
quality considerations -cropping systems- climate resilient
technologies

4. Jute- Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance- - soil

- climatic requirements- types of jute- - land preparation - seeds and sowing- seed treatment-seed rate-spacing season-time and method of sowing- varieties - nutrient management - water management- weed management-yield attributes - yield- harvesting - processing of jutequality considerations- cropping systems.

6. Mesta – Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance- - soil - climatic requirements types of mesta - land preparation - seeds and sowing- seed treatment-seed rate spacing-season-time and method of sowing- varieties - nutrient management - water management- weed management-yield attributes -yield- harvesting -processing of mesta-quality considerations- cropping systems. Sugar crops- Sugarcane and Sugarbeet

7. Sugarcane – Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance - soil climatic requirements– Influence of rainfall, temperature, light- land preparation –planting time in Coastal and Rayalseema regions of AP

### UNIT -IV (6 Hours)

1. Planting material – setts – short crop – nursery crop – different methods of planting – growth stages

2. Nutrient Management – crop logging- trash mulching – wrapping and propping water management- weed management- criteria for judging maturity- climate resilient technologies

3. Ratoon cane management – factors affecting quality of sugarcane – arrowing– jaggery making – clarification.

4. Sugar beet – Origin - geographical distribution - area, production and productivity in India - economic importance- soil - climatic requirements - Land preparation seeds and sowing- seed treatmentseed rate-spacing-season-time and - nutrient management - water management- weed management- yield attributes -yield harvesting quality considerations- cropping systems

5. Tobacco –Origin - geographical distribution - area, production and productivity in India and Andhra Pradesh - economic importance - soil - climatic requirements– types of tobacco-Land preparation

6. Nursery management-seeds and sowing for different types- seed treatment-seed rate-spacing-season-time and method of sowing

#### UNIT – V(6 Hours)

1. Varieties - nutrient management - topping and desuckering-water management weed management- yield attributes -yield- harvesting - priming-curing

2. Quality characters-nicotine content, burning quality, aroma and sugar content methods of curing -flue curing of Virginia tobacco - cropping systems

3. Forage crops- Importance- terminology in forage productionclassification of fodders-sorghum and maize importance-seeds and sowing - nutrient requirement irrigation- weed management- harvesting -yield- quality of fodder.

4. Cowpea, cluster bean - napier grass - importance- seeds and sowing -nutrient requirement- irrigation- weed management- harvesting -yield- quality of fodder.

5. Lucerne, berseem, oat – importance- seeds and sowing -nutrient requirement irrigation- weed management- harvesting –yield quality of fodder.

6. Forage crops- Quality considerations- preservation of fodder – hay and silage making Other crops: Potato

7. Potato - Origin - geographical distribution - area, production and productivity in India - economic importance- - soil - climatic requirements - varieties - soil - climatic requirements - land preparation - seeds and sowing- seed treatment-seed rate spacingseason-time and - nutrient management - water management- weed management- yield attributes -yield- harvesting - quality considerations- cropping systems

#### References text books:

- 1. Reddy, S.R. and ReddiRamu. 5th edition, 2016. Agronomy of field crops. Kalyani publishers, Ludhiana.
- 2. Chidda Singh, Singh, P and Singh, R. 2003. Modern techniques of raising field crops. Oxford & IBH Publishing house, New Delhi.
- 3. Rajendra Prasad. 2004. Text book of field crops production. Commercial crops, volume-II, Technical Editor, ICAR, New Delhi.
- 4. Panda S.C.2014. Agronomy of fodder and forage crops, Kalyani publishers, Ludhian

# MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Crop Production Technology–II (Oil Seeds, Fiber,<br/>Sugar, Tobacco And Fodder Crops)Image: Course Code: AGRO202No. of Hrs:30Credits: 2

#### SECTION-A

#### Answer ALL questions

#### $20 \times 1 = 20 \text{ M}$

- 1. The most cultivated crop in India among cereals
  - A) Rice
  - B) Wheat
  - C) Maize
  - D) Sorghum
- 2. Protein % in wheat
  - A) 10-12 %
  - B) 40-60%
  - C) 90-100 %
  - D) 20-30%
- 3. Wheat is also known as
  - a) king of cereals
  - b) minister of cereals
  - c) queen of cereal
  - d) poor man's cereal
- 4. Indian Institute of wheat and barley is situated in
  - a) Ghaziabad, Uttar Pradesh
  - b) Bhubaneswar, Odisha
  - c) Dharwad, Karnataka
  - d) Karnal, Haryana
- 5. Production of wheat is \_\_\_\_\_ million tonnes in India
  - a) 79
  - b) 85
  - c) 69
  - d) 200

6. Highest productivity of wheat is in \_\_\_\_\_ state of India

- a) West Bengal
- b) Punjab
- c) Maharashtra
- d) Odisha

- 7. Ideal fertilizer dose for wheat is
  - a) 140:80:60
  - b) 120:60:40
  - c) 120:60:40
  - d) None of the above
- 8. Mention the Rabi season pulse
  - a) Chick pea
  - b) Green gram
  - c) Red gram
  - d) Soyabean
- 9. Origin of wheat
  - a) South east asia
  - b) South west asia
  - c) America
  - d) India
- 10. Family of wheat
  - a) Grammineae
  - b) Leguminacea
  - c) Triticeae
  - d) Malvaceae
- 11. Common wheat is \_\_\_\_\_
- 12. Centre of origin of barley \_\_\_\_\_
- 13. The inflorescence of barley is called as \_\_\_\_\_
- 14. Shoot of barley is called as \_\_\_\_\_
- 15. Most critical stage of irrigation of chick pea \_\_\_\_\_
- 16. Chick pea belongs to the family \_\_\_\_\_
- 17. An ideal temperature for sowing of chick pea is \_\_\_\_\_
- 18. Lentil seed contains \_\_\_\_\_% of protein
- 19. Pea is commonly known as \_\_\_\_\_
- 20. Ideal temperature for germination of pea is \_\_\_\_\_

#### SECTION-B

#### Answer any FOUR questions

- 21. Write importance of Importance of oilseed crops edible and non edible oils?
- 22. Write about Quality characters nicotine content, burning quality, aroma and sugar content methods of curing flue curing of Virginia tobacco?
- 23. Write production technology of potato?
- 24. Explain about classification of fodders?
- 25. Write short notes on quality considerations- cropping systems for Sugar crops?
- 26. Write about land preparation seeds and sowing, seed treatment seedrate spacing-season-time and method of sowing of cotton?

#### SECTION-C

### Answer any FOUR questions

 $4 \times 12 = 48$  M

- 27. Write production technology of cowpea and cluster bean?
- 28. Write production technology of jute?
- 29. Explain criteria for judging maturity for different agricultural crops?
- 30. Write about Ratoon cane management factors affecting quality of sugarcane arrowing jaggery making clarification?
- 31. Write Water management -weed management- yield attributes yield- harvesting, postharvest operations- quality considerations cropping systems value addition in groundnut.
- 32. Write production technology of sunflower?

#### Subject: Agriculture and Rural Development Semester: IV Course Title: Crop Production Technology-II - Practical Course Code: AGRO202P No. of Hrs:30

Credits:1

# Objectives

- To learn Land preparation and layout of plots
- To know about Different types of sowing methods
- To identify plant characteristics of oil seeds, fiber, sugar crops and fodder crops

# **Course Outcomes**

**CO1:** Students will learn about Importance of oilseed crops- edible and non – edible oils – nutritional value importance in Indian economy CO2: Students will learn aboutSoil and climatic requirements - types growth stages - land Preparation -seeds and sowing- seed treatmentseed rate-spacing-season-time and method of sowing varieties **CO3:** Students will understand aboutNutrient management- water management- weed management yield attributes - yield- Harvesting post harvest operations- quality considerations - cropping systems **CO4**:Students will understand aboutNursery management-seeds and sowing for different types- seed treatment-seed rate-spacing-seasontime and method of sowing

CO5:Students will understand about Ratoon cane management factors affecting quality of sugarcane - arrowing- jaggery making clarification

# **EXPERIMENTS**

- Land preparation and layout of plots 1.
- 2. Sowing methods of sugarcane
- 3. Sowing of oil seeds, fiber, sugar crops and fodder crops
- 4. Identification of plant characteristics of oil seeds, fiber, sugar crops and fodder crops
- 5. Yield and juice quality analysis of sugarcane
- 6. Visit to research stations of related crops
- 7. Collection of post-harvest data on the crop

# Agronomy Tour

- 1. Visit to agronomic experiments of Oil seeds, fiber, sugar crops and fodder crops at experimental farms.
- 2. Visit to nearby farmers' fields

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

# SCHEME OF EVALUATION

Subject: Agriculture and Rural Development Semester: IV Course Title: Irrigation water management, farming systems and Sustainable Agriculture **Course Code: AGRO203** No. of Hrs: 30

Credits: 2

# Objectives

- To determine bulk density
- To know lay out of surface irrigation methods
- To determine soil moisture content by gravimetric and volumetric method
- To determine infiltration rate

# **Course Outcomes**

At the end of the course, students will be able to

**CO1**:Summarize the farming and cropping systems in India.

**CO2:**List and explain different allied enterprises.

CO3: Explain the techniques of sustainable agriculture and development of integrated farming systems, including models for different agri-climatic zones.

CO4: Discuss the properties and relationship of natural resources and their importance in integrated farming systems.

**CO5:** Summarize different aspects and methods of irrigation.

# THEORY

# UNIT -1 (6hrs)

1. Farming System - introduction - scope of farming system importance – concept – principles of farming system.

2. Types of farming systems – advantages and limitations - suitability factors affecting the farming system

3. Farming systems – system and systems approach - determinants of farming system - cropping systems(navadhanya concept) and related terminology

4. Allied enterprises – significance of integrating crop and livestock enterprises - components and maintenance- dairying and sheep and goat rearing – breeds – housing– feed and fodder requirements – biogas plant

5. Allied enterprises – poultry farming – breeds – housing –feed and fodder requirements – apiculture – species and management

6. Allied enterprises – sericulture – moriculture and silkworm rearing – agro-forestry systems suitable for dryland farming

7. Tools for determining production and efficiencies in different farming and cropping systems.

#### UNIT-II (6hrs)

1. Adverse effects of modern agriculture - sustainable agriculture - definition -concept - goals - elements.

2. Problems related to soil, water and environment - adaptation and mitigation strategies - indicators of sustainability.

3. Conservation agriculture – concept – need - management of natural resources land, water and vegetation.

4. Techniques for sustainability - Low External Input Agriculture (LEIA) and Low External Inputs for Sustainable Agriculture (LEISA) and HEIA (High External Input Agriculture).

5. Integrated farming system-historical background, objectives and characteristicsadvantages

6. Site specific development of IFS models for different agro climatic zones of India and A.P.

#### UNIT -III (6hrs)

1. Resource use efficiency – optimization of resource use by different methods in an IFS(Annapurna model)

2. Resource cycling - flow of energy in different farming systems. Visit of IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field

3. Introduction – importance – definition and objectives - water resources of world.

4. Surface and ground water resources in India and Andhra Pradeshimportant major irrigation projects in India and Andhra Pradesh.

5.Soil-water relations – physical properties of soil viz., depth, soil texture, soil structure, particle density, bulk density and porosity influencing water retention, movement and availability.

6. Water retention in soil – adhesion and cohesion – soil moisture tension – pF – soil moisture characteristic curves- Water movement in

soils – infiltration – percolation – seepage – permeability – hydraulic conductivity – saturated and unsaturated water flow.

#### UNIT -IV (6hrs)

1. Kinds of water in soil – gravitational water – capillary water – hygroscopic water – their importance in crop production - Soil moisture constants – saturation – Field capacity (FC) – Permanent Wilting Point (PWP) – Available Soil Moisture (ASM) – hygroscopic coefficient – theories of soil water availability.

2.Plant-water relationships – rooting characteristics – effective root zone depth – moisture extraction pattern – moisture sensitive periods of crops – Soil Plant Atmospheric Continuum (SPAC).

3.Evapotranspiration – evaporation – transpiration – factors influencing evapotraspiration – Reference crop evapotraspiration (ETo) – Crop coefficient – Crop Evapotranspiration (ETc) - daily, seasonal and peak period consumptive use.

4.Crop water requirement – irrigation requirement – net and gross irrigation requirement – irrigation interval – irrigation period – seasonal water requirement of important crops – duty of water – base period – relation between duty and base period – conjunctive use of water – advantages of conjunctive use.

5.Scheduling of irrigation – different criteria – soil moisture regime approach – feel and appearance method – soil moisture tension and depletion of available soil moisture method - climatological approach – Irrigation Water (IW) / Cumulative Pan Evaporation (CPE) ratio method.

Scheduling of irrigation – plant indices approach – visual symptoms
 soil cumsand mini plot technique – growth rate – relative water content – plant water potential – canopy temperature – indicator plants and critical growth stages.

#### UNIT – V (6hrs)

1. Methods of irrigation - surface methods – wild flooding check basin, ring basin, border strip, furrow and corrugations – advantages and disadvantages- Sub surface irrigation.

2. Micro irrigation systems - sprinkler irrigation – merits and demerits – system components and layout – suitable crops – rain guns.

3. Drip irrigation (surface and sub surface) – merits and demerits – system components and layout – suitable crops - fertigation and maintenance of micro irrigation systems.

4. Water Use Efficiency (WUE) – crop and field water use efficiency – factors influencing WUE – climatic, genetic and management (agronomic) factors - Irrigation efficiencies – water conveyance efficiency, water application efficiency, water storage efficiency, water distribution efficiency and project efficiency.

5. Quality of irrigation water – salinity hazard, sodium hazard, residual sodium carbonate and boron toxicity – criteria and threshold limits – management practices for using poor quality water.

6. Water logging – causes for waterlogging – drainage- surface and sub-surface drainage systems – relative merits.

# References text books

- 1. Michael, A.M. 2006. Irrigation Theory and Practice. Vikas Publishing House Pvt. Ltd., New Delhi. Reddy, S.R. 2016.
- Arun K. Sharma. 2006. A hand book of organic farming -Agrobios(India) Jodhpu
- Jayanthi C, Devasenapathy P and Vinnila, C. 2008. Farming systems principles and practice. Satishserial publishing house, Delhi
- 4. Panda.S.C. 2011. Cropping and farming systems. Agrobios (India) Jodhpur.
- 5. Ruthenburg, H. 1980. Farming systems in the tropics. Oxford university

# MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Irrigation water management, farming systems and<br/>sustainable AgricultureSustainable AgricultureCourse Code: AGRO203Max. Marks: 100

#### SECTION-A

#### **Answer ALL questions**

 $20 \times 1 = 20 \text{ M}$ 

- 1. What are the biological factors affecting farming system among the following?
  - A) Topography
  - B) Livestock
  - C) Education
  - D) Rainfall
- 2. Diversified Farming System is otherwise known as
  - a) IFS
  - b) Specialized Farming
  - c) Organic Farming
  - d) Ranching Farming
- 3. Which of the following is not the objective of farming system?
  - A) Saving Energy
  - B) Fodder Requirement
  - C) Input Use Efficiency
  - D) Risk a version
- 4. Avenafatua comes under which factor of farming system?
  - A) Physical Factor
  - B) Biological Factor
  - C) Chemical Factor
  - D) Mechanical Factor

5. Suggest the best Allied Enterprise to the farmers, when the maincrop grown is RICE.

- A) Apiculture
- B) Sericulture
- C) Fishery
- D) Biogas
- 6. Farming system is which kind of enterprise among the following?
  - A) Dependent Enterprise
  - B) Independent Enterprise
  - C) Both A and B
  - D) None of the Above
- 7. Mix Farming is which kind of enterprise among the following?
  - A) Dependent Enterprise
  - B) Independent Enterprise
  - C) Both A and B
  - D) None of the Above
- 8. Recycling of waste & amp; residues of Farming system.
  - A) Component
  - B) Objective
  - C) Principle
  - D) Advantage
- 9. Grazing of animals on public field is known as?
  - A) Dairy Farming
  - B) Diversified Farming
  - C) Mix Farming
  - D) Ranching Farming

10. Which of the following is/are the Socio Economic factors of Farming System?

- A) Family Composition
- B) Education
- C) Food Preference
- D) All the Above

11. Kharif, Rabi and Zaid word belong to \_\_\_\_\_

- 12. Climate pertains to a \_\_\_\_\_
- 13. Instrument used for measuring wind velocity is known as
- 14. application of fertilizers along with water is known as \_\_\_\_\_
- 15. Water use efficiency is highest in \_\_\_\_\_type of irrigation
- 16. acidic soils are reclaimed by \_\_\_\_\_
- 17. WUE stands for \_\_\_\_\_
- 18. alkaline soils are reclaimed by \_\_\_\_\_
- 19. Neutral pH is \_\_\_\_\_
- 20. Commonly using irrigation method in fruit crops \_\_\_\_\_

#### SECTION-B

#### Answer any **FOUR** questions

#### $4 \times 8 = 32$ M

 $4 \times 12 = 48$  M

- 21. Define Farming System and write importance and principles oFarming system.
- 22. Write about Problems related to soil, water and environment?
- 23. What are Surface and ground water resources in India and Andhra Pradesh, important major irrigation projects in India and Andhra Pradesh?
- 24. Write about Integrated farming system, objectives and advantages?
- 25. What are Micro irrigation systems and write about sprinkler Irrigation merits and Demerits?
- 26. Explain about Kinds of water in soil?

# SECTION-C

Answer any **FOUR** questions

- 27. Explain about Types of farming systems, advantages and limitations Suitability, factors affecting the farming system?
  - 28. Explain about Techniques for sustainability?
  - 29. Discus about Drip irrigation and fertigation, merits and demerits?
  - 30. Write about Methods of irrigation?
  - 31. Write about Plant-water relationships?
  - 32. Write Introduction, importance, definition and objectives water resources of World?

Subject: Agriculture and Rural Development Semester: IV Course Title: Irrigation water management, farming systems and sustainable Agriculture-PRACTICAL Course Code: AGR0203P

No. of Hrs: 30

Credits:1

# Objectives

- To Determine the bulk density
- To study aboutLay out of surface irrigation methods
- To Determine the soil moisture content by gravimetric and volumetric method

# Course Outcomes

**CO1**:Students will learn about Farming Systems, scope of farming system, importance and principles of farming system

**CO2:** Students will learn aboutTypes of farming systems, advantages and limitations

**CO3:** Students will learn aboutAllied enterprises on sericulture, moriculture and silkworm rearing.

**CO4**:Students will learn aboutagro-forestry systems suitable for dry land farming

**CO5:** Students will learn aboutProblems related to soil, water and environment, adaptation and mitigation strategies and indicators of sustainability

# EXPERIMENTS

- 1. Determination of bulk density
- 2. Determination of soil moisture content by gravimetric and volumetric method
- 3. Determination of infiltration rate
- 4. Determination of field capacity by field method
- 5. Measurement of irrigation water through flumes, weirs and V notches
- 6. Scheduling of irrigation by IW / CPE ratio method
- 7. Calculation of irrigation water requirements
- 8. Lay out of surface irrigation methods
- 9. Visit to micro irrigation systems in farmer fields.

- 10. Water management practices in rice, wheat and maize.
- 11. Water management practices in groundnut, sunflower and sugarcane.

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

# SCHEME OF EVALUATION

# Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Agricultural Marketing, Trade and PricesCourse Code: AECO242

No. of Hrs:30 Credits: 2

# Objectives

- To Calculate the elasticities for important agricultural commodities.
- To Study of relationship between market arrivals and prices of some selected commodities.
- To Computatemarketable and marketed surplus of important commodities.
- To Study price behavior over time for some select commodities.

# Course Outcomes

At the end of the course, students will be able to

**CO1:**Explain different aspects of agricultural marketing.

**CO2**:Discuss facilitating functions, market functionaries, supply chain management, market promotion and

**CO3:**Outline thefactors affecting demand and supply of agricultural farm products.

**CO4:** Explain marketing concepts like segmentation, integration, cost, regulated markets and government interventions.

**CO5**:Discuss national, international cooperative marketing agencies.

# UNIT – 1 (6hrs)

1. Agricultural Marketing - Concepts and definitions of market, marketing, agricultural marketing - Components of market, dynamics of market structure.

2. Classification and characteristics of each type of agricultural markets.

3. Demand and supply of Agri-commodities, factors affecting the demand and supply of farm products, producer's surplus - Meaning and types and producer's surplus of Agri-commodities in India.

4. Meaning of marketable surplus and marketed surplus, importance and their measurement. marketable surplus and marketed surplus of Agri-commodities in India, factors affecting them. 5. Marketing process and functions - Marketing process -Concentration, dispersion and equalization - Thompson's classification.

6. Exchange functions – Buying and selling, methods - Physical functions – Storage, transportation and processing.

# UNIT – 2 (6hrs)

1. Facilitating functions – Packing and packaging, branding, grading, standardization, FAQs for major crop produce, quality control and labeling - AGMARK, HACCP, FSSAI, CODEX - Need for codex certification and relevance.

2. Market functionaries - Types and importance of agencies involved in agricultural marketing and their role - Producers, middlemen (merchant middlemen, agent middlemen, speculative middlemen, processors, facilitative middlemen).

3. Meaning and definition of marketing channels and supply chain management and their importance.

4. Marketing mix - Meaning, 4Ps of marketing - Product, price, place and promotion Their importance and characteristics in agriculture.

5. Meaning and stages in PLC (Product Life Cycle) - Characteristics of PLC - Strategies in different stages of PLC.

6. Pricing and promotion strategies - Pricing considerations and approaches – Cost based and competition-based pricing.

7. Market promotion – Advertising, personal selling, sales promotion and publicity – Their meaning and merits and demerits.

#### UNIT – 3 (6hrs)

1. Market Segmentation-Meaning and its importance, types of market segmentation and benefits.

2. Market Integration - Meaning, definition - Marketing efficiency - Meaning, definition, measurement of marketing efficiency - Types of market integration and marketing efficiency.

3. Marketing costs, margins and price spread - Meaning and measurement, factors affecting cost of marketing - Reasons for higher marketing costs of farm commodities - Ways of reducing marketing costs.

4. Regulated Markets-Definition - Important features of regulated markets - Functions, progress and defects.

5. Model regulated market act, objectives and features - APMC Act in Andhra Pradesh - Objectives and features and functions

6. Govt. interventions in agricultural marketing, their need, importance, and role Important market acts - Public sector institutions - CWC, SWC, FCI, & DMI – Objectives and functions.

# UNIT- 4 (6hrs)

1. Cooperative marketing - Meaning and its need and importance, cooperative marketing agencies in India - NAFED, MARKFED – Objectives and functions and activities.

2. Risk in marketing - Types of risk in marketing - Measures to minimize risks, speculation and hedging - Meaning, differences between speculation & hedging, advantages, disadvantages and process of speculation and hedging.

3. An overview of futures trading in agricultural commodities -Forward/future markets - Meaning, advantages and disadvantages of forward markets.

4. Commodity exchanges – Role and importance - Commodity exchanges in India MCX,NCDX,NCMX,ACX, Safal - Role of regulatory bodies in futures markets - SEBI, etc, Contract farming - Meaning, procedures and advantages - Contract farming act in Andhra Pradesh.

5. Meaning and functions of price - Characteristics of agricultural product prices Agricultural price stabilization - Need for agricultural price policy - Role of Commission for Agricultural Costs and Prices (CACP) - Meaning of administered prices - Minimum support price, procurement price and issue price, levy price.

6. Concept of International Trade and its importance in globalised world economies Free trade and protectionism - Meaning, pros and cons of free trade and protectionism.

# UNIT – 5 (6hrs)

1. Theory of absolute and comparative advantage and their importance international trade.

2. Trends, present status and prospects of Indian agri-commodities trade in international trade.

3. WTO - Genesis, objectives, functions and principles of multilateral trade.

4. WTO agreements - Agreement on Agriculture (AoA) - Market access, Aggregate Measures of Support (AMS), export subsidies, sanitary and phytosantitary measures (SPS) and their implications and impact on Indian agriculture. 5. TRIPS and intellectual property rights and their implications to Indian agriculture Meaning of patents, copy rights, trademarks, geographical indications, industrial designs, trade secrets, integrated circuits, and plant varieties protection.

# Reference text books

- 1. S S Acharya and N L Agarwal. 2012. Agricultural Marketing in India. Oxford & IBH Publications Co. Pvt. Ltd., New Delhi.
- 2. S S Acharya and N L Agarwal. Agricultural Price: Analysis and Policy. Oxford & IBH Publications Co. Pvt Ltd., New Delhi.
- Subba Reddy, S., P.Raghu Ram., Sastry, T.V.N and Bhavani Devi, I. 2016. Agricultural Economics. Oxford & IBH Publishing Company Private Ltd., New Delhi,
- 4. Kahlon, A.S and Tyagi.D S. 1983. Agricultural Price Policy in India. Allied Publishers Pvt. Ltd., New Delhi.
- 5. Mamoria, C.B. and Joshi. R L.1995. Principles and Practices of Marketing in India. Kitab Mahal, Allahabad
- Philip Kotler, Kevin Lane Keller, Abraham Koshy and MithileswarJha. 2009. Marketing Management: A South Asian Perspective. International 13th edition. Pearson Prentice Hall

# MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Agricultural Marketing, Trade and PricesCourse Code: AECO242Time: 3 Hrs.Max. Marks: 100

#### SECTION-A

Answer ALL questions

 $20 \times 1 = 20 \text{ M}$ 

1.\_\_\_\_ is the father of Modern Marketing.

- A) Abraham Maslow
- B) Lester Wunderman
- C) Peter Drucker
- D) Philip Kotler
- 2. \_\_\_\_\_is not a part of marketing mix.
  - A) Product
  - B) Purpose
  - C) Place
  - D) Price

3. "Many people want BMW, only a few are able to buy" this is an example of

- A) Need
- B) Want
- C) Demand
- D) Status

4. Marketing is a process which aims at \_\_\_\_\_

- e) Production
- f) Profit making
- g) The satisfaction of customer needs
- h) Selling products

5.The term marketing refers to \_\_\_\_\_

- e) Advertising, Sales Promotion, Publicity and Public Relational activities
- f) A new product needs ideas, Developments, concepts and improvements.
- g) Sales Planning, Strategy and Implementation
- h) A philosophy that stresses customer value and satisfaction.

- Want for a specific product backed by an ability to pay is called \_\_\_\_\_
  - e) Demand
  - f) Need
  - g) Want
  - h) Customer

7.Select an appropriate definition of Want.

- e) More consumer Needs
- f) Needs backed by buying power
- g) Needs directed to the product
- h) Basic human requirements

8	are th	ne form	of	human	needs	take	as	shaped	by	culture	&
individual	perso	nality.									

- e) Wants
- f) Demands
- g) Needs
- h) Social Needs

9.Marketers often use the term \_\_\_\_\_ to cover various groupings of customers.

- e) Buying power
- f) Demographic segment
- g) Market
- h) people

10.A place where goods are bought and sold against the price consideration between the buyers and the sellers is called \_\_\_\_\_

- A) Buying power
- B) Demographic segment
- C) Market
- D) people

11. In duopsony market there will be \_\_\_\_\_

12. Converting ground nut into oil creates \_\_\_\_\_

- 13. Primary function of the marketing is \_\_\_\_\_
- 14. Quality of agricultural commodities is ensured by

15. International food safety standards are developed by

16. FCI was established in the year \_\_\_\_\_

17. Risk taking is a function of \_\_\_\_\_

18 Expand FSSAI \_\_\_\_\_

19 Market management function of marketing refers to

20 Tertiary function of marketing includes \_\_\_\_\_

#### SECTION-B

Answer any FOUR questions

 $4 \times 8 = 32$  M

- 21. Explain about Classification and characteristics of each type of agriculturalmarkets?
- 22. What are Demand and supply of Agri-commodities, factors affecting the Demand and supply of farm products?
- 23. What is WTO write about its genesis, objectives, functions and principles of multilateral trade?
- 24. Explain about NAFED, MARKFED Objectives and functions and activities?
- 25. Write in detail about Theory of absolute and comparative advantage and their importance international trade?
- 26. What is Risk in marketing explain types of risk in marketing?

# SECTION-C

#### Answer any FOUR questions

# $4 \times 12 = 48$ M

- 27. Define agricultural marketing explain about its concepts and components?
- 28. Define Marketing mix and its meaning, write about 4Ps of marketing Product, price, place and promotion and their importance and characteristics in Agriculture?
- 29. What is WTO and explain about it's agreements?
- 30. Write in detail about Market promotion Advertising, personal selling, salesPromotion and publicity Their meaning and merits and demerits?
- 31. What are TRIPS and their implications to Indian agriculture?
- 32. Explain about administered prices, Minimum support price, procurement price and issue price, levy price?

# Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Agricultural Marketing, Trade and Prices-PracticalCourse Code: AECO242P

No. of Hrs:30

Credits:1

# Objectives

- To Calculate elasticities for important agricultural commodities.
- To Study about relationship between market arrivals and prices of some selected commodities.
- To Computation of marketable and marketed surplus of important commodities.

# Course Outcomes

**CO1**:Students will learnDemand and supply of agri-commodities, factors affecting the demand and supply of farm products

**CO2:**Students will understandMarketing process and functions

CO3: Students will understandPacking and packaging, branding,

grading, standardization, FAQsmajor crop produce, quality control and labeling - AGMARK, HACCP FSSAI, CODEX

**CO4**:Students will understandMarketing mix - Meaning, 4Ps of marketing - Product, price, place andpromotion Their importance and characteristics in agriculture

# EXPERIMENTS

1. Plotting and study of demand and supply curves for major agricultural commodities.

2. Calculation of elasticities for important agricultural commodities.

3. Study of relationship between market arrivals and prices of some selected commodities.

4. Computation of marketable and marketed surplus of important commodities.

5. Study of price behaviour over time for some selected commodities.

6. Estimation and calculation of marketing costs, margins and price spread and presentation of report in the class.

7. Visit to SWC/CWC to study their objectives, role, organization, functioning and performance.

8. Visit to FCI and study its objectives, role, organization and functioning and performance.

# SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

# Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Manures, fertilizers and soil fertility managementCourse Code: SSAC221

No. of Hrs: 30

Credits: 2

# Objectives

- To Estimate available N in soils
- To Estimate of K & S in plant samples
- To Identify acid radicals in fertilizers /salts
- To Identify basic radicals in fertilizer /salt Determination of most profitable level of capital use.

# Course Outcomes

At the end of the course, students will be able to

**CO1**:Discuss the conceptual framework of soil fertility and plant nutrition.

**CO2:**Classify plant nutrients and explain nutrient cycles.

**CO3**:Summarize the deficiency and toxicity symptoms in plants and corrective measures.

**CO4:**Discuss the methods of soil fertility evaluation and plant analysis.

**CO5:**Explain the use and control of natural, chemical and mixed fertilizers in agriculture.

# THEORY

# UNIT-1 (6 Hours)

1. Introduction - History of soil fertility and plant nutrition - Concepts of soil fertility, soil productivity, Navadhanya and Annapurna concepts in relation to soil fertilitySoil as a source of plant nutrients - Nutrient Elements - Arnon's criteria of essentiality – Essential, functional and beneficial elements.

2. Scientists responsible for the essentiality of nutrients -lonic forms of plant nutrients in soil – Mechanism of nutrient transport - Movement of ions from soils to roots – Mass flow, diffusion, root interception and contact exchange.

3. Essential nutrients – Classification and their functions in plants.

4. Deficiency symptoms of nutrients - Corrective measures – Toxicity symptoms of different nutrients.

5. Nitrogen - Occurrence, content and distribution - Factors influencing the content of nitrogen in soil. Forms of soil nitrogen - Nitrogen Cycle - Transformations in soils - Mineralization (aminisation and ammonification) - Fate of released ammonia - Factors affecting ammonium fixation - Nitrification - Factors affecting nitrification - Fate of released nitrate nitrogen.

6. Leaching losses of nitrate nitrogen – Nitrification inhibitors-Denitrification – Immobilization, Nitrogen fixation - Different types – Biological fixation of nitrogen – Symbiotic and non symbiotic – Nitrogen balance sheet – Gains and losses.

# UNIT -II (6 Hours)

1Phosphorus - P – Cycle – Content in soils – Forms of phosphorus in soil - Inorganic and organic phosphorus compounds – Phosphorus fixation – Mechanisms of phosphate fixation -Factors affecting phosphate fixation in soil - Quantity and intensity parameters.

2. Potassium - Content in soil – Source – Forms of soil potassium - Potassium fixation Factors affecting potassium fixation – Quantity and Intensity parameters – Luxury consumption.

3.Calcium - Sources and content – Forms of calcium in soil, factors affecting the availability of calcium in soil –Magnesium - Sources – Content – Forms of magnesium in soils - Factors affecting availability of magnesium - Functions.

4. Sulphur - S - Cycle - Occurrence - Forms of Sulphur in soil -Sulphur transformation in soils - Mineralization and immobilization -Sulphur Oxidation - Factors affecting oxidation in soils - Sulphide injury - Causes, symptoms and remedial measures.

5. Micronutrient - Sources – Forms in soil solution – Pools of micronutrients – Predisposing factors for occurrence of micronutrient deficiencies in soil and plants

6. Zn and Mn - Content – Forms in soils – Critical limits in soils and plants - Factors affecting their availability.

7. Fe and Cu - Content – Forms in soils – Critical limits in soils and plants. Factors affecting their availability.

#### UNIT- III (6 Hours)

1. Boron and Molybdenum - Content – Forms in soil - Critical limits in soils and plants. Factors affecting their availability.

2. Chlorine - Content – Forms in soils – Critical limits in soils and plants. Factors affecting its availability – Beneficial Elements- Sodium, Cobalt, Vanadium and Silicon

3. Soil fertility Evaluation: - Approaches – Soil testing – Objectives of soil testing – Chemical methods for estimating available nutrients.
4.Plant analysis – Rapid tissue tests – Indicator plants - Biological methods of soil fertility evaluation, A- value – Microbiological methods

Sackett and Stewart techniques – Mehlich technique –
 Cunninghamella plaque method – Mulder's Aspergillusniger technique –
 Mistcherlich's pot culture method.

5. Soil test-based fertilizers recommendation: - Critical nutrient concept (Cate and Nelson) – Critical levels of nutrients in soils - General recommendations Use of empirical equations for scheduling fertilizer doses - Targeted yield approach

6. Nutrient use efficiency: - Soil, plant and management factors influencing Nutrient use efficiency in respect of N, P, K, S, Fe and Zn fertilizers – Foliar application – Fertigation – Liquid fertilizers.

7.Methods of application of nutrients under rainfed and irrigated conditions

# UNIT – IV (6 Hours)

1. Introduction and importance of organic manures - Definition and difference between manures and fertilizers-Classification of manures (Bulky & Concentrated) with suitable examples. Importance of manures in soil fertility management.

2. Bulky organic manures – Preparation of FYM – Methods of collection and storage. Losses of nutrients from FYM during collection and storage -Ways to minimize these losses.

3. Compost and composting – Different methods of composting including the starters and raw materials

4. Methods of preparation of rural and urban compost. Mechanical compost plants – Their advantages over conventional composting – Vermi-composting

5. Green manures – Classification with examples. Advantages and limitations of green manuring and green leaf manuring. Biogas plant – Principles of operation and its advantages.

6. Definitions of penning, sewage, sewerage, sullage, pouderette, Activated compost process. Concentrated organic manures – Oil cakes, blood meal, bone meal, horn meal, fish meal, meat meal and guano.

# UNIT -V (6 Hours)

1. Chemical fertilizers – Classification with examples – Nitrogenous fertilizers – composition and properties of major nitrogenous fertilizers viz., Ammonium sulphate, urea and calcium ammonium nitrate.

2. Phosphatic fertilizers – Composition of Rock phosphate – Occurrence, types and properties- properties of SSP, TSP and basic slag – Potassic fertilizers – MOP, SOP properties.

3. Secondary and micronutrient fertilizers – Different sources of these nutrients and their contents - Conditions leading to their deficiency - Methods of application and mode of action of NPK fertilizers in soils.

4. Amendments – Role of important organic and inorganic amendments and synthetic conditioners as amendments - Complex fertilizers – Types, composition of DAP, MAP, UAP, important nitrophosphates.

5. Mixed fertilizers – Advantages and disadvantages over straight fertilizers - Nanofertilizers- Fertilizer grade – Fertilizer ratio – unit value of fertilizers – Problems - INM - Components - Advantages.

6. Fertilizer Control Order (FCO) – Its importance and regulations -Specifications for important fertilizers - Fertilizer storage – Specifications - Problems during storage.

#### References text book

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

# MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Manures, fertilizers and soil fertility managementCourse Code: SSAC221

Time: 3Hrs Max. Marks: 100 M

#### SECTION-A

#### **Answer ALL questions**

#### $20 \times 1 = 20$ M

#### 1. Green manure plants are

- A) Poaceae
- B) Solanaceae
- C) Leguminosae
- D) Compositae

# 2. This chemical fertilizer is essential for better rhizobial nitrogen fixation

- A) Calcium
  - B) Potassium
  - C) Sodium
  - D) Phosphorus

#### 3. Azolla is used as a biofertilizer as it possesses

- A) Humus in large quantities
- B) Rhizobium
- C) Mycorrhiza
- D) Cyanobacteria

# 4. Pyrethrin is obtained from

- A) Chrysanthemum cinerariifolium
- B) Azadirachtaindica
- C) Urtica dioica
- D) Tageteserecta

#### 5. This is not included in organic farming

- A) Crop rotation
- B) Chemical fertilizer
- C) Green manures
- D) Compost and farmyard manures

# 6. Appropriate use of cow dung is made in

- A) Medicine
- B) Fuel
- C) Manure
- D) Building/construction material

# 7. In children, this disease is caused due to excess nitrate

# fertilizers usage

- A) Mumps
- B) Jaundice
- C) Septicemia
- D) Methaemoglobinaemia

# 8. For paddy, the best fertilizer is

- A) Bacillus polymyxa
- B) Bacillus megaterium
- C) Azolla pinnata
- D) Rhizobium meliloti

# 9. Composted manure is formed from

- A) Farm and household refuse
- B) Animal refuse and rotten vegetables
- C) Organic wastes from where biogas extraction takes place
- D) Green and farmyard manure

# 10. Green manure is

- A) Maize
- B) Rice
- C) Sorghum
- D) Sesbania
- Fill in the blanks

# 11. Expand INM \_\_\_\_\_

- 12. FCO was established in the year\_\_\_\_\_
- 13. Percentage of nitrogen in urea \_\_\_\_\_
- 14. Example for green manure \_\_\_\_\_
- 15. Expand FYM \_\_\_\_\_
- 16. Give an example for concentrated organic manure

# 17. Expand CAN\_\_\_\_\_

- 18. Example for micro nutrient \_\_\_\_\_
- 19. Example for highly mobile nutrient \_\_\_\_\_
- 20. Give an example for bulky organic manure\_\_\_\_\_

#### SECTION-B

#### Answer any **FOUR** questions

#### $4 \times 8 = 32$ M

- 21. Write about Essential nutrients, Classification and their functions in Plants?
- 22. Explain about Immobilization, Nitrogen fixation?
- 23. Explain about Phosphorus fixation, Mechanisms of phosphate fixation?
- 24. Define organic manures and Classification of manures (Bulky &Concentrated) with suitable examples?
- 25. Explain about importance and regulations of Fertilizer Control Order (FCO)?
- 26. What are mixed fertilizers and write advantages and disadvantages over straight fertilizers?

#### SECTION-C

#### Answer any FOUR questions

#### $4 \times 12 = 48 \text{ M}$

- 27. What is compost and explain about different methods of composting including the starters and raw materials?
- 28. What are chemical fertilizers and write classification with examples?
- 29. Explain about Green manures, green leaf manures write advantageandlimitations?
- 30. Write deficiency symptoms of nutrients, Corrective measures toxicity symptoms of different nutrients.
- 31. Explain about Methods of preparation of rural and urban compost and write advantages over conventional method?
- 32. Write in detail about vermicomposting?

Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Manures, fertilizers and soil fertility management-<br/>PracticalCourse Code: SSAC221PNo. of Hrs: 30Credits:1

# Objectives

- To Estimate of available N in soils
- To Estimate of K & S in plant samples
- To Identify acid radicals in fertilizers /salts

# Course Outcomes

**CO1**:Students will understand aboutHistory of soil fertility and plant nutrition Concepts of soil fertility, soil productivity.

**CO2:** Students will understand aboutEssential nutrients, Classification and their functions in plants

**CO3:** Students will understand aboutDeficiency symptoms of nutrients, Corrective measures, Toxicity symptoms of different nutrients

**CO4**:Students will understand aboutMethods of application of nutrients under rainfed and irrigatedConditions

**CO5:** Students will understand aboutIntroduction and importance of organic manures

# EXPERIMENTS

- 1. Introduction to analytical instruments and principles-spectrometry and flame photometry
- 2. Estimation of available N in soils
- 3. Estimation of K & S in plant samples
- 4. Identification acid radicals in fertilizers /salts
- 5. Identification of basic radicals in fertilizer /salt
- 6. Estimation of N in Ammonium sulphate
- 7. Estimation of N in Urea and FYM
- 8. Estimation of water soluble P2O5 in SSP
- 9. Estimation of K in Muriate of potash or Sulphate of potash by using Flame photo meter

# SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

Subject: Agriculture and Rural Development Semester: IV **Course Title: Production Technology for Ornamental Crops,** Medicinal and Aromatic Plants and Landscaping Course Code: HORT282 No. of Hrs:15

Credits: 1

# Objectives

- To Identify ornamental plants
- To Identify Medicinal and Aromatic Plants.
- To prepare and planting of Medicinal and Aromatic Plants.
- To study about Harvesting and postharvest handling of cut and loose flowers

# **Course Outcomes**

At the end of the course, students will be able to

**CO1:**Explain the principles of land scaping and importance of ornamental plants.

**CO2**: Discuss the production technology of different types of ornamental crops.

**CO3:** Examine the production technology of medicinal and aromatic crops.

**CO4:** Discuss the methods of value addition in ornamental, medicinal and aromatic crops.

# Theory

# UNIT – 1 (6 Hours)

1. Importance and scope of ornamental crops and landscaping -Landscape uses of trees, shrubs and climbers.

2. Principles of landscaping - Initial approach - Axis - Focal Point -Mass effect – Unity – Space – Divisional Lines – Proportion and Scale - Texture - Time and Light - Tone and Colour - Mobility - Rhythm -Balance - Contract - Harmony- Vista - Style.

3. Production technology of cut flowers under protected conditions -Rose - Introduction- origin and distribution- Classification- Species and varieties- Climate and soil requirements- Propagation - Rootstocks-Stock scion compatibility- Land preparation- planting- Manures and fertilizers- Cultural operations (pruningpinching and mulching) harvesting- Post harvest management- Yield and rose biproducts.

4. Gerbera - Introduction- Origin and distribution- Classification-Species and varieties- Climate and soil requirements- Propagation-Land preparation- PlantingManures and fertilizers- Cultural operations -Defoliation- Soil loosening- Shadinguse of growth regulators-Physiological disorders- Harvesting- Post harvest management and yield.

# UNIT –II (6 Hours)

1. Carnation - Introduction- Origin and distribution- Classification-Species and varieties- Climate and soil requirements- Propagation-Land preparation- PlantingManures and fertilizers- Cultural operations-(Pinching and disbudding) use of growth regulators- Physiological disorders- Harvesting- Post harvest management and yield.

2. Liliumand Orchids - Introduction- Origin and distribution-Classification- Species and varieties- Climate and soil requirements-Propagation- Land preparationPlanting- Manures and fertilizers-Cultural operations- Use of growth regulatorsPhysiological disorders-Harvesting- Post harvest management and yield.

3. Production technology of cut flowers under open conditions -Gladiolus and Tuberose- Introduction- Origin and distribution-Classification of varieties- Species and varieties- Climate and soil requirements- Propagation- Land preparationPlanting- Manures and fertilizers- Cultural operations- Use of growth regulatorsPhysiological disorders- Harvesting- Post harvest management and yield.

# UNIT -III (6 Hours)

1. Chrysanthemum - Introduction- Origin and distribution-Classification- Species and varieties- Climate and soil requirements-Propagation- Land preparationPlanting, Manures and fertilizers-Cultural operations- Pinching and disbudding Use of growth regulators-Harvesting- Post harvest management and yield.

2. Loose flowers - Marigold and Jasmine under open conditions -Introduction- Origin and distribution- Species and varieties- F1 hybrids-Cimate and soil requirementsPropagation- Land preparation- Planting-Manures and fertilizers- Cultural operations- Pinching and disbudding -Use of growth regulators- Harvesting- Post harvest management and yield.  Medicinal plants – Scope and Importance – Production technology of Asparagus, Aloe, Costus- Botanical name – Family - Origin- Economic part - Introduction – Climate – Soil - Varieties – Propagation – Planting
 Manuring - Irrigation Intercultural operations - Harvesting- Yield.

# UNIT -IV (6 Hours)

 Periwinkle, Isabgol -Botanical name – Family - Origin - Economic part Introduction – Climate – Soil - Varieties – Propagation – Planting -Manuring Irrigation - Intercultural operations - Harvesting- Yield.
 Aromatic plants – Importance – Essential oil industry in India – Properties of essential oils – Production technology of Mint and Ocimum - Botanical name – Family - Origin- Economic part -Introduction – Climate – Soil - Varieties – Propagation – Planting -Manuring - Irrigation- Intercultural operations Harvesting - Yield.
 Lemongrass, Citronella, Palmarosa - Botanical name – Family -Origin- Economic part - Introduction – Climate – Soil - Varieties – Harvesting - Planting - Manuring - Irrigation- Intercultural operations -Harvesting - Yield.

# UNIT -V (6 Hours)

 Geranium and Vettiver - Botanical name – Family - Origin- Economic part Introduction – Climate – Soil - Varieties – Propagation – Planting -Manuring Irrigation - Intercultural operations - Harvesting- Yield.
 Processing and value addition in ornamental crops and MAPs produce – Dry flower making - Extraction methods of essential oils.

#### **References text books**

- 1. Bose, T.K. 1999. Floriculture and Landscaping. Naya Prakash, Kolkatta.
- 2. Bose, T.K. and Yadav, L.P. 1992. Commercial Flowers. Naya Prakash, Kolkatta.
- 3. Randhawa, G.S. and Mukhopadhyaya, A. 1994. Floriculture in India. Allied Publishers Pvt. Ltd., New Delhi
- Chattopadhyay, S.K. 2007.Commercial Floriculture. Gene-Tech Books, New Delhi
- 5. Srivastava, H.C.2014. Medicinal and Aromatic Plants. ICAR, New Delh

# MODEL QUESTION PAPER

Subject: Agriculture and Rural Development Semester: IV Course Title: Production Technology for Ornamental Crops, Medicinal and Aromatic Plants and Landscaping Course Code: HORT282

Time: 3 Hrs.

Max. Marks: 100

#### SECTION-A

#### **Answer ALL questions**

 $20 \times 1 = 20 \text{ M}$ 

- 3. A lawn can be described as
  - A) Green carpet.
  - B) A land covered with lawn grass.
  - C) A piece of land in a garden.
  - D) A beautifully designed piece of land with green grass.
- 2. Which is known as miniature garden?
- A) Mughal garden
  - B) English garden.
- C) Japanese garden.
- D) Italian garden
- 3. Floribundas are crossed between
  - A) Hybrid Teas × Perpetual Polianthas.
  - B) Hybrid Perpetual × Tea Rose.
  - C) Tea Rose × Perpetual Polianthas.
  - D) Perpetual Polianthas × Hybrid Perpetual.

# 4. Which of the following is not used for preserving flowers?

- A) Sugar.
- B) Polyols.
- C) KCL.
- D) H<sub>2</sub>SO<sub>4</sub>.

5. In home garden, area of lawn should not be more than?

- A)70%.
- B) 30%.
- C) 20%.
- D) 40%.

6. The term 'sours' related with which flower plant?

- A) Rose
- B) Lilly
- C) Jasmine.
- D) Tulip.

# 7. Bottom heating is an important process in the propagation of which flower plant?

- A) Rose
- B) Cold region's flower.
- C) Bougainvillea.
- D) English primrose

# 8. Swarnarekha and Vaibhav are important cultivars of?

- A) Gladiolus.
- B) Tuberose.
- C) Lilly.
- D) None of the above

#### 9. A special dried flower arrangement is known as?

- A) Pot Porris.
- B) Flower bouquet.
- C) Ikebana.
- D) Both b and c.

#### 10. An example for formal garden

- a) Japanese garden
- b) Mughal garden
- c) Italian garden
- d) English garden
- 11. Stone lanterns are the main feature of \_\_\_\_\_ garden
- 12. Rajat Rekha and Swarna Rekha are the cultivars of \_\_\_\_\_
- 13. Heart of the garden is \_\_\_\_\_
- 14. Tea garden is the main feature of \_\_\_\_\_
- 15. Gladiolus belongs to the family\_\_\_\_\_
- 16. Botanical name of Aloe \_\_\_\_\_
- 17. Pinching is mainly practiced in \_\_\_\_\_
- 18. Give two examples for medicinal plants\_\_\_\_\_
- 19. The plants which provides secondary metabolites as drugs are called as \_\_\_\_\_
- 20. Example for aromatic plants \_\_\_\_\_

#### SECTION-B

#### Answer any **FOUR** questions

 $4 \times 8 = 32$  M

- 21. Write importance and scope of ornamental crops and landscaping?
- 22. Write production technology of gerbera?
- 23. Explain about intercultural operations in carnation?
- 24. Write production technology of gladiolus?
- 25. Explain about classification in chrysanthemum?
- 26. What are Medicinal plants and write its scope and Importance?

#### SECTION-C

#### Answer any FOUR questions

 $4 \times 12 = 48 \text{ M}$ 

- 27. Write in detail about climate, Soil, Varieties, Propagation, Planting, manuring irrigation, Intercultural operations, Harvesting and yield of geranium?
- 28. Briefly explain about dry flower making and extraction methods of essential oils?
- 29. What are Aromatic plants and write importance and Properties of essential oils?
- 30. Briefly explain about intercultural operations in chrysanthemum?
- 31. explain about principles of landscaping?
- 32. write short notes on production technology of gladiolus and tuberose?

Subject: Agriculture and Rural Development Semester: IV Course Title: Production Technology For Ornamental Crops, Medicinal and Aromatic Plants and Landscaping-Practical Course Code: HORT282P No. of Hrs:30 Credits:1

# Objectives

- To Identify ornamental plants
- To Identify Medicinal and Aromatic Plants.
- To know Bed preparation and planting of Medicinal and Aromatic Plants.

# Course Outcomes

**CO1**:Students will understand about Importance and scope of ornamental crops and landscaping

CO2:Students will understand about Principles of landscapingCO3: Students will understand about Production technology of cut flowers under protected conditions

**CO4:** Students will understand aboutProduction technology of cut flowers

**CO5:** Students will understand aboutProduction technology of loose flowers

# EXPERIMENTS

- 1. Identification of ornamental plants.
- 2. Identification of Medicinal and Aromatic Plants.
- 3. Nursery bed preparation and flower seed sowing.
- 4. Training and pruning of roses.
- 5. Bed preparation and planting of Medicinal and Aromatic Plants.
- 6. Harvesting and postharvest handling of cut and loose flowers.
- 7. Floral preservatives to prolong vase-life of cut flowers.
- 8. Visit to commercial flower unit.
- 9. Visit to commercial MAP unit.

# SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

Subject: Agriculture and Rural Development Semester: IV Course Title: Entrepreneurship Development and Business Communication Course Code: AEXT292 No. of Hrs:15 Credits: 1

# Objectives

- To visit any one Agri based industries/ business Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis.
- To study about the constraints in setting up of agro based industries.
- To study about the formulation of project feasibility reports.

# Course Outcomes

At the end of the course, students will be able to

**CO1:** Explain concepts of entrepreneur, entrepreneurship and its development in the Indian agricultural sector.

**CO2**:Outline the use of SWOT analysis to assess agri-enterprises and various skills required for successful entrepreneurship.

**CO3:** Summarize governmental and non-governmental agencies in entrepreneurship development in the Indian agriculture sector.

CO4: Classify the types of agri-enterprises

**CO5:** Explain the features of supply chain and marketing management.

# Theory

# UNIT –I (3 Hours)

1. Concept of entrepreneur, entrepreneurship - Distinction between an entrepreneur and a manager - Management - Management functions – Planning - Organizing - Directing - Motivation - Ordering - Leading – Supervision Communication and Control.

2. Characteristics of entrepreneurs - Opportunities for entrepreneurship and rural entrepreneurship - Types of entrepreneurs and functions of entrepreneurship.

3. Agri – entrepreneurship - Concept, need and scope - Assessing overall business environment in Indian economy and globalization and the emerging business entrepreneurial environment.

4. Entrepreneurship development programmes (EDPs) – Objectives, phases, problems of EDPs - Entrepreneurial behavior and role of

achievement - Motivation, factors affecting entrepreneurship development.

# UNIT –II (3 Hours)

1. Generation, incubation and commercialization of business ideas -Environment scanning and opportunity identification - Researching/ Managing competition Ways to define possible Competitors.

2. Globalization and the emerging business entrepreneurial environment - Role of ED in economic development of a country -Overview of Indian social, political systems and their implications for decision making by individual entrepreneurs.

3. SWOT Analysis - Concept, meaning and advantages.

# UNIT –III (3 Hours)

1. Government policies, incentives, programmes and schemes for entrepreneurship development - Export and import policies relevant to Indian Agriculture sector.

2. Institutional support - Financial Institutions and other agencies in entrepreneurship development

3. Venture capital (VC), contract farming (CF) and joint ventures (JV) - Public-private partnerships (PPP).

# UNIT –IV (3 hours)

1. Overview of agricultural input industry – Seed, fertilizer, pesticides, farm machinery and agricultural food processing industry.

2. Steps in establishment of MSME Enterprise - Planning of an enterprise - Project identification - Selection of the product/ services - Selection of form of ownership - Registration, selection of site, capital sources, acquisition of manufacturing know how, packaging and distribution.

3. Project planning - Formulation and project report - Meaning - Importance Components and preparation.

# UNIT –V (3 Hours)

1. Supply chain management - Meaning, advantages, stages and process and total quality management.

2. Marketing management - Market types - Marketing assistance -Market strategies - Definition of business - Stakeholders in business -Stages of Indian business Importance of agribusiness in Indian economy -Social responsibility of business - Morals and ethics in enterprise management.

3. Assessment of entrepreneurship skills - Business leadership skills Communication skills for entrepreneurship development - Developing organizational skill - Developing managerial skills - Problem solving skill and time management skills.

# Reference Books

- Anil Kumar, S., Poornima, S. C., Mini, K., Abraham andJayashree, K. 2003. Entrepreneurship Development. New Age International Publishers, New Delhi 2 Bhaskaran, S. 2014. Entrepreneurship Development & Management. Aman Publishing House, Meerut
- Gupta, C.B. 2001. Management: Theory and Practice. Sultan Chand and Sons, New Delhi 4 Indu Grover 2008. Handbook on Empowerment and Entrepreneurship. Agrotech Publishing Academy, Udaipur
- 3. Khanka, S.S. 1999. Entrepreneurship Development. S. Chand and Co., New Delh

# MODEL QUESTION PAPER

Subject: Agriculture and Rural Development Semester: IV Course Title: Entrepreneurship Development and Business Communication

Course Code: AEXT292

Time: 3 Hrs.

Max. Marks: 100

#### SECTION-A

# Answer ALL questions

# $20 \times 1 = 20 M$

- 4. Which of the following shows the process of creating something new:
  - A) Business model
  - B) Modeling
  - C) Creative flexibility
  - D) Innovation
- 2. The entrepreneur was distinguished from capital provider in:
- A) Middle ages
- B) 17th century
- C) 18th century
- D) 19th and 20th century

3. A corporate manager who starts a new initiative for their company which entails setting up a new distinct business unit and board of directors can be regarded as:

- A) Ecopreneur
- B) Technopreneur
- C) Intrapreneur
- D) Social Entrepreneur

4. Family business always interested to handover the change of his business to:

- A) Indian Administration Officers
- B) Professional Managers
- C) Next generation
- D) None of the above

5. EDP (Entrepreneurship Development Programmes) is required to help:

- A) Existing entrepreneurs
- B) First generation entrepreneurs
- C) Future generation entrepreneurs

D) None of the above

6. A Micro Enterprise is an enterprise where investment in plant and machinery does not exceed (According to MSMED Act, 2006):

- A) Rs. 25 Lakh
- B) Rs. 20 Lakh
- C) Rs. 15 Lakh
- D) Rs. 30 Lakh

7. Why should an entrepreneur do a feasibility study for starting a new venture:

- A) To identify possible sources of funds
- B) To see if there are possible barriers to success
- C) To estimate the expected sales
- D) To explore potential customers

8. Which one of the following is the next stage to the Concept Stage of Product Planning and Development Process:

- A) Idea Stage
- B) Product Planning Stage
- C) Product Development Stage
- D) Test Marketing Stage

9. What is the process by which individuals pursue opportunities without regard to resources they currently control

A) Startup management

- B) Entrepreneurship
- C) Financial analysis
- D) Feasibility planning

10. An individual who initiates, creates and manages a new business can be called

- A) A leader
- B) A manager
- C) A professional
- D) An entrepreneur

**11.** he term "Entrepreneur" has been derived from the word "entreprendre" which means\_\_\_\_\_

12. Entrepreneurship is a creative activity – Said by\_\_\_\_\_

13. \_\_\_\_\_ is the hallmark of a successful entrepreneur

14. "Seed Capital Scheme" is being operated by\_\_\_\_\_

15. \_\_\_\_\_manufactured "Sumeet" mixies to suit Indian conditions

16.BEP=(F/(S-V)x100F stand for	
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17. Ownership capital is also known as\_\_\_\_\_

18. Government industrial estates come under \_\_\_\_\_type of classification

- 19. Expand SWOT\_\_\_\_\_
- 20. IPR stands for \_\_\_\_\_

# SECTION-B

# Answer any FOUR questions

 $4 \times 8 = 32$  M

- 21. Explain about Concept of entrepreneur, entrepreneurship?
- 22. Write about Entrepreneurship development programmes (EDPs) Objectives, phases, problems of EDPs?
- 23. Briefly explain about Environment scanning and opportunity identification?
- 24. Write short notes on Export and import policies relevant to Indian Agriculture sector?
- 25. What are Seed, fertilizer, pesticides, farm machinery and agricultural food processing industry?
- 26. Write short notes on market types?

# SECTION-C

# Answer any FOUR questions

 $4 \times 12 = 48$  M

- 27. Explain about Supply chain management Meaning, advantages, stages and process and total quality management?
- 28. Explain about Business leadership skills Communication skills for entrepreneurship development?
- 29. Discus steps in Steps in establishment of MSME Enterprise?
- 30. WriteInstitutional support Financial Institutions and other agencies in entrepreneurship development?
- 31. Write about Government policies, incentives, programmes and schemes for entrepreneurship development?
- 32. WriteSWOT Analysis Concept, meaning and advantages?
Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Entrepreneurship Development and BusinessCommunication-PracticalCourse Code: AEXT292PNo. of Hrs:30Credits:1

#### Objectives

- To study about any one Agri based industries/ business Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis.
- To study about constraints in setting up of agro based industries Formulation of project feasibility reports and industrial and agribusiness houses.
- To study formulation of project feasibility reports.

#### Course Outcomes

CO1: students will learnConcept of entrepreneur, entrepreneurship
CO2:Students will understandCharacteristics of entrepreneurs Opportunities for entrepreneurship and rural entrepreneurship
CO3: students will learnEntrepreneurship development programmes
(EDPs).

**CO4**:students will learnSWOT Analysis

**CO5**:Students will understandInstitutional support - Financial Institutions and other agencies in entrepreneurship development

#### EXPERIMENTS

- Field visits to study any one Agri based industries/ business Strengths, Weaknesses, Opportunitiesand Threats (SWOT) analysis.
- Field visits to study the constraints in setting up of agro based industries Formulation of project feasibility reports and industrial and agri-business houses.
- 3. Field visits to study the formulation of project feasibility reports.
- 4. Field visits to study the industrial and agri-business houses.
- 5. Field visits to study the characteristics of successful entrepreneurs.
- 6. Field visits to study the any one of the Local Financial Institutions to study the MSME Policies.

- 7. Field visits to study the Entrepreneurial Development Institute to study the Process of Entrepreneurship Development.
- 8. Field visits to the local Public Private Enterprises to study the managerial skills and achievement motivation.

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### SCHEME OF EVALUATION

# Subject: Agriculture and Rural Development Semester: IV Course Title: Renewable Energy and Green Technology Course Code: AENG252

No. of Hrs:15 Credits: 1

# Objectives

- To know Availability and uses of non conventional energy in agricultural sector.
- To know Bio-fuel production from biomass and its application.
- To study about Practical approach to biogas production and biogas plants capacity and design calculations.
- To study about Evaluation of solar pump for agriculture

# Course Outcomes

At the end of the course, students will be able to

**CO1:**Explain the classification, advantages and disadvantages of renewable energy sources.

**CO2:** Classify gasifiers and briquettes and explain the uses.

**CO3**:Outline the methods of tapping solar energy and its applications.

**CO4:** Summarize the types, construction and applications of wind mills.

**CO5:** Discuss the characteristics of biofuels and production of biodiesel and ethanol from biomass.

# Theory

# UNIT -I (3 Hours)

1. Introduction - Renewable energy sources, classification, advantages and disadvantages.

2. Biomass - Importance of biomass, classification of energy productionPrinciples of combustion, pyrolysis and gasification.

3. Biogas - Principles of biogas production, advantages, disadvantages, utilization.

4. Biogas plants - Classification, types of biogas plants, constructional details of biogas plants.

# UNIT-II (3 Hours)

1. Types of gasifiers - Producer gas and its utilization.

2. Briquettes, briquetting machinery – Types and uses of briquettes - Shredders.

3. Solar energy – Application of solar energy, methods of heat transfer, conduction, convection and radiation.

# UNIT-III (3 hours)

1. Solar appliances - Flat plate collectors, focusing type collectors, solar air heater.

2. Solar space heating and cooling - Solar energy gadgets, solar cookers, solar water heating systems.

3. Solar grain dryers, solar refrigeration system, solar ponds.

# UNIT -IV (3 Hours)

1. Solar photovoltaic system - Solar lantern, solar street lights, solar fencing, solar water pumping system.

2. Wind energy - Advantages, disadvantages, wind mills and types.

3. Constructional details of wind mills, applications of wind mills.

# UNIT-V (3 hours)

1. Biofuels – Characteristics of various biofuels, different parameters and calorific values.

2. Bio diesel production – Applications, extraction from jatropha.

3. Ethanol from agricultural produce (sugarcane and corn).

# References text books

- 1. Rai, G.D. 2004. Non-conventional Energy Sources. Khanna Publishers, New Delhi.
- 2. Rajput, R. K. 2012. Non-conventional Energy Sources. S. Chand Publishers.
- 3. Ojha, T.P. and Michael, A.M. Principles of Agricultural Engineering. Vol. I, Jain Brothers, New Delhi.
- 4. Rathore, N.S., Mathur, A.N. and Kothari, S. Alternate Sources of Energy. ICAR Publication.

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Renewable Energy and Green TechnologyCourse Code: AENG252

Time: 3 Hrs.

Max. Marks: 100

#### **SECTION-A**

#### Answer ALL questions

#### $20 \times 1 = 20 M$

1. Which of the following is a disadvantage of renewable energy?

- A) High pollution
- B) Available only in few places
- C) High running cost
- D) Unreliable supply

2. A Solar cell is an electrical device that converts the energy of light

directly into electricity by the \_\_\_\_\_

- A) Photovoltaic effect
- B) Chemical effect
  - C) Atmospheric effect
  - D) Physical effect

3. In hydroelectric power, what is necessary for the production of power throughout the year?

- A) Dams filled with water
- B) High amount of air
- C) High intense sunlight
- D) Nuclear power

4. The main composition of biogas is \_\_\_\_\_

- A) Methane
- B) Carbon dioxide
- C) Nitrogen
- D) Hydrogen

5. Which Ministry is mainly responsible for research and development in renewable energy sources such as wind power, small hydro, biogas and solar power?

- A) Human Resource Development
- B) Agriculture and Farmers Welfare
- C) Ministry of New and Renewable Energy
- D) Health and Family Welfare

6. Which among the following have a large amount of installed grid interactive renewable power capacity in India?

- A) Wind power
- B) Solar power
- C) Biomass power
- D) Small Hydro power

7. Which of the following is not under the Ministry of New and Renewable Energy?

- A) Wind energy
- B) Solar energy
- C) Tidal energy
- D) Large hydro

8. Where is the largest Wind Farm located in India?

- A) Jaisalmer Wind Park, Rajasthan
- B) Muppandal Wind Farm, Tamil Nadu
- C) Vaspet Wind Farm, Maharashtra
- D) Chakala Wind Farm, Maharashtra

9. The world's first 100% solar powered airport located at \_\_\_\_\_

- A) Cochin, Kerala
- B) Bengaluru, Karnataka
- C) Chennai, Tamil Nadu
- D) Mumbai, Maharashtra

# 10. Which Indian enterprise has the Motto "ENERGY FOREVER"?

- A) Indian Renewable Energy Development Agency
- B) Indian Non-Renewable Energy Development
- C) Indian Agricultural Development
- D) Indian Biotechnology Development
- 11. Give an example for non-renewable resource \_\_\_\_\_

12. Photovoltaic energy is the conversion of sunlight into\_\_\_\_\_

- 13. Give an example for non-renewable energy \_\_\_\_\_
- 14. Horizontal axis and vertical axis are \_\_\_\_\_types
- 15. Steam reforming is currently the least expensive method of producing\_\_\_\_\_
- 16. A fuel cell, in order to produce electricity, burns \_\_\_\_\_
- 17. Both power and manure is provided by\_\_\_\_\_
- 18. he outermost layer of the earth is\_\_\_\_\_
- 19. Common energy source in Indian villages is\_\_\_\_\_
- 20. BTU is measurement of \_\_\_\_\_

#### SECTION-B

#### Answer any FOUR questions

 $4 \times 8 = 32$  M

- 21. Explain about Bio diesel production and Applications, extraction from jatropha?
- 22. Write about Biofuels and Characteristics of various biofuels?
- 23. What is Wind energy and write Advantages, disadvantages?
- 24. Write about Solar grain dryers?
- 25. Explain about methods of heat transfer?
- 26. Explain about Biogas Principles of biogas production, advantages, disadvantages, utilization?

#### SECTION-C

#### Answer any FOUR questions

 $4 \times 12 = 48 \text{ M}$ 

- 27. Explain about classification of energy production Principles of combustion, pyrolysis and gasification?
- 28. Write in detail about Biogas plants Classification, types of biogas plants, constructional details of biogas plants.?
- 29. Discus about Types and uses of briquettes, Shredders?
- 30. Write about Application of solar energy?
- 31. Write about Solar photovoltaic system?
- 32. Write the procedure for Ethanol production from agricultural produce?

# Subject: Agriculture and Rural Developments Semester: IV Course Title: Renewable Energy and Green Technology-Practical Course Code: AENG252P

No. of Hrs:30 Credits:1

#### Objectives

- To know Availability and uses of non conventional energy in agricultural sector.
- To study about Bio-fuel production from biomass and its application.
- To study about practical approach to biogas production and biogas plants capacity and design calculations.
- To Evaluation of solar pump for agriculture

#### Course Outcomes

CO1: Students will understandImportance of biomass, classification of energy production - Principles of combustion, pyrolysis and gasificationCO2: Students will understandClassification, types of biogas plants.

CO3: Students will understandTypes of gasifiers

**CO4:** Students will understandSolar energy

# EXPERIMENTS

1. Availability and uses of non - conventional energy in agricultural sector.

2. Bio-fuel production from biomass and its application.

3. Practical approach to biogas production and biogas plants capacity and design calculations.

- 4. Evaluation of solar pump for agriculture.
- 5. Study of solar drying system.
- 6. Study of solar distillation and solar pond.
- 7. Steps adopted for erecting solar fence.
- 8. Visit to solar wind farm. 15&16. Visit to solar photovoltaic farm.

# SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

# Subject: Agriculture and Rural Development Semester: IV Course Title: LIVE-STOCK AND POULTRY MANAGEMENT Course Code: LSPM201 No. of Hrs:30 Credits: 2

# Objectives

- To study about body points/parts of different domesticated animals and poultry
- To Approach and handling methods of restraining.
- To Identify methods of farm animals and poultry (branding, tattooing, notching & tagging).
- To Identify various breeds and familiarizing with various farm routines and farm records.

# **Course Outcomes**

At the end of the course, students will be able to

**CO1:**Elaborate on the demographic distribution and population dynamics of livestock

**CO2**:Explain thedesign and construction of livestock and poultry buildings.

**CO3:** Categorize the breeds of livestock and explain their management.

**CO4:**Discuss the nutritional management of livestock and poultry.

**CO5:** Summarize the disease management of livestock and poultry.

# Theory

# UNIT -1 (6 Hours)

- 1. Demographic distribution of live-stock population.
- 2. Population dynamics of live-stock and role in Indian economy.
- 3. Reproduction in live-stock and poultry.
- 4. Housing systems live-stock and poultry.
- 5. Design and construction of live-stock and poultry buildings.
- 6. Selection of site and General principles affecting the design.

# UNIT -II (6 Hours)

- 1. Arrangements of building.
- 2. Building materials
- 3. Indian breeds of cattle, buffalo, sheep, goat, swine and poultry
- 4. exotic breeds of cattle, buffalo, sheep, goat, swine and poultry
- 5. Management of calves, growing heifers and milch animals

6. Management of sheep, goat and swine

7. Incubation, hatching and brooding

# UNIT –III (6 Hours)

1. Improvement of live-stock and poultry.

- 2. Digestion and metabolism live-stock and poultry.
- 3. Classification of feedstuffs for live-stock and poultry.
- 4. Proximate principles of feed.
- 5. Nutrients and their functions.
- 6. Feed ingredients for ration- Balanced ration.
- 7. General principles of computation of ration.

# UNIT-IV (6 Hours)

- 1 Formulation of rations and feeding dairy cattle and buffaloes.
- 2 Formulation of rations sheep, goat and swine and poultry.

3 Feed supplements Feed additives in the rations of live-stock and poultry.

4 Feeding of live-stock and poultry.

5 Diseases of cattle and buffaloes.

6 Diseases of sheep, goat and swine.

# UNIT-V (6 Hours)

- 1. Diseases of Poultry.
- 2. Sanitation Sanitation of live-stock and poultry houses.
- 3. Prevention of infectious diseases in live-stock and poultry.
- 4. Vaccination schedule for cattle and buffaloes sheep, goat.
- 5. Vaccination schedule for swine and poultry.
- 6. Control of infectious diseases in live-stock and poultry.

# MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: LIVE-STOCK AND POULTRY MANAGEMENTCourse Code: LSPM201Time: 3HrsMax. Marks: 100 M

#### SECTION-A

Answer **ALL** questions

 $20 \times 1 = 20 \text{ M}$ 

Multiple Choice Questions

- 5. Incubation period of Muscovy duck is
  - A) 21 days
  - B) 28 days
  - C) 32 days
  - D) 35 days
- 6. In India around......% egg production is from ducks alone.
  - A) 5%
  - B) 10%
  - C) 15%
  - D) 20%
- 7. During incubation testing of egg should be done at
  - A) 10th day
  - B) 15th day
  - C) 18th day
  - D) 21th day
- 8. The feed cost as the percentage of total cost of commercial poultry production is
  - A) 30-40
  - B) 40-50
  - C) 60-70
  - D) above 90
- 9. The major component of egg shell is
  - A) Calcium phosphate
  - B) Calcium chloride
  - C) Calcium carbonate
  - D) Dicalcium phosphate
- 10. Ducks layed eggs at.....degree angle.
  - A) 90
  - B) 180
  - C) any of the above
  - D) none

- 11. Egg low in
  - A) Calcium
  - B) vit-c
  - C) both of the above
  - D) phosphorus
- 12. The hatchery should be situated at least .....ft away from other poultry houses.
  - A) 100ft
  - B) 500ft
  - C) 1000ft
  - D) none of the above
- 13. Which of the following methods is not used for sexing of chicks?
  - A) Identification of rudimentary testes in cloaca
  - B) Rapid and alowfeathring
  - C) Barring and non-barring
  - D) Comb shape
- 14. Rotating eggs from side to side over a ......degree angle improve hatchability.
  - A) 90degree
  - B) 120 degree
  - C) 180degree
  - D) a and c both

# Fill in the blanks

15. Poultry birds which exclusively grown for meat are called as \_\_\_\_\_

- 16. Give an example for Indian breed of poultry\_\_\_\_\_
- 17. \_\_\_\_\_\_ is the father of white revolution in India
- 18. Write an example for dairy animal \_\_\_\_\_
- 19. \_\_\_\_\_Vitamin helps to stop bleeding by clotting the blood
- 20. Poultry birds which exclusively grown for eggs are called as
- 21. Write an example for Indian sheep breed \_\_\_\_\_
- 22. Write one disease of buffalo\_\_\_\_\_
- 23. Scientific name of goat \_\_\_\_\_
- 24. Egg contains high in \_\_\_\_\_

#### SECTION-B

#### Answer any **FOUR** questions

#### $4 \times 8 = 32$ M

21. Explain Population dynamics of live-stock and its role in Indian economy?

22. Briefly explain about design and construction of live-stock and poultry buildings?

23. Write short notes on Indian breeds of cattle, buffalo, sheep, goat and poultry?

24. Write in detail about Digestion and metabolism live-stock and poultry?

25. Explain about Diseases of cattle and buffaloes?

26. Explain about Prevention of infectious diseases in live-stock and poultry

# SECTION-C

Answer any FOUR questions

 $4 \times 12 = 48 \text{ M}$ 

27. What are the Feed supplements Feed additives in the rations of live-stock and poultry?

28. Briefly explain about Diseases of Poultry?

29. Enlist the diseases of sheep, goat and explain about them?

30. Briefly explain about Digestion and metabolism live-stock and poultry?

31. Write short notes on Incubation, hatching and brooding?

32. Explain about exotic breeds of cattle, buffalo, sheep, goat, swine and poultry?

#### Subject: Agriculture and Rural Development Semester: IV **Course Title: Live-Stock and Poultry Management-Practical** Course Code: LCPM201P No. of Hrs:30

# Credits:1

# **Objectives**

- To Familiarizing with body points/parts of different domesticated animals and poultry
- To learn about Approaching, handling methods of restraining.
- To Identify methods of farm animals and poultry (branding, tattooing, notching & tagging).

# **Course Outcomes**

**CO1**:Students will understand aboutDemographic distribution of livestock population

**CO2:** Students will understand aboutPopulation dynamics of live-stock and role in Indian economy

CO3: Students will understand aboutDesign and construction of livestock and poultry buildings

**CO4:** Students will understand about Students will understand aboutIncubation, hatching and brooding

CO5: Students will understand aboutClassification of feedstuffs for livestock and poultry

# **EXPERIMENTS**

- 1. Familiarizing with body points/parts of different domesticated animals and poultry.
- 2. Approaching, handling methods of restraining.
- 3. Casting of live-stock.
- 4. Identification methods of farm animals and poultry (branding, tattooing, notching & tagging).
- 5. A visit to the live-stock and poultry farms.
- 6. Identification of various breeds and familiarizing with various farm routines and farm records.
- 7. Hatching equipment Hatchery operations and incubation.
- 8. Management of chicks, growers and layers.
- 9. Debeaking, dusting and vaccination.

10. Economics of cattle, buffalo, sheep, goat, swine and poultry production

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### SCHEME OF EVALUATION

Semester: IV

Subject: Agriculture and Rural Development Course Title: STATISTICAL METHOD Course Code: SMCA201 No. of Hrs:15 Credits: 1

# Objectives

- To Prepare frequency distribution for ungrouped data
- To Prepare various graphs and charts
- To Compute of A.M, Median and Mode for grouped and ungrouped data
- To study about Problems on calculating skewness and kurtosis -S.D and CV% for grouped data

# **Course Outcomes**

At the end of the course, students will be able to

**CO1:**Explain the importance and limitations of statistics in agriculture. **CO2:**Interpret agricultural datausing central tendency and dispersion measures.

**CO3:** Explain the importance of probability and testing of hypothesis measures in agricultural field data.

**CO4:** Apply the correlation and regression methods to interpret agricultural data.

**CO5:**Design the layouts and apply ANOVA methods to agricultural data. **CO6:** Differentiate sampling and complete enumeration surveys and explain different sampling methods.

# Theory

# UNIT –1 (3Hours)

1. Introduction and various definitions of Statistics - Singular and plural reference of Statistics - A comprehensive definition of Statistics - Importance of Statistics in agriculture - limitations of statistics.

2. Frequency Distribution- Exclusive and inclusive methods - Discrete and continuous variables - Graphical representation of data

3. Central tendency-Definition - Measures of Central tendency - List of all the different measures and study of Arithmetic Mean - Median -

Mode in detail (including merits and demerits) for ungrouped and grouped data.

4. 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.

# UNIT - II (3 Hours)

1. Definition of Probability – Addition - Multiplication theorems -Binomial and Poisson distributions

2. Normal Curve and its properties - Identification of normality through data i.e.., criterion. etc., expression for frequency function of Normal distribution

3. Testing of Hypothesis – Concept - Null hypothesis - Type I and Type II Errors Level of Significance - Critical region - General setup of testing - Large Sample Test with known and unknown

# UNIT –III (3 Hours)

1. Small Sample test (t-test for one and two samples and Paired t- test) and F-test

2. Chi-Square test for 2x 2 and m x n contingency Table - Yate's correction for Continuity

3. Correlation – Scatter diagram - Positive and negative correlation and its testing

# UNIT –IV (3 Hours)

1. 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

2. Analysis of Variance (ANOVA) - Definition and assumptions -ANOVA with One-way classification (CRD) layout and analysis withequal and unequal repetitions, Advantages and disadvantages

3. ANOVA with Two-wayClassification (RBD) - Layout and analysis, Advantagesand disadvantages

# UNIT - V(3 Hours)

1. ANOVA with three-way classification (LSD) – Layout and Analysis - Advantages and disadvantages.

2. Introduction to Sampling - Sampling Vs Census - Purposive and Random Sampling

3. Simple Random Sampling - Method of selection - Estimates of population mean and total and the estimates of their variances and confidence limits.

#### References text books

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

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

3. Chandel SRS, Hand Book of Agricultural Statistics. AchalPrakashanMandirpublications, New Delhi.

4. Agrawal, B.L. Programmed Statistics. 2nd Edition, New Age International Publishers

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: STATISTICAL METHODCourse Code: SMCA201Time: 3HrsMax. Marks: 100 M

#### SECTION-A

#### **Answer ALL questions**

#### $20 \times 1 = 20 M$

1. Which of the following values is used as a summary measure for a sample, such as a sample mean?

- A) Population parameter
- B) Sample parameter
  - C) Sample statistic
- D) Population means
- 2. Which of the following is a branch of statistics?
- A) Applied statistics
- B) Mathematical statistics
- C) Industry statistics
- D) Both A and B

3. The control charts and procedures of descriptive statistics which are used to enhance a procedure can be classified into which of these categories?

- A) Behavioural tools
- B) Serial tools
- C) Industry statistics
- D) Statistical tools

4. Which of the following can also be represented as sample statistics?

- A) Lowercase Greek letters
- B) Roman letters
- C) Associated Roman alphabets
- D) Uppercase Greek letters

5. To which of the following options do individual respondents, focus groups, and panels of respondents belong?

- A) Primary data sources
- B) Secondary data sources
- C) Itemised data sources
- D) Pointed data sources

6. What are the variables whose calculation is done according to the weight, height, and length known as?

A) Flowchart variables

B) Discrete variables

C) Continuous variables

D) Measuring variables

7. Which method used to examine inflation rate anticipation, unemployment rate, and capacity utilisation to produce products?

A) Data exporting technique

B) Data importing technique

C) Forecasting technique

D) Data supplying technique

8. Specialised processes such as graphical and numerical methods are utilised in which of the following?

A) Education statistics

B) Descriptive statistics

C) Business statistics

D) Social statistics

9. What is the scale applied in statistics, which imparts a difference of magnitude and proportions, is considered as?

A) Exponential scale

B) Goodness scale

C) Ratio scale

D) Satisfactory scale

10. Review of performance appraisal, labour turnover rates, planning of incentives, and training programs are the examples of which of the following?

A) Statistics in production

B) Statistics in marketing

C) Statistics in finance

D) Statistics in personnel management

11. The word statistics seems to have been derived from \_\_\_\_\_

12. If an experiment is repeated under essentially homogeneous and similar

conditions and the result are not unique but may be one of the several possible

outcomes, this type of phenomenon is known as \_\_\_\_\_\_.

13. Arrangement of statistical data in chronological order is known as

\_\_\_\_\_

14. Intelligence Quotient (I.Q.) is regarded as an indicator of an individual's

mental and intellectual development. I.Q. is defined as\_\_\_\_\_.

15. Sample is denoted by \_\_\_\_\_

16. Population is denoted by \_\_\_\_\_

17. Formula for coefficient of variation\_\_\_\_\_

- 18. Expand CRD \_\_\_\_\_
- 19. Formula for mean\_\_\_\_\_
- 20. Write mean for 2, 4,5, 7, 2,8, 10, 2 \_\_\_\_\_

# SECTION-B

#### Answer any FOUR questions

 $4 \times 8 = 32$  M

- 21. Define statistics and write importance of Statistics in agriculture and limitations?
- 22. What is Frequency Distribution and explain about Exclusive and inclusive methods?
- 23. Explain about Testing of Hypothesis?
- 24. Write in detail about t-sample test and F test?
- 25. Define correlation and explain about positive and negative correlation?
- 26. Explain about measures of dispersion?

# SECTION-C

# Answer any FOUR questions

 $4 \times 12 = 48$  M

- 27. Write in detail about ANOVA with three-way classification (LSD), Layout, Analysis with Advantages and disadvantages?
- 28. Briefly explain about 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?
- 29. Explain about Chi-Square test for 2x 2?
- 30. Briefly explain about Normal Curve and its properties?
- 31. Define Central tendency write about Measures of Central tendency?
- 32. What is Simple Random Sampling and write in detail about method of selection?

Subject: Agriculture and Rural Development Course Title: Statistical Method-Practical Course Code: SMCA201P No. of Hrs:30 Semester: IV

#### Credits:1

#### Objectives

- To Prepare frequency distribution for ungrouped data
- To Prepare various graphs and charts
- To Computate of A.M, Median and Mode for grouped and ungrouped data by direct and deviation methods.
- To know the Problems on calculating skewness and kurtosis S.D and CV% for grouped data

#### Course Outcomes

**CO1:** Students will understand aboutImportance of Statistics in agriculture - limitations of statistics.

**CO2:** Students will understand aboutFrequency Distribution

**CO3**:Students will understand aboutMeasures of Dispersion

**CO4:**Students will understand aboutTesting of Hypothesis

#### EXPERIMENTS

- Preparing frequency distribution for ungrouped data by using inclusive and exclusive methods and calculation of quartile -Deciles and Percentiles.
- 2. Preparing various graphs and charts.
- 3. Computation of A.M, Median and Mode for grouped and ungrouped data by direct and deviation methods.
- 4. Problems on calculating skewness and kurtosis S.D and CV% for grouped data
- 5. Problems on probability.
- 6. Problems on binomial and poisson distributions.
- 7. Normal curve and its properties, identification of normality through data i.e., criterion. etc., Expression for frequency function of normal distribution.
- 8. Problems on Z- test for one Sample Two sample with known and unknown conditions of.

# SCHEME OF EVALUATION

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

Subject: Agriculture and Rural Development Semester: IV Course Title: Rural Development Planning and Management Course Code: PMRD 202 No. of Hrs:30 Credits: 2

# **Objectives**:

- To study about unit aimed at enabling you to understand the process of planning
- To study about the process of planning in India;
- To Indicate the nature of the planning machinery both at the national and state level

#### **Course Outcomes**

At the end of the course, students will be able to

- **CO1:** Explain types of planning process in rural development.
- **CO2:** Discuss the decentralization of planning.
- **CO3:** Elaborate on different levels of planning.
- **CO4:** Discuss strategies for sustainable development in rural areas.

Unit I (6 Hrs.) Types of Planning Process Unit II (6 Hrs.) Decentralization of Planning Unit III (6 Hrs.) Micro Level Planning (Village Level Planning) Unit IV (6 Hrs.) Block and District Level Planning- Strategies for Sustainable Development Unit V (6 Hrs.) District Planning

#### MODEL QUESTION PAPER

Subject: Agriculture and Rural DevelopmentSemester: IVCourse Title: Rural Development Planning and ManagementCourse Code: PMRD 202

Time: 3 Hrs

Max. Marks: 100 M

#### **SECTION-A**

#### Answer ALL questions

#### $20 \times 1 = 20 M$

- 1. The action plan for rural development focuses on
  - A) Lingering challenges
  - B) Emerging challenges
  - C) Both A and B
  - D) None of the above
- 2. Initiate required for Rural development includes
  - A) Development of Human resource
  - B) Land Reforms
  - C) Infrastructure development
  - D) Price
- 3. Lingering Challenges include
  - A) Challenge of rural credit
  - B) Challenge of rural marketing
  - C) Challenge of Unemployment
  - D) Both A and B
- 4. Emerging Challenges of rural development includes
  - i) Diversification of production activities
  - j) Organic farming
  - k) Both a and b
  - I) Selling products
- 5. Rural credit is required for farming because
  - i) Most farming families have small land holdings
  - j) They produce only for self- consumption
  - k) They need funds for further investment in agriculture
  - I) A philosophy that stresses customer value and satisfaction.
- 6. The duration of short-term credit is
  - i) 6 to 12 months
  - j) 2 to 5 years
  - k) 5 to 20 years
  - I) 12 months to 5 years

- 7. Which approach was adopted by India in 1969 to meet the needs of rural credit?
  - i) Social banking
  - j) Multi-agency
  - k) Both A and B
  - I) Basic human requirements
- 8. Short term credit is required for
  - i) Construction of fence
  - j) Purchasing inputs like seeds, fertilizers etc
  - k) For purchasing land or tractor
  - I) Social Needs
- 9. The duration of medium-term credit is
  - i) 6 to 12 months
  - j) 2 to 5 years
  - k) 5 to 20 years
  - I) 12 months to 5 years
- 10. Non-institutional source of rural credit includes
  - E) Moneylenders
  - F) Commercial banks
  - G) Regional Rural banks
  - H) None of the above
- 11. NABARD stands for \_\_\_\_\_
- 12. The apex funding agency for providing rural credit is
- 13. The main function of NABARD is \_\_\_\_\_
- 14. Expand SHG \_\_\_\_\_
- 15. Credit required for digging the well is an example of \_\_\_\_\_ credit.
- 16. \_\_\_\_\_ is the lifeline of farming activities in rural areas
- 17. In 1969 India adopted\_\_\_\_ and multi-agency approach to meet the needs of rural development.
- 18. The State Bank of India was set up in \_\_\_\_ with a focus on rural credit.
- 19. Nationalization of commercial bank happened in\_\_\_\_\_.
- 20. \_\_\_\_\_ is an important source of occupation for the women.

#### SECTION-B

#### Answer any FOUR questions

#### 4 ×8 = 32 M

- 21. Describe the process of planning in India?
- 22. Explain nature of planning in state level?
- 23. Write short notes on the process of planning?
- 24. Explain about challenges in Rural development?
- 25. Write in detail about micro level planning?
- 26. What is Rural development and explain about it briefly?

#### SECTION-C

#### Answer any FOUR questions

# $4 \times 12 = 48$ M

- 27. Define Planning and explain about district level developments?
- 28. Explain about non institutional sources of rural credits?
- 29. Write in detail about Block and District Level Planning- Strategies for Sustainable Development?
- 30. Write in detail about village level planning?
- 31. What is decentralization and explain about it?
- 32. Explain about Types of Planning Process

# SEMESTER - V

#### B.Sc. Agriculture and Rural Developments SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Geo informatics and Nanotechnology for PrecisionFarming andPractical Crop ProductionCourse Code: AGRO301No. of Hrs: 30Credits: 2

# Objectives

1. SSAC GIS software, spatial data creation and editing.

- 2. SSAC Image processing software.
- 3. SSAC Visual and digital interpretation of remote sensing images.
- 4. SSAC Generation of spectral profiles of different objects.

# Course Outcomes

**CO1:** AGRO Precision agriculture: concepts and techniques-Issues and concerns for Indian agriculture

**CO2:**AGRO Geo-informatics- definition, concepts, tools and techniques and their use in Precision Agriculture.

CO3: AGRO Crop discrimination and Yield monitoring techniques

CO4: AGRO Spatial data and their management in GIS

**CO5:**AGRO Application of nanotechnology in agriculture - tillage, seed, water, fertilizers, plant protection for scaling-up farm productivity

# THEORY

# UNIT I (6 Hours)

1. AGRO Precision agriculture: concepts and techniques-Issues and concerns for Indian agriculture

2. AGRO Principles and practices of precision agriculture.

3. AGRO Geo-informatics- definition, concepts, tools and techniques and their use in Precision Agriculture.

4. AGRO Crop discrimination and Yield monitoring techniques

# UNIT II (6 Hours)

1.AGRO Global positioning system (GPS) –Components and its application in agriculture

2. AGRO Geodesy and its basic principles

3. AGRO Spatial data and their management in GIS

# UNIT III (6 Hours)

1. AGRO Application of nanotechnology in agriculture - tillage, seed, water, fertilizers, plant protection for scaling-up farm productivity

2. SSAC Cartography, units of cartography, map scale, various symbols used in cartography, Soil mapping techniques

3. SSAC Remote sensing- concepts, Spectral reflectance of various earth features, atmospheric windows

# UNIT IV (6 Hours)

1.SSAC Image processing and interpretation - geo referencing supervised and unsupervised classification of RS images. STCR approach for precision agriculture - principles and computations

2. SSAC Applications of remote sensing techniques in the field of agriculture and allied sciences including drones.

3. SSAC Spatial variability of soil fertility, its determination, fertilize recommendation using geospatial technologies in precision farming.

# UNIT V (6 Hours)

1. SSAC Nanotechnology, definition, concepts and techniques – Nano scale –definition – Nano-particles, materials - occurrence – properties

2. SSAC Characterization of nano-materials - structural characterization- Nano-sensors

3. SSAC Nano-fertilizers, nano-pesticides - importance and advantages –synthesis– strategies

# REFERENCES

1. Pradeep. T. 2007. NANO: The Essentials: Understanding Nanoscience and Nanotechnology. Tata McGraw-Hill Publishing Company Limited, New Delhi

2. Lillesand, T.M. and Kiefer, R. W. 1994. Remote sensing and image interpretation.

3. (3rd edition), John Wiley and Sons.

4. Anji Reddy, M. 2006. Text book of Remote sensing and Geographical Information

Systems, (3rd edition), B.S. Publications, Hyderabad.

## Model Question Paper

#### Subject: Agriculture and Rural Development Semester: V Course Title: Geo informatics and Nanotechnology for Precision Farming and Practical Crop Production Course Code: AGRO301

Time: 3Hrs

Max. Marks: 100 M

#### SECTION-A

Answer **ALL** questions

#### 20×1 = 20 M

Multiple Choice Questions

- 1. The navigation system based on a network of satellites that helps users to record positional information
  - A) GPS
  - B) GIS
  - C) Remote sensing
  - D) All the above
- 2. The concept of SSNM in rice was developed in cooperation with researchers across \_\_\_\_\_.
  - A) Africa
  - B) South America
  - C) Asia
  - D) Europe

3. The required fertiliser N is distributed in several applications during the crop growing season using tool like the \_\_\_\_\_.

- A) Specific leaf area
- B) Leaf area index
- C) Leaf colour chart
- D) None of the above

4. \_\_\_\_ are automatic and may be applied to numerous farming operations.

A) Variable rate application

B) Variable rate applicator

- C) Variable rate technologies
- D) All the above

5. Geoinformatics is a new discipline concerned with the \_\_\_\_\_ of spatial data and the processing techniques in spatial information systems.

- A) Modelling
- B) Probabilistic model
- C) Deterministic model
- D) None of the above

6. \_\_\_\_\_ Can be defined as a system for capturing, storing, checking and

displaying data, which are spatially referenced to the earth.

A) GIS

B) GPS

C) Variable rate applicator

D) Remote sensing

7. \_\_\_\_\_ is used to operationalise precision farming at the farm level

A) Variable rate applicator

B) Variable rate technology

C) Variable rate application

D) None of the above

8. Image characteristics or features which effectively provides meaningful

information for image interpretation.

A) Feature extraction

B) Spectro radiometer GIS

C) Hydrospectral data

D)None of the above

9. Band selection is one of the important steps in \_\_\_\_\_

A) Remote sensing

B) Hydrospectral data

C) Hyperspectral remote sensing

D) All the above

10. \_\_\_\_\_ can be used as potential variables for crop type discrimination.

A) Narrow band vegetation indices

B) Physiological indices

C) Stress indices

D) All the above

11. GPS equipped combine harvester collects\_\_\_\_\_

12. Precision farming is a\_\_\_\_\_

13. Precision agriculture is popular in \_\_\_\_\_Countries

14. Technology behind yield map is\_\_\_\_\_

15. The proximate sensors measure\_\_\_\_\_

16. First use with aerial photos in agriculture is in\_\_\_\_\_year

17. Farming practices should be more closely to\_\_\_\_\_

18. Improving the management of fertilizers and other inputs are the part of\_\_\_\_\_

19. In P. A., GIS works as \_\_\_\_\_\_ of modern technologies

# SECTION-B

# Answer any **FOUR** questions**4**×**8** = **32 M**

11. Define AGRO Precision agriculture and write its concepts and techniques-Issuesand concerns for Indian agriculture?

12. Explain about AGRO Crop discrimination and Yield monitoring techniques?

13. What is AGRO Global positioning system (GPS) write its Components and

its application in agriculture?

14. Write about concepts, Spectral reflectance of various earth features, atmospheric windows of SSAC Remote sensing?

15. Write in detail about SSAC Spatial variability of soil fertility, its determination, fertilize recommendation using geospatial technologies in precision farming?

16. Explain about SSAC Nano-fertilizers, nano-pesticides, importance and advantage synthesis and strategies?

# SECTION-C

Answer any FOUR questions  $4 \times 12 = 48 \text{ M}$ 

17. Definition, concepts and techniques of SSAC Nanotechnology?

18. Explain about the SSAC Spatial variability of soil fertility, its determination,

fertilize recommendation using geospatial technologies in precision farming?

19. Discus about structural characterization of Nano sensors?

20. Explain about SSAC Remote sensing- concepts, Spectral reflectance of

various earth features, atmospheric windows?

21. Briefly discus about AGRO Spatial data and their management in GIS?

22. Write about AGRO Principles and practices of precision agriculture?

# **B.Sc. Agriculture and Rural Developments**

# PRACTICAL SYLLABUS

Subject: Agriculture and Rural Development Semester: V Course Title: Geo informatics and Nanotechnology for Precision Farming and Practical Crop Production Practical Course Code: AGRO301P

No. of Hrs: 30

Credits: 1

#### Objectives

- To develop the methodology for identifying the causes of within field variation in crop performance
- To develop the practical guidelines required to implement precision farming technology to achieve best management
- To explore the possibility of using remote sensing methods and GIS to enable management decision to be made in real time during the growth of the crop

#### **Course Outcomes:**

After the completion of course students will able to

**CO1:** Explain the SSAC GIS software, spatial data creation and editing and processing software

**CO2:** Summarise AGRO Supervised and unsupervised classification and acreage estimation.

**CO3:**Explain soil fertility based on GIS

**CO4:** Outline productivity and management zones and Fertilizers recommendations based of VRT and STCR techniques

# **EXPERIMENTS (10 Hours)**

- 1. SSAC GIS software, spatial data creation and editing.
- 2. SSAC Image processing software.
- 3. SSAC Visual and digital interpretation of remote sensing images.
- 4. SSAC Generation of spectral profiles of different objects.
- 5. AGRO Supervised and unsupervised classification and acreage estimation.
- 6. SSAC Multispectral remote sensing for soil mapping.
- 7. SSAC Creation of thematic layers of soil fertility based on GIS.
8. AGRO Creation of productivity and management zones.

9. AGRO Fertilizers recommendations based of VRT and STCR techniques.

### REFERENCES

1. Pradeep. T. 2007. NANO: The Essentials: Understanding Nanoscience and Nanotechnology. Tata McGraw-Hill Publishing Company Limited, New Delhi

2. Lillesand, T.M. and Kiefer, R. W. 1994. Remote sensing and image interpretation.

3. (3rd edition), John Wiley and Sons.

4. Anji Reddy, M. 2006. Text book of Remote sensing and Geographical Information

Systems, (3rd edition), B.S. Publications, Hyderabad.

### Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### B.Sc. Agriculture and Rural Developments SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Environmental Studies and Disaster ManagementCourse Code: CPHY361No. of Hrs: 15Credits: 1Objectives

1. Collection, processing and storage of effluent samples

2. Determination of chemical oxygen demand in waste water sample

3. Estimation of dissolved oxygen in waste water sample

4. Determination of total dissolved solids in waste water sample

### **Course Outcomes**

CO1: Environmental studies - Definition - Scope and importance

CO2:Natural resources – Renewable and non-renewable resources

CO3: Resources - Sources, uses and over utilization of surface and

groundwater - Dams – Benefits and problems – Sustainable management of water

**CO4:**Threats to biodiversity – Habitat loss – Poaching of wild life – Man-wild life conflicts – Conservation of biodiversity – In situ and ex situ.

**CO5:**Environmental pollution – Causes, effects and control measures of air and water pollution – Tolerable limits for toxic gases in air.

#### THEORY

### UNIT I (6 Hours)

1. Environmental studies - Definition – Scope and importance, need for public awareness, people and institutions in environment.

2. Natural resources – Renewable and non-renewable resources – Forest resources –Functions of forests – Causes and consequences of deforestation.

3. Water resources – Sources, uses and over utilization of surface and groundwater - Dams – Benefits and problems – Sustainable management of water.

4. Food resources – Food sources, world food problems and food security

## UNIT II (6 Hours)

1. Energy resources – Renewable and non-renewable energy sources and their impact on environment.

2. Land resources – Land degradation, desertification and land use planning – Role of an individual in conservation of natural resources.

3. Biodiversity – Definition – Types of biodiversity – Bio-geographical classification in India – Methods of measuring biodiversity – Biodiversity Act – Functions of National Biodiversity Board.

## UNIT III (6 Hours)

1. Threats to biodiversity – Habitat loss – Poaching of wild life – Man-wild life conflicts – Conservation of biodiversity – In situ and ex situ.

2. Environmental pollution – Causes, effects and control measures of air and water pollution – Tolerable limits for toxic gases in air.

3. Causes, effects and control measures of soil pollution – Bioremediation – Tolerable limits for heavy metals in soil.

## UNIT IV (6 Hours)

1. Causes, effects and control measures of thermal, marine and noise pollution, nuclear hazards.

2. Solid waste management – Need of waste management – Types of solid waste – Management processing technologies.

3&4Disaster management - Natural Disasters – Meaning and nature of natural disasters, types and effects - Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, heat and cold waves - Manmade disasters – Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, road accidents, rail accidents, air accidents, sea accidents. – International strategy for disaster reduction - Concept of disaster management - National disaster management framework - Financial arrangements - Role of NGOs, community-based organizations and media, Central, state, district and local administration, Armed forces, police and other organizations in disaster response.

### UNIT V (6 Hours)

1. Social issues and the environment – Unsustainable to sustainable development – The Environment Protection Act – The air (prevention and control of pollution) act - The water (prevention and control of pollution) act – The wildlife protection act - Forest conservation act.

2. Woman and child welfare – Human immuno-deficiency virus (HIV)/ Acquired ImmunodeficiencySyndrome (AIDS) – Role of information technology on environment and human health.

## REFERENCES

1. Bharucha, E. 2005. Text book of Environmental Studies for undergraduate courses. University Grants Commission, New Delhi.

2. Anjaneyalu, Y. 2004. Introduction to Environmental Science. BS Publications, Hyderabad, A.P. India.

### **Model Question Paper**

#### Subject: Agriculture and Rural Development Semester: V Course Title: Environmental Studies and Disaster Management Course Code: CPHY361 Time: 3Hrs Max. Marks: 100 M

SECTION-A

Answer **ALL** questions

 $20 \times 1 = 20 \text{ M}$ 

**Multiple Choice Questions** 

1. In an ecotone, the species which become abundant are called1. In an ecotone, the species which become abundant are called:

- A) Edge species
- B) Keystone species
- C) Endemic species
- D) Foster species
- 2. The objective of Environment studies is
  - A) Raise consciousness about environment conditions
  - B) To teach environmentally appropriate behaviour
  - C) Create an environmental ethic sensitive society
- D) All of the above
- 3. Which of the following is not influenced by human activities?
  - A) Destruction of mangroves and wetlands
  - B) Depletion of ground water
  - C) Increased extinction rate of species
  - D) None of the above

- 4. Which of the following is management option for air pollution?
  - A) Regulations and standards
  - B) Transport planning
  - C) Using CNG as fuel
  - D) All of these
- 5. Development activities on the hydrosphere cause
  - A) Air pollution
  - B) Soil pollution
  - C) Water pollution
  - D) Soil erosion
- 6. The species restricted to be present in one region are called
  - A) Edge species
  - B) Endemic species
  - C) Endangered species
  - D) Keystone species
- 7. The basic requirements of human beings are provided by
  - A) Industrialisation
  - B) Agriculture
  - C) Nature
  - D) Urbanisation
- 8. Environment is the life support system that includes
  - A) Air
  - B) Water

C) Land

D) All of the above

9. The term 'Environment' has been derived from the French word which means to encircle or surround

A) Environ

B) Oikos

C) Geo

D) Aqua

10. Biosphere is

A) The solid shell of inorganic materials on the surface of the earth

B) The thin shell of organic matter on the surface of the earth comprising of

all the living things

C) The sphere which occupies the maximum volume of all the spheres

D) All the above

11. An active volcano Mauna Loa is located in\_\_\_\_\_

12. A disease that becomes unusually widespread and even global in its reach is referred to as\_\_\_\_\_

13. Bhopal Gas Disaster is a kind of\_\_\_\_\_

14. father of modern seismology\_\_\_\_\_

15. The National Disaster Management Authority (NDMA) is headed by\_\_\_\_\_

16. Volcanic erupted material when inside the hill/earth/mountain it is called

17. Cyclones occurring in North Atlanticocean are called\_\_\_\_\_

18. Most of the Principal rivers in Tripura meets with which river of Bangladesh\_\_\_\_\_

19.In India National Institute of Disaster Management is located at\_\_\_\_\_

20. The Disaster Management Act was made in\_\_\_\_\_

# SECTION-B

# Answer any FOUR questions4×8 = 32 M

11. Define Environmental studies and write its Scope and importance?

12. Explain about Sources, uses and over utilization of surface Water resources?

13. Write the differences between Renewable and non-renewable resources?

14. Define biodiversity and explain the types of biodiversity?

15. Explain Causes, effects and control measures of soil pollution?

16. Write short notes on Environment Protection Act?

# SECTION-C

Answer any FOUR questions

 $4 \times 12 = 48 \text{ M}$ 

17. Explain about Role of information technology on environment and human health?

18. Explain about wildlife protection act and Forest conservation act?

19. What is disaster management and enlist and explain about natural Disasters?

20. Define environmental pollution and what are the causes, effects and control

measures of air and water pollution?

- 21. Explain about land degradation, desertification?
- 22. Write about Causes and consequences of deforestation?

### B.Sc. Agriculture and Rural Developments PRACTICAL SYLLABUS

Subject: Agriculture and Rural Development Semester: V Course Title: Environmental Studies and Disaster Management Practical Course Code: CPHY361P

No. of Hrs: 30

Credits: 1

- Objectives
- Explain collection of samples
- Estimation of dissolved oxygen
- Analysis of hardiness of water

# Course Outcomes

After the completion of course students will able to

CO1: Explain Collection, processing and storage of effluent samples
CO2: Discuss Determination of chemical oxygen demand in waste water sample and total dissolved solids in waste water sample
CO3: Outline temporary hardness of waste water sample by titration
CO4: Explain Preparation of sludge / waste water sample for analysis of heavy metals

**CO5:** Summarise Estimation of heavy metals in sludge / waste water by Atomic Adsorption Spectrophotometer (AAS)

# **EXPERIMENTS (10 hours)**

- 1. Collection, processing and storage of effluent samples
- 2. Determination of chemical oxygen demand in waste water sample
- 3. Estimation of dissolved oxygen in waste water sample
- 4. Determination of total dissolved solids in waste water sample
- 5. Analysis of temporary hardness of waste water sample by titration
- 6. Analysis of total hardness of waste water sample by titration
- 7. Preparation of sludge / waste water sample for analysis of heavy metals

8. Estimation of heavy metals in sludge / waste water by Atomic Adsorption Spectrophotometer (AAS)

# REFERENCES

1. Bharucha, E. 2005. Text book of Environmental Studies for undergraduate courses. University Grants Commission, New Delhi.

2. Anjaneyalu, Y. 2004. Introduction to Environmental Science. BS Publications, Hyderabad, A.P. India.

# Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### B.Sc. Agriculture and Rural Developments SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Principles of Food Science and NutritionCourse Code: BICM300No. of Hrs: 30Credits: 2

## Objectives

1. Minerals, pigments, colours, flavours

2. Natural emulsifiers.

3. Organic acids.

4. Oxidants and antioxidants.

5. Proteins, Fats and Vitamins

### **Course Outcomes**

**CO1:** Concepts of food science - Definitions of food, specific nutrients in foods and their functions

**CO2:**Food physical characteristics

CO3: Food composition

**CO4:**Carbohydrates

**CO5:**Proteins

THEORY

### UNIT I (6 Hours)

1. Concepts of food science - Definitions of food, specific nutrients in foods and their functions - Physical characteristics of foods - Importance

2. Food physical characteristics - Density - Phase change, pH, osmosis, surface tension, colloidal systems.

3. Food composition - Food chemistry - Water, solutions, water balances in body, clinical signs of water depletion, excessive water intake, recommended requirements

4. Carbohydrates - Structure, properties of sugars, starches, cellulose and hemicelluloses, pectin, gums.

5. Proteins - Structure, amino-acids, properties.

6. Fats and oils - Structure, functional aspects.

7. Vitamins - Retinol, vitamin D, vitamin E, vitamin K, ascorbic acid, B-complex group

# UNIT II (6 Hours)

1. Minerals, pigments, colours, flavours

- 2. Natural emulsifiers.
- 3. Organic acids.
- 4. Oxidants and antioxidants.
- 5. Enzymes.

6. Food microbiology - Morphology and fine structure of bacteria - Cultivation of bacteria, nutritional requirements -Nutritional classification of bacteria.

## UNIT III (6 Hours)

1. Introduction to yeast, algae and protozoa and virus, general characteristics

2. Microbial spoilage of foods - Factors affecting kinds, numbers, growth and survival of microorganisms in foods.

3. Production of fermented foods - Production, purification and estimation of beer/ ethanol.

4. Preservation by heat treatment - Principle and equipment for blanching.

5. Preservation by heat treatment - Canning, pasteurization, sterilization.

## UNIT IV (6 Hours)

1. Preservation by use of low temperature - Principle, methods, equipment

2. Preservation by chemicals - Antioxidants, mould inhibitors, antibodies, acidulants, etc.

3. Preservation by irradiation - Principle, methods, equipment.

4. Preservation by fermentation - Principles, methods, equipment

5. Preservation by drying, dehydration and concentration - Principle, methods, equipment.

6. Food and nutrition - History of diet around the world - European diet

7. Malnutrition (over and under nutrition), body cell, digestion and absorption, energy and calories, obesity and weight control.

### UNIT V (6 Hours)

1. Nutritional disorders that can compromise health.

2. Energy metabolism - Carbohydrates, individual sugars, sugars and diabetes mellitus, glycemic response, dietary carbohydrates

3. Energy metabolism - Fat, synthesis, control, biosynthesis, cellular degradation, peroxidation.

4. Energy metabolism - Proteins, synthesis, catabolism, ammonia and urea.

5. Balanced/modified diets, diet selection.

6. Menu planning.

7. New trends in food science and nutrition.

### REFERENCES

1. Sumati R. Mudambi, Shalini M. Rao and M.V. Rajagopal. 2006. Food Science, 2nd Ed. New Age International (P) Limited, New Delhi.

2. Martin Eastwood. 2003. Principles of Human Nutrition. Blackwell Science Ltd., Oxford.

3. Norman N. Potter. 1998. Food Science, 5th Ed. Springer Science+ Business Media, New York.

4. Michael J. Pelczar Jr., E.C.S. Chan and Noel R. Krieg. 1998. Microbiology, 5th Ed. Tata McGraw-Hill Education, New Delhi.

5. William C. Frazier and & Dennis C. Westfoff. 1987. Food Microbiology, 4th Ed. Tata McGraw-Hill Education, New Delhi.

6. L.E. Casida Jr. 1968. Industrial Microbiology. New Age International Publishers, New Delhi.

7. P. Fellows. 2000. Food Processing Technology: Principles and Practice, 2nd Ed. CRC Press, Boca Raton, FL, USA.

8. Marcus Karel and Darvl B. Lund.2003. Physical Principles of Food Preservation, 2nd Ed. Marcel Dekker, Inc., NY, USA.

9. Gerald Wiseman. 2002. Nutrition and Health. Taylor & Francis, London.

10. An Introduction to Nutrition, v. 1.0

### **Model Question Paper**

Subject: Agriculture and Rural Development Semester: V Course Title: Principles of Food Science and Nutrition Course Code: BICM300 Time: 3Hrs Max. Marks: 100 M

SECTION-A

Answer **ALL** questions

 $20 \times 1 = 20 \text{ M}$ 

**Multiple Choice Questions** 

1.A substance needed by the body for growth, energy, repair and maintenance is called a \_\_\_\_\_

- A) Nutrient
- B) Carbohydrate
- C) Calorie
- D) Fatty acid

2.All of the following are nutrients found in food except \_\_\_\_\_.

- A)Plasma
- **B**)Proteins
- C)Carbohydrates
- D)Vitamins

3. A diet high in saturated fats can be linked to which of the following?

- A) Kidney failure
- B)Bulimia
- C) Anorexia
- D) Cardiovascular disease

4.Amylases in saliva begin the breakdown of carbohydrates into

- A) Fatty acids
- B) Polypeptides
- C) Amino acids

D) Simple sugars

5. Your body needs vitamins and minerals because \_\_\_\_\_

A) They give the body energy

B) They help carry out metabolic reactions

- C)They insulate the body's organs
- D)They withdraw heat from the body

6.Food passes through the stomach directly by \_\_\_\_\_.

A)The large intestine

B)The small intestine

C)The heart

D) The pancreas

7. About half of your diet should be made up of \_\_\_\_\_

A)Grains and vegetables

B)Fruits and milk

C)Milk and cheese

D)Fats and sugars

8.A mineral that the body needs to work properly is \_\_\_\_\_

A)Calcium

B) Silver

C)Gold

D) Lead

9.According to the MyPyramind food guidance system, a person should obtain most of their fat from \_\_\_\_\_

A) Beef, chicken, and fish

B)Vegetables oils, nuts, and fish

C)Fats, oils, and sweets

D) Milk, yogurt, and cheese

10 is a unit of energy that indicates the amount of energy contained in food
A)Label
B)Food guide pyramid
C)Calorie
D)Basket
11. Carbohydrates, fats & proteins are essential for
12. Deficiency ofmineral causes chlorosis
13. Deficiency of K+ causes
14. Autotrophic organisms can exist in an exclusively
environment\
15. Strong chlorosis is due to the deficiency of in plant
16. Stunted growth of roots is due to the deficiency of in plants
17. Nodules on roots of leguminous plants have bacteria
18. Earthworm is an example of feeder
19. The food component present in sugar is
20. The percentage of water in human body is
SECTION-B

Answer any FOUR questions4×8 = 32 M

11. Define food and write different nutrients in foods and their functions?

12. Briefly explain about composition of Food?

13. What are natural emulsifiers and explain about them?

14. How do you Preserve the food by heat treatment and write Principle and equipment for blanching?

15. Explain about Nutritional disorders that can compromise health?

16. Explain about Energy metabolism, Proteins, synthesis, catabolism?

## **SECTION-C**

### Answer any **FOUR** questions

### 4×12 = 48 M

17. Define Carbohydrates and write their Structure and properties of sugars?

18. Define proteinsand write their Structure and properties amino acids?

19. Discus aboutMinerals, pigments, colours, flavours?

20. Explain about Energy metabolism of Fat, synthesis, control, biosynthesis?

21. What is irradiation and how do you preserve the food by irradiation and write Principle, methods, equipment?

22. Explain about Preservation by fermentation and write Principles, methods, equipment?

### B.Sc. Agriculture and Rural Developments PRACTICAL SYLLABUS

Subject: Agriculture and Rural Development Semester: V Course Title: Principles of Food Science and Nutrition Practical Course Code: BICM300P

No. of Hrs: 30

Credits: 1

### **Objectives:**

- To understand the basics of and concepts of food
- Understand food composition
- Explain functions and vitamins

# COURSE OUTCOMES:

After the completion of course students will able to

- CO1: Explain concepts of food science
- CO2: Discuss food composition
- **CO3:** Explain structure and functions of proteins
- CO4: Explain functions of fats and oils
- **CO5:** Discuss vitamins and vitamins

## **Experiments:**

- 1. Food groups- Grouping of foods, discussion on nutritive value
- 2. Measuring ingredients methods of measuring different types of foodsgrains, flours and liquids.
- 3. Edible portion: Determination of edible portion of edible portion percentage of different foods.
- 4. Cooking methods moist heat methods-(i) boiling, simmering, steaming and pressure cooking (ii) Dry methods- baking
- 5. Methods of cooking fine and coarse cereals and examination of starch
- 6. Cooking and soaked and unsoaked pulses, common preparation with pulses
- 7. Milk and milk products: common preparation with milk, cheese and curd, cheese curry and cooking vegetable milk
- 8. Flesh foods: Fish, meat and poultry preparations
- 9. Beverages preparation of hot beverages-coffee, tea
- 10. Preparation of cold beverages fruit drink and milk shake

### REFERENCES

- 1. Food science, chemistry and experimental foods by M. Swaminathan
- 2. Food science by Norman.N. Potter
- 3. Experimental study of foods by Griswold R.M
- 4. Food science by Helen Charley
- 5. Foundation of food preparation by A.G Peckam
- 6. Modern cookery for teaching and trade, volume I&II, Thangam Philip. Orient Longmans Ltd.

#### Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### B.Sc. Agriculture and Rural Developments SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Crop Improvement - I(Cereals, Millets, Pulses andOilseeds) and Intellectual PropertyRightsCourse Code: GPBR311No. of Hrs: 30Credits: 2Objectives

1. Hybridization techniques and precautions to be taken, Floral morphology, selfing, emasculation and crossing techniques in field crops

2. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in rice.

3 Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Wheat and Barley.

4. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Maize and Sorghum.

## **Course Outcomes**

CO1: Explain Introduction – General Breeding Objectives, Concepts of breeding self-pollinated, cross pollinated and vegetatively propagated crops
CO2: Discuss Cereals, Rice, Origin, Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures
CO3: Explain Cereals - Wheat and Barley - Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures
CO4: Outline Pulses - Pigeonpea - Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures
CO4: Outline Pulses - Pigeonpea - Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures
CO5: Discuss Oilseeds - Castor and Sesame - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures

## THEORY

## UNIT I (6 Hours)

1 Introduction – General Breeding Objectives – Concepts of breeding self-pollinated, cross pollinated and vegetatively propagated crops - Breeding populationsrelevance in crop improvement.

2 Cereals - Rice - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids-Accomplishments.

3. Cereals - Wheat and Barley - Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments.

4. Millets - Sorghum and Pearlmillet - Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments.

# UNIT II (6 Hours)

1. Millets - Finger millet, Kodo millet and Proso millet - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids-Accomplishments.

2. Pulses - Chickpea - Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids-Accomplishments.

3. Pulses - Pigeonpea - Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments.

# UNIT III (6 Hours)

1. Pulses - Urd bean and Mung bean - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

2. Pulses - Soybean and Cowpea - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

3. Pulses - Horsegram, Fieldpea and Lentil - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties-seed production technology of varieties and hybrids –Accomplishments.

# UNIT IV (6 Hours)

1. Oilseeds - Groundnut- Origin – Distribution of species – Wild relatives and forms – breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids-Accomplishments.

2. Oilseeds - Castor and Sesame - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

3. Oilseeds - Sunflower and Safflower - Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments.

# UNIT V (6 Hours)

1. Oilseeds - Rapeseed and Mustard - Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

2. Oilseeds - Linseed and Niger - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures

(conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments.

3. Oilseeds - Coconut and Oilpalm - Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments.

## REFERENCES

1. Allard, R.W. 1960. Principles of Plant Breeding. John Wiley & Sons, New York.

2. Phundan Singh. 2006. Essential of Plant Breeding. Kalyani Publishers, Ludhiana.

3. Poehlman, J.M. and Borthakur, D. 1995. Breeding of Asian Field Crops. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

4. Sharma, J.R. 1994. Principles and Practices of Plant Breeding. Tata McGraw-Hill Publishing Co. Ltd., New Delhi.

5. Kalloo, G.1994. Vegetable Breeding. Panima Educational Book Agency, New Delhi.

6. Kumar, N.2006. Breeding of Horticultural Crops-Principles and Practices. New India Publishing Agency, New Delhi

7. George Acquaah. 2012. Principles of Plant Genetics and Breeding. Blackwell Publishing Ltd., USA

8. Mono graphs available on specific crops.

### **Model Question Paper**

Subject: Agriculture and Rural Development Semester: V Course Title: Crop Improvement - I(Cereals, Millets, Pulses and Oilseeds) and Intellectual PropertyRights Course Code: GPBR311 Time: 3Hrs Max. Marks: 100 M

### SECTION-A

Answer ALL questions

 $20 \times 1 = 20 \text{ M}$ 

**Multiple Choice Questions** 

- 1. What is the length of growing period in semi-arid regions?
  - A) 70 210 days
  - B) 150 210 days
  - C) 90 150 days
  - D) More than 270 days
- 2. The important approach in micro watershed is
  - A) Soil conservation
  - B) Productivity improvement
  - C) Storage of runoff water
  - D) All of these
- 3. Surface runoff depends on
  - A) Intensity of rain fall
  - B) Amount of rain fall
  - C) Duration of rain fall
  - D) All of these
- 4. Area with less than 500 mm rain fall is suitable for

- A) Mono cropping
- B) Crop holding
- C) Fallowing
- D) All of these
- 5. Major soil type of southern Karnataka is
  - A) Red soil
  - B) Black soil
- C) Alluvial soil
- D) Both a & b

6. Which of the following cultural methods will reduce the weed population

- A) Arresting flowering
- B) Deep ploughing
- C) Puddling
- D) All of these
- 7. Phalaris minor is a crop associated weed with ..... crop
  - A) Wheat
  - B) Maize
  - C) Rice
  - D) Cotton
- 8. Objectives of intercropping are
  - A) Suppression of weeds
  - B) Reduction of pests and diseases
  - C) Stability in yield and income
  - D) All of these
- 9. The component crops of intercropping should not be
  - A) Competitive
  - B) Suppressive
  - C) Mutually inhibitive

- D) All the above
- 10. Phyllotaxy is defined as
  - A) Arrangement of roots
  - B) Arrangement of flowers
  - C) Arrangement of fruits
  - D) Arrangement of leaves
- 11. Pusalerma is an improved variety of\_\_\_\_\_

12. The most cultivated crop in India among cereals\_\_\_\_\_

- 13. Protein % in wheat\_\_\_\_\_
- 14. Wheat is also known as \_\_\_\_\_

15. Indian Institute of wheat and barley is situated in\_\_\_\_\_\_

- 16. Production of wheat is \_\_\_\_\_ million tonnes in India
- 17. Highest productivity of wheat is in \_\_\_\_\_ state of India
- 18. Ideal fertilizer dose for wheat is\_\_\_\_\_
- 19. Mention the Rabi season pulse\_\_\_\_\_
- 20. Origin of wheat\_\_\_\_\_

## **SECTION-B**

# Answer any **FOUR** questions

 $4 \times 8 = 32 \text{ M}$ 

- 11. Write Breeding objectives of rice?
- 12. write differences between self-pollination and crosspollination?
- 13. Write Breeding objectives of cereals?

14. Write Major breeding procedures in oil seeds like oil palm and coconut?

15. Write in detail about Horsegram, Fieldpea and Lentil's Origin and Distribution of species?

16. Write Breeding objectives of oils?

## SECTION-C

Answer any **FOUR** questions

 $4 \times 12 = 48 \text{ M}$ 

17. Write Origin, distribution of species Wild relatives and forms, Breeding objectives Major breeding procedures of mustard and rapeseed?

18. Write Origin, distribution of species Wild relatives and forms, Breeding objectives Major breeding procedures of Oilseeds - Sunflower and Safflower?

19. Write Origin, distribution of species Wild relatives and forms, Breeding objectives Major breeding procedures of ground nut?

20. Write Origin, distribution of species Wild relatives and forms, Breeding objectives Major breeding procedures of Oilseeds Soybean and Cowpea r?

21. Write Origin, distribution of species Wild relatives and forms, Breeding objectives Major breeding procedures of Sorghum and Pearlmillet?

22. Write Origin, distribution of species Wild relatives and forms, Breeding objectives Major breeding procedures of Oilseeds wheat and barley

### B.Sc. Agriculture and Rural Developments PRACTICAL SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Crop Improvement - I(Cereals, Millets, Pulses andOilseeds) and Intellectual PropertyRights PracticalCourse Code: GPBR311PNo. of Hrs: 30Credits: 1

### Objectives

- To know the floral biology
- Explain hybridization techniques
- Explain emasculation techniques
- Explain Selfing

### **Course Outcomes**

After the completion of course students will able to

**CO1:** Explain Hybridization techniques and precautions to be taken, Floral morphology, selfing, emasculation and crossing techniques in field crops

**CO2:** Explain Hybridization techniques and precautions to be taken, Floral morphology, selfing, emasculation and crossing techniques in millets

**CO3:** Explain Hybridization techniques and precautions to be taken, Floral morphology, selfing, emasculation and crossing techniques in peas

**CO4:** Explain Hybridization techniques and precautions to be taken, Floral morphology, selfing, emasculation and crossing techniques in beans.

## PRACTICALS

1. Hybridization techniques and precautions to be taken, Floral morphology, selfing, emasculation and crossing techniques in field crops

2. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in rice.

3 Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Wheat and Barley.

4. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Maize and Sorghum.

5. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Pearl millet and Finger millet.

6. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Kodo millet and Proso millet.

7. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Chickpea and Pigeonpea.

8. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Urdbeanand Mungbean.

9. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Soyabeanand Cowpea.

### REFERENCES

1. Allard, R.W. 1960. Principles of Plant Breeding. John Wiley & Sons, New York.

2. Phundan Singh. 2006. Essential of Plant Breeding. Kalyani Publishers, Ludhiana.

3. Poehlman, J.M. and Borthakur, D. 1995. Breeding of Asian Field Crops. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

4. Sharma, J.R. 1994. Principles and Practices of Plant Breeding. Tata McGraw-Hill Publishing Co. Ltd., New Delhi.

5. Kalloo, G.1994. Vegetable Breeding. Panima Educational Book Agency, New Delhi.

6. Kumar, N.2006. Breeding of Horticultural Crops-Principles and Practices. New India Publishing Agency, New Delhi

7. George Acquaah. 2012. Principles of Plant Genetics and Breeding. Blackwell Publishing Ltd., USA

8. Mono graphs available on specific crops.

### Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### B.Sc. Agriculture and Rural Developments SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Problematic Soils and their ManagementCourse Code: SSAC321No. of Hrs: 15Credits: 1Objectives

- 1. Determination of pH, EC of acid, saline and sodic soils.
- 2. Determination of ESP of sodic soils.
- 3. Determination of GR of sodic soils.
- 4. Determination of LR of acid soils.

## **Course Outcomes**

**CO1:** Problem soils – Definition – Different types of problematic soils

- CO2: Salt affected soils Origin and formation
- **CO3:** Saline soils Visual symptoms for identification of saline soils
- CO4: Sodic soils Visual symptoms for identification of sodic soils
- CO5: Acid soils

# THEORY

# UNIT I 6 (Hours)

1. Problem soils – Definition – Different types of problematic soils – Extent and distribution of problematic and wastelands soils in different agro-eco systems and in Andhra Pradesh.

2. Salt affected soils – Origin and formation - Distribution of salt affected soils in India and Andhra Pradesh - Characteristic features of saline, sodic and saline – sodic soils – Diagnostic criteria based on properties.

3. Saline soils – Visual symptoms for identification of saline soils – Buildup of salinity - Effect of salinity on plant growth and nutrient availability -Reclamation and management.

# UNIT II (6 Hours)

1. Sodic soils - Visual symptoms for identification of sodic soils - Effect of sodicity on plant growth and nutrient availability - Reclamation and management.

2. Acid soils – Extent of area in India and Andhra Pradesh – Formation -Characteristics of acid soils – Sources of soil acidity – nutrient limitations and toxicity – Reclamation of acid soils - Different liming materials used for reclamation – Benefits of liming – Harmful effects of over liming.

3. Acid sulphate soils – Origin – Types – Characterization - Constraints and management.

# UNIT III (6 Hours)

1. Land degradation - Eroded, compacted, flooded and water-logged soils – Biologically sick soils – Effects on plant growth – Management.

2. Polluted soils – Definition – Sources of pollution – Bio solid wastes – Industrial effluents (distillery, paper mill, tannery, textiles industrial effluents) – Mechanism of interaction of wastes with soil.

3. Soil pollution - Potentially toxic elements - Excessive use of fertilizers, pesticides and weedicides – Heavy metal contamination – Management.

# UNIT IV (6 Hours)

1. Bio-remediation of problem soils through Multi-Purpose Tree Species.

2. Taxonomic classification of soils - Land Capability Classification.

3. Land suitability classification - Index – Criteria - Different approaches – Land suitability for different crops.

# UNIT V (6 Hours)

1. Remote Sensing and GIS techniques in diagnosis, mapping and management of degraded and problematic soils.

2. Soil health and quality – Definition - Concepts – Soil resilience – Factors affecting soil quality (Physical, chemical and biological) – Assessment of soil quality - Management and improvement of soil quality.

3. Irrigation water – Quality and standard parameters - Classification based on ICAR, CSSRI and USDA criteria. 16. Guidelines for judging quality of water - Utilization of saline water in agriculture.

# REFERENCE

1. Indian Society of Soil Science. 2012. Fundamentals of Soil Science, IARI, New Delhi.

2. Das, D. K. 2015. Introductory Soil Science. 4th Edition, Kalyani publishers, New Delhi

3. Soils of Andhra Pradesh, Monograph of I.V. Subbarao.

### **Model Question Paper**

Subject: Agriculture and Rural Development	Semester:
Course Title: Problematic Soils and their Management	
Time: 3Hrs	Max. Marks: 100 M

#### SECTION-A

## Answer ALL questions

20×1= 20 M

**Multiple Choice Questions** 

1. What is a substance that donates H<sup>+</sup> to some other substances called?

- A) Base
- B) Neutron
- C)Acid
- D) All

2. What are those solutions having pH less than 7 called?

- A) Acidic
- B) Saline
- C) Alkaline
- D) Neutral
- 3. Which type of soil acidity is measured by soil pH?
  - A) Passive acidity
  - B) Active acidity
  - C) Total acidity
  - D)Exchangeable acidity
- 4. In acid soil, due to what does Al<sup>3+</sup>cause acidity?
  - A) Oxidation
  - B) Reduction

- C) Hydrolysis
- D) Hydration

# 5. Who proposed the lime potential?

- A) Beckett
- B) Schofield
- C) Ramamoorthy
- D) Richards
- 6. What is the CCE value of CaO?
  - A)108
  - B) 136
  - C) 179
  - D )60
- 7. What is the CCE value of Ca(OH)<sub>2</sub>?
  - A) 108
  - B) 136
  - C) 179
  - D) 60
- 8. How can an acid soil be best described?
  - A) Base saturated
  - B) Base unsaturated
  - C) Acid unsaturated
  - D) All
- 9. Who proposed the term lime requirement?
  - A) Schoonover
  - B) Schofield
  - C) Ramamoorthy
  - D) Shoemaker et al.

10. Who proposed the term Gypsum requirement?

- A) Schoonover
- B) Schofield
- C) Ramamoorthy
- D) Shoemaker et al.

11. Acidic soils can be characterized by \_\_\_\_\_

12. The pH of acid sulphate soil is \_\_\_\_\_

13. Crops that are grown on acidic sulphate soils gets destroyed due to

nutrient deficiency caused due to \_\_\_\_\_

14. Phosphorus uptake in alkali soil in the form of \_\_\_\_\_

15. Maximum N content found in N fertilizer\_\_\_\_\_

16. Rock phosphate has P<sub>2</sub>O<sub>5</sub>\_\_\_\_\_

17. The phenomenon slickenside found in which soil\_\_\_\_\_

18. In munsell colour chart hue 10 represents as \_\_\_\_\_

- 19. pF scale for Field capacity is \_\_\_\_\_
- 20. Available water held between\_\_\_\_\_

# **SECTION-B**

Answer any FOUR questions4×8 = 32 M

11. Define Problematic soils? Enlist and explain different types of problematic soils?

12. Write Characteristic features of saline, sodic and saline and sodic soils?

13. Write in detail about effect of sodicity on plant growth and nutrient availability and Reclamation?

14. Write about concepts, Spectral reflectance of various earth features, atmospheric windows of SSAC Remote sensing?

15. Write Types and Characteristics of acid sulphate soil?

16. Explain Taxonomic classification of soils?
# SECTION-C

Answer any **FOUR** questions

4×12 = 48 M

17. Explain about Remote Sensing and GIS techniques in diagnosis, mapping and management of degraded and problematic soils?

18. Define soil health and write concepts, soil resilience and factors affecting soil quality?

19. Explain about land suitability classification and land suitability for different crops?

20. Define Polluted soils and write sources of pollution, Bio solid wastes and industrial effluents?

21. Briefly discus about Formation characteristics of acid soils and sources of soil acidity?

22. Write about Bio-remediation of problem soils through Multi-Purpose Tree Species?

#### B.Sc. Agriculture and Rural Developments PRACTICAL SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Problematic Soils and their Management PracticalCourse Code: SSAC321PNo. of Hrs: 30Credits: 1

# Objectives

- Explain identification of problematic soil samples
- Explain EC and pH
- Explain infiltration of soils

# Course Outcomes

CO1: Explain identification of problematic soils and their management

CO2: Discuss infiltration rates of light soils and infiltration rates of heavy soils

CO3: Explain pH, EC of acid, saline and sodic soils

CO4: Outline ESP, GR and LR of sodic soils

CO5: Explain lime content (CaCO3) of calcareous soil

# PRACTICALS

- 1. Field identification of problematic soils and visit to degraded lands.
- 2. Determination of infiltration rates of light soils.
- 3. Determination of infiltration rates of heavy soils.
- 4. Determination of aggregate stability of sodic soils.
- 5. Determination of pH, EC of acid, saline and sodic soils.
- 6. Determination of ESP of sodic soils.
- 7. Determination of GR of sodic soils.
- 8. Determination of LR of acid soils.
- 9. Determination of lime content (CaCO3) of calcareous soil.

10. Determination of pH and EC of saline, sodic and good quality irrigation water.

# REFERENCE

1. Indian Society of Soil Science. 2012. Fundamentals of Soil Science, IARI, New Delhi.

2. Das, D. K. 2015. Introductory Soil Science. 4th Edition, Kalyani publishers, New Delhi

3. Soils of Andhra Pradesh, Monograph of I.V. Subbarao.

# Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

## B.Sc. Agriculture and Rural Developments SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Protected Cultivation and Post-harvest technologies

## Course Code: AENG351

No. of Hrs: 15

Credits: 1

# Objectives

- Study of different types of greenhouses based on shape, etc.
- Computing the rate of air exchange in an active summer and winter cooling systems.
- Visit to post harvest technology units and laboratories.
- Determination of moisture content of various grains by oven drying and infrared methods.
- Determination of size, space, porosity, bulk density, etc., of grains.

# Course Outcomes

**CO1:** Explain definition, greenhouse effect, advantages of green houses.

**CO2:**Outline types of greenhouses - Greenhouses based on shape, utility, construction, covering materials and cost, shade nets.

**CO3:** Summarise criteria and constructional details of greenhouses -Construction of pipe framed greenhouses, material requirement, preparation of materials and procedure of erection.

**CO4:**Explain irrigation system used in greenhouses - Rules of watering, hand watering, perimeter watering, overhead sprinklers, boom watering and drip irrigation

**CO5:**Explain postharvest equipment based on physical and thermal properties

# THEORY

# UNIT I (6 Hours)

1. Introduction to greenhouses - History, definition, greenhouse effect, advantages of green houses.

2. Brief description of types of greenhouses - Greenhouses based on shape, utility, construction, covering materials and cost, shade nets.

3. Plant response to greenhouse environments - Light, temperature, relative humidity, ventilation and carbon dioxide and environmental requirement of agriculture and horticulture crops inside green houses.

4. Equipment required for controlling greenhouse environment – Summer cooling and winter cooling, natural ventilation, forced ventilation and computers.

# UNIT II (6 Hours)

1. Planning of green house facility - Site selection and orientation, structural design and covering materials.

2. Materials for construction of greenhouses - Wood, galvanized iron, glass, polyethylene film, poly vinyl chloride film, Tefzel T2 film, fiberglass reinforced plastic rigid panel and acrylic and polycarbonate rigid panel.

3. Design criteria and constructional details of greenhouses - Construction of pipe framed greenhouses, material requirement, preparation of materials and procedure of erection.

# UNIT III (6 Hours)

1. Greenhouse heating and distribution systems - Greenhouse utilization - Offseason drying of agricultural produce - Economic analysis of greenhouse production - Capital requirement, economics of production and conditions influencing returns.

2. Irrigation system used in greenhouses - Rules of watering, hand watering, perimeter watering, overhead sprinklers, boom watering and drip irrigation.

3. Important engineering properties such as physical, thermal and aerodynamic properties of cereals, pulses and oil-seeds.

# UNIT IV (6 Hours)

1. Designing postharvest equipment based on physical and thermal properties.

2. Winnowing - Manual and power operated winnowers, care and maintenance - Groundnut decorticators - Hand and power operated decorticators, principle of working, care and maintenance.

3. Moisture measurement - Equilibrium moisture content (EMC) – importance - Drying theory - Drying and dehydration.

# UNIT V (6 Hours)

1. Commercial grain dryers - Deep bed, flat bed, tray, fluidised bed, recirculated and solar dryers.

2. Material handling equipment - Bucket elevator and screw conveyer and their selection.

3. Primary processing of cereals, pulses and oilseeds - Cleaning, grading and packaging.

## REFERENCES

1. Radha Manohar, K and Igathinathane. C. Greenhouse Technology and Management, 2nd Edition, BS Publications.

2. Tiwari, G.N. Greenhouse Technology for Controlled Environment. Narosa Publishing house Pvt.Ltd. 3. Singh Brahma and Balraj Singh., 2014. Advances in Protected Cultivation, New India Publishing Company.

4. Sahay, K.M. and Singh, K.K. 1994. Unit operations of Agricultural Processing. Vikas Publishing house Pvt. Ltd. New Delhi.

5. Chakraverty, A. Post-Harvest Technology of cereals, pulses and oilseeds. Oxford & IBH publishing Co. Ltd., New Delhi.

6. Ojha, T.P and Michael, A.M. Principles of Agricultural Engineering, Vol. I, Jain Brothers, Karol Bag, New Delhi.

# MODEL QUESTION PAPER

Subject:AgricultureandRuralDevelopmentSemester: VVCourse Title:Protected Cultivation and Post-harvest technologiesCourse Code:AENG351Time: 3HrsMax. Marks:100 M

## **SECTION-A**

Answer ALL questions	2 <b>0</b> ×1 = 20 M
Multiple Choice Questions	
1. Percentage of jam in acid is	
A) 0.2 – 0.3.	
B) 0.3 – 0.4.	
C) 0.5 – 0.6.	
D) 0.1 – 0.2.	
2. SS of jam is	
A) 50 – 60%.	
B) 70% – 72%.	
C) 81 -82%	
D) 68 – 70%	
3. Which fruit is rich in pectin low acid	
A) Pineapple.	
B) Cherry.	
C) Sour peach.	
D) Apple.	
4. Tartaric acid is best for the preparation of	

A) Jam.

B) Jelly.

- C) Marmalade.
- D) All of the above.
- 5. Syneresis is a term which is used with
- A)Jam.
- B) Jelly.
- C) Marmalade.
- D)Pickle.
- 6. Aroma in apple is due to
- A) 2- methyl butyrate.
- B) 2 hexanal.
- C) Hexanal.
- D) All of the above.
- 7. Major acid present in Apple is
- A) Tartaric.
  - B) Malic.
  - C) Glycolic.
  - D) Aspartic.
- 8. Premature setting in jam can be controlled by
- A) Adding more sugar.
  - B) Adding less amount of sugar.
  - C) Replacing sugar using water.
  - D) Altering temperature.
- 9. Nira is prepared from
- A) Orange.
  - B) Palm.
  - C) Apple.
  - D) Cherry.
- 10. Papain is prepared from

A) Papaya.

B) Coconut.

C) Pear.

D) Gum of french bean.

11. Withering of tea leaves is a \_\_\_\_\_process

12. Pure coffee is prepared from\_\_\_\_\_

13. Coconut honey is prepared from\_\_\_\_\_

14. Percentage of husk in a whole coconut is\_\_\_\_\_

15. Percentage of water in a whole coconut is\_\_\_\_\_

16. RTS stands for\_\_\_\_\_

17. TSS of RTS is\_\_\_\_\_

18. Percentage of juice in RTS is\_\_\_\_\_

19. TSS of cordial is\_\_\_\_\_

20. Percentage of juice in nector is\_\_\_\_\_

# SECTION-B

Answer any **FOUR** questions

 $4 \times 8 = 32 \text{ M}$ 

11. Define greenhouse effect write advantages of greenhouses?

12. Explain about Commercial grain dryers?

13. Briefly explain about Drying and dehydration?

14. What is Winnowing explain about manual and power operated winnowers?

15. Write in detail about Irrigation system used in greenhouses?

16. Explain about Planning of green house facility?

# SECTION-C

Answer any **FOUR** questions

4×12 = 48 M

- 17. Briefly describe types of greenhouses?
- 18. Explain about Equipment required for controlling greenhouse environment
- 19. Explain about Design criteria and constructional details of greenhouses?
- 20. Explain about Economic analysis of greenhouse production?
- 21. Enlist and explain about Commercial grain dryers?

22. what is Equilibrium moisture content (EMC) and explain about it?

#### B.Sc. Agriculture and Rural Developments PRACTICAL SYLLABUS

Subject: Agriculture and Rural Development Semester: V Course Title: Protected Cultivation and Post-harvest technologies practical

## Course Code: AENG351P

No. of Hrs: 30

Credits: 1

#### Objectives

- Identify the different types of green houses
- Identify the moisture measurements
- Determination of aerodynamic properties of grains.
- Cleaning and grading of grains, pulses and oilseeds

## **COURSE OUTCOMES:**

After the completion of course students will able to

- **CO1**: Explain different types of greenhouses based on shape and functions and systems of green houses.
- CO2: Discuss postharvest technology
- **CO3:** Explain determination of moisture content in grains
- CO4: Discuss size, space, porosity, bulk density of grains
- **CO5:** Explain Cleaning and grading of grains, pulses and oilseeds.

## EXPERIMENTS

1. Study of different types of greenhouses based on shape, etc.

2. Computing the rate of air exchange in an active summer and winter cooling systems.

3. Feasibility study on drying of agricultural products inside a greenhouse and its calculation.

4. Visit to post harvest technology units and laboratories.

5. Determination of moisture content of various grains by oven drying and infrared methods.

6. Determination of size, space, porosity, bulk density, etc., of grains.

7. Determination of aerodynamic properties of grains.

8. Cleaning and grading of grains, pulses and oilseeds.

#### REFERENCES

1. Radha Manohar, K and Igathinathane. C. Greenhouse Technology and Management, 2nd Edition, BS Publications.

2. Tiwari, G.N. Greenhouse Technology for Controlled Environment. Narosa Publishing house Pvt.Ltd. 3. Singh Brahma and Balraj Singh., 2014. Advances in Protected Cultivation, New India Publishing Company.

4. Sahay, K.M. and Singh, K.K. 1994. Unit operations of Agricultural Processing. Vikas Publishing house Pvt. Ltd. New Delhi.

5. Chakraverty, A. Post-Harvest Technology of cereals, pulses and oilseeds. Oxford & IBH publishing Co. Ltd., New Delhi.

6. Ojha, T.P and Michael, A.M. Principles of Agricultural Engineering, Vol. I, Jain Brothers, Karol Bag, New Delhi.

#### Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### B.Sc. Agriculture and Rural Developments SYLLABUS

Subject: Agriculture and Rural Development Semester: V Course Title: Pests of Field crops and Stored Grain and their Management

Course Code: ENTO331 No. of Hrs: 30 Objectives

Credits: 2

1. Typical symptoms of damage by various phytophagous insects.

2. Calculations on the doses of insecticides and their application techniques.

3. Identification of major insect pests of rice and their damage symptoms

4. Identification of major insect and mite pests of sorghum, maize and other millets, and their damage symptoms

# Course Outcomes

**CO1:** General account on nature and type of damage by different arthropod pests

**CO2:**Introduction of Economic Entomology and Economic Classification of Insect Pests

CO3: Pests of rice

**CO4:**Pests of sorghum and other millets

**CO5**:Pests of cotton

# THEORY

## UNIT I (6 Hours)

1. General account on nature and type of damage by different arthropod pests. Scientific name, order, family, host range, distribution, marks of identification, bionomics, nature of damage, and management of major, minor insect pests and other important arthropod pests of various field crops.

2. Introduction of Economic Entomology and Economic Classification of Insect Pests

3-5. Rice-Yellow stem borer and other borers, gall midge, brown planthopper, green leafhopper, hispa, leaf folder, ear head bug, grasshoppers, root weevil, swarming caterpillar, climbing cutworm, case worm, whorl maggot, leaf mite and panicle mite-IPM practices.

## UNIT II (6 Hours)

1-2. Sorghum and other millets- Sorghum shoot fly, stem borer, pink borer, sorghum midge, ear head bug, red hairy caterpillar, deccan wingless grasshopper, aphids, maize shoot bug, flea beetle, blister beetles, ragi

cutworm, ragi root aphid and army worm- IPM practices. Wheat- Ghujia weevil, ragi pink borer and termites- IPM practices.

3-5. Sugarcane- Early shoot borer, internode borer, top shoot borer, scales, leafhoppers, white grub, mealybugs, termites, whiteflies, woolly aphid and yellow mite- IPM Practices.

## UNIT III (6 Hours)

1-2. Cotton- Spotted bollworm, American bollworm, pink bollworm, tobacco caterpillar, leafhopper, whiteflies, aphid, mites, thrips, red cotton bug, dusky cotton bug, leaf roller, stem weevil, grasshoppers, and mealybug - IPM Practices.

3-4. Jute- Semilooper, stem weevil, stem girdler and Bihar hairy caterpillar. Mesta- Hairy caterpillars, stem weevil, mealybugs, leafhopper and aphid. Sunhemp- Hairy caterpillars, stem borer and flea beetle. IPM Practices.

5-6. Pulses- Gram caterpillar, plume moth, pod fly, stem fly, spotted pod borer, cowpea aphid, cowbug, pod bug, leafhopper, stink bug, green pod boring caterpillar, blue butterflies, leaf webber/borer and redgram mite. Soyabean-Stem fly, stem girdler, ragi cutworm, leaf miner and whitefly- IPM Practices. Pea- pea leaf miner and pea stem fly

## UNIT IV (6 Hours)

1. Castor-Semilooper, shoot and capsule borer, tobacco caterpillar, leafhopper, butterfly, whitefly, thrips, castor slug and mite- IPM Practices. Groundnut - White grub, leaf miner, red hairy caterpillar, tobacco caterpillar, leafhopper, thrips, aphid, pod bug, bud borer, wire worms and jewel beetle-IPM Practices.

2. Sesamum-Leaf and pod borer, gall fly and sphinx caterpillar. Safflower-Aphids and leaf eating caterpillars- IPM Practices.

3. Mustard- Aphid, sawfly, diamondback moth and painted bug. Sunflower-Helicoverpa and Spodoptera, leafhopper, Bihar hairy caterpillar and thrips -IPM Practices.

4. Stored grains Pests- Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain

5. Stored grain Insect pests - Rice weevil, lesser grain borer, khapra beetle, pulse beetle, groundnut bruchid, flour beetles, saw-toothed beetle, cigarette beetle, angoumois grain moth and rice moth

## UNIT V (6 Hours)

1-2. Stored grains - Non insect Pests- Mites, rodents, birds and microorganisms associated with stored grain - Storage structures and methods of grain storage and fundamental principles of grain store management.

3. Locusts- Locusts and their management, Mites- Economically important phytophagous mites of field crops and their management

4. Nematodes-White tip nematode of rice, cyst and gall nematode of wheat, and their management.

5. Rodents- Rodents damaging field crops and stored grains - Keys for identification of rodents and their management.

6. Birds- Various birds infesting crops and their management

## REFERNCES

1. Vasantharaj David, B. and Rama Murthy V.V. 2016. Elements of Economic Entomology, Popular Book Depot, Coimbatore

2. Vasantharaj David, B and Aanathakrishnan, T.N. 2006. General and Applied Entomology. Tata McGraw-Hill Publishing House, New Delhi.

3. Nair MRGK. 1986. Insects and Mites of crops in India. Indian Council of Agricultural Research New Delhi.

4. Ramakrishna Ayyar, T.V. 1963. Handbook of Economic Entomology for South India. Government Press, Madras.

5. Dennis S Hill 1987 Agricultural Insect Pests of tropics and their control, Cambridge University Press, New York

6. Upadhyaya K.P. and Kusum Dwivedi. 1996. A Text Book of Plant Nematology. Aman Publishing House, Meerut.

7. Khare, S.P. 1993. Stored Grain Pests and their Management. Kalyani Publishers, Ludhiana.

8. Atwal, A.S. 1976. Agricultural Pests of India and South East Asia. Kalyani Publishers, Ludhiana.

## **Model Question Paper**

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Pests of Field crops and Stored Grain and theirManagement

Course Code: ENTO331 Time: 3Hrs

Max. Marks: 100 M

#### SECTION-A

Answer **ALL** questions

 $20 \times 1 = 20 \text{ M}$ 

Multiple Choice Questions

- 1. Which is not a natural predator of BPH?
- A) Spiders.
- B) Mirid bugs.
- C) Red ants.
- D) All of the above.

2. Grassy stunt virus disease is caused by?

- A) BPH.
- B) Green leafhoppers.
- C) White rice leafhoppers.
- D) Zig-zag leafhoppers

3. The vector of 'Orange leaf' disease in rice is?

- A) Zig-zag leafhoppers.
- B) Pink stem borer.
- C) Pink ants.
- D) Pale-headed stripe borer.

4. The virus disease tungro is associated with?

- A) BPH.
- B) White backed planthopper.

- C) Green leafhoppers.
- D) Rice blue leafhoppers.

5. Trichogramma japonicum is used mainly as bio-control agent of which insect in rice?

- A) Rice caseworm.B) Rice leaf-folder.
- C) Pink stem borer.
- D) BPH.

6. Which is the scientific name and family of BPH?

- A) Nilaparvatalugens, Delphacidae.
- B) Sogaferafurcifera, Delphacidae.
- C)*N. virescens*, Cicadellidae
- D) Cofana spectra, Cicadellidae.
- 7. Which stage of BPH causes damage to paddy crop?
- A) Only adults.
- B) Only nymphs.
- C) Both a and b.
- D) Only male.
- 8. The ETL for BPH is?
- A) 5-10 insects per hill.
- B) 2-3 insects per hill.
- C) 1 insect per hill.
- D) 10-15 insects per hill.

9. Proper management practice for BPH is?

A) Wider spacing, alternate drying of field, making alleys.

- B) Closer spacing, regular drying of field.
- C) Either a or b.
- D) Late sowing of rice.

10. Hopper burn is a plant damage symptom which is caused by?

- A) Sogatellafurcifera.
- B) Nilaparvatalugens.

- C) Nephotettixvirescens.
- D) Chodana spectra.

11. The high infestation of rice weevil causes\_\_\_\_\_

12. The \_\_\_\_\_\_stage of rice weevil causes damage

13. *Trogoderma granarium* is\_\_\_\_\_

- 14. Family of khapra beetle is\_\_\_\_\_
- 15. The non-traditional host range of khapra beetle is\_\_\_\_\_
- 16. Lesser grain borer is also known as\_\_\_\_\_
- 17. Lesser grain borer is also known as\_\_\_\_\_
- 18. The lesser grain grubs emerge after \_\_\_\_\_instar pupa
- 19. \_\_\_\_\_\_grain is rarely attacked by angoumois grain moth
- 20. Angoumois attack in\_\_\_\_\_

# SECTION-B

## Answer any **FOUR** questions

## $4 \times 8 = 32 \text{ M}$

11. Write short notes on nature and type of damage by different arthropod pests?

12. Write introduction of Economic Entomology and explain about economic Classification of Insect Pests?

13. Write short notes on IPM?

14. Explain about locusts and their management?

15. Explain about Keys for identification of rodents and their management.

16. Explain about Leaf and pod borer, gall fly and sphinx caterpillar. Safflower- Aphids and leaf eating caterpillars IPM Practices of sesamum?

# SECTION-C

Answer any FOUR questions

4×12 = 48 M

17. Explain about Storage structures and methods of grain storage and fundamental principles of grain store management?

18. Explain about White tip nematode of rice, cyst and gall nematode of wheat, and their management.?

19. Discus about Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain?

20. Enlist and explain the different types of pests in castor?

21. Explain the different types of pests in cotton?

22.Breifly explain Hairy caterpillars, stem borer and flea beetle. IPM Practices of sunhemp?

#### B.Sc. Agriculture and Rural Developments PRACTICAL SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Pests of Field crops and Stored Grain and theirManagement PracticalCourse Code: ENTO331P

No. of Hrs: 30

Credits: 1

- Objectives
- Identify various insect pests
- To calculate the doses of insecticides
- Identify and control pets of rice, sugarcane

## **Course Outcomes**

After the completion of course students will able to

**CO1:** Explain identification and symptoms of damage by various phytophagous insects

**CO2:** Summarise Calculations on the doses of insecticides and their application techniques

**CO3:** Explain pests of pulse crop and their damage symptoms. Identification of insect pests of oil seed crops and their damage symptoms

CO4: Explain Mite pests of crops and their damage symptoms

**CO5:** Summarise Nematode pests of crops and their damage symptoms **PRACTICALS** 

1 Typical symptoms of damage by various phytophagous insects.

2 Calculations on the doses of insecticides and their application techniques.

3 Identification of major insect pests of rice and their damage symptoms

4 Identification of major insect and mite pests of sorghum, maize and other millets, and their damage symptoms

5 Identification of insect pests of sugarcane and their damage symptoms

6 Identification of insect pests of cotton, sunhemp and mesta and their damage symptoms

7. Identification of insect pests of pulse crop and their damage symptoms. Identification of insect pests of oil seed crops and their damage symptoms

8 Mite pests of crops and their damage symptoms

9 Nematode pests of crops and their damage symptoms

10 Rodent pests of crops and their nature of damage

## REFERNCES

1. Vasantharaj David, B. and Rama Murthy V.V. 2016. Elements of Economic Entomology, Popular Book Depot, Coimbatore

2. Vasantharaj David, B and Aanathakrishnan, T.N. 2006. General and Applied Entomology. Tata McGraw-Hill Publishing House, New Delhi.

3. Nair MRGK. 1986. Insects and Mites of crops in India. Indian Council of Agricultural Research New Delhi.

4. Ramakrishna Ayyar, T.V. 1963. Handbook of Economic Entomology for South India. Government Press, Madras.

5. Dennis S Hill 1987 Agricultural Insect Pests of tropics and their control, Cambridge University Press, New York

6. Upadhyaya K.P. and Kusum Dwivedi. 1996. A Text Book of Plant Nematology. Aman Publishing House, Meerut.

7. Khare, S.P. 1993. Stored Grain Pests and their Management. Kalyani Publishers, Ludhiana.

8. Atwal, A.S. 1976. Agricultural Pests of India and South East Asia. Kalyani Publishers, Ludhiana.

#### Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### B.Sc. Agriculture and Rural Developments SYLLABUS

Subject: Agriculture and Rural Development Semester: V Course Title: Diseases of Field and Horticultural Crops and their Management - I (Field Crops

Course Code: PATH 371

No. of Hrs: 30

Credits: 2

# Objectives

- 1. Rice diseases
- 2. Wheat, Sorghum and Bajra diseases
- 3. Maize and Finger millet diseases
- 4. Sugarcane diseases

# **Course Outcomes**

**CO1:** Explain Rice diseases

- CO2: Explain Maize diseases
- CO3: Explain Sorghum diseases
- CO4: Summarize Bajra diseases and Tobacco diseases
- CO5: Discuss Sugarcane diseases and Bengal gram diseases

# THEORY

# UNIT I (6 Hours)

Study of etiology, symptoms, host-parasite relationship and specific management practices of the following diseases.

- 1. Rice diseases blast, brown spot.
- 2. Rice diseases Sheath rot, Stem rot, narrow brown leaf spot.
- 3. Rice diseases sheath blight, False smut, Bacterial leaf blight.
- 4. Rice diseases Bacterial leaf streak, Rice Tungro Disease, Khaira.
- 5. Wheat diseases Black or stem rust, orange rust, yellow rust.
- 6. Wheat diseases loose smut, Karnal bunt.
- 7. Wheat diseases Powdery mildew, alternaria blight, Tundu disease.

# UNIT II (6 Hours)

1. Sorghum diseases – Anthracnose, rust, ergot, headmold, leaf blight.

2. Sorghum diseases - smuts, charcoal rot, downy mildew, Striga.

3. Maize diseases - Turcicum leaf blight, post flowering stalk rots, charcoal rot.

4. Maize diseases - Banded leaf and sheath blight, downy mildew.

5. Bajra diseases – Downy mildew/green ear, rust, ergot, smut.

# UNIT III (6 Hours)

1. Ragi/Fingermillet diseases- blast, smut, mosaic.

2. Cotton diseases- Bacterial blight, Fusarium wilt, Verticillium wilt, root rot.

3. Cotton diseases – grey mildew, anthracnose, Alternaria leaf spot, Cercospora leaf spot, Helminthosporium leaf spot, rust.

4. Sugarcane diseases – red rot, whip smut, wilt, ring spot.

5. Sugarcane diseases – Grassy shoot, mosaic, ratoon stunting, rust, PokahBoeng.

6. Tobacco diseases –black shank, Damping off, Frog eye spot, brown spot, black root rot.

# UNIT IV (6 Hours)

1. Tobacco diseases – Mosaic, leaf curl, Orobanche.

2. Groundnut diseases – Collar rot, Tikka leaf spots, rust, pepper leaf spot, stem rot.

3. Groundnut diseases – Bud necrosis, Peanut stem necrosis disease, Kalahasti malady.

4. Sesamum diseases – Phyllody, Alternaria leaf spot, powdery mildew, charcoal rot, bacterial leaf spot.

5. Castor diseases – wilt, root rot, grey mold, bacterial leaf spot, seedling blight, rust.

6. Sunflower diseases – leaf blight, rust, powdery mildew, head rot, collar rot, downy mildew, mosaic, sunflower necrosis virus.

7. Safflower diseases – Alternarialeaf blight, wilt, rust, mosaic.

# UNIT V (6 Hours)

1. Mustard diseases – White rust, downy mildew, powdery mildew, Alternaria leaf spot, Sclerotinia stem rot.

2. Red gram diseases – Phytophthora blight, wilt, sterility mosaic and, bacterial leaf spot and stem canker.

3. Bengal gram diseases – wilt, rust, Ascochyta blight, stem and root rot, grey mold.

4. Black gram and Green gram diseases – Powdery mildew, rust, Cercospora leaf spot, Corynespora leaf spot, Angular black spot, Dry root rot, web blight.

5. Blackgram and Greengram diseases – Bacterial leaf spot, Yellow Mosaic virus, Leaf crinkle, Cuscuta.

6. Soybean diseases – Rhizoctonia blight, seed and seedling rot, rust, Soybean mosaic, Bacterial pustule;Pea diseases - downy mildew, powdery mildew and rust.

7. Cowpea diseases – Cowpea mosaic virus disease.; Lentil diseases - rust and wilt.

# PRACTICALS

Study of the symptoms, identification and histopathological studies of the following diseases.

- 1. Rice diseases
- 2. Wheat, Sorghum and Bajra diseases
- 3. Maize and Fingermillet diseases
- 4. Field visits for the diagnosis of crop diseases.
- 5. Sugarcane diseases
- 6. Tobacco diseases 6 Groundnut diseases
- 7. Field visits for the diagnosis of crop diseases.
- 8. Sunflower and Safflower diseases
- 9. Castor and sesamum diseases
- 10. Mustard diseases

# REFERNCES

1. Rangaswami, GandK.Mahadevan. 2001. Diseases of crop plants in India. Prentice Hall of India Pvt.Ltd, New Delhi.

2. Singh, R.S. 2005. Plant Diseases. Oxford & IBH Publications, New Delhi

#### Model Question Paper

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Diseases of Field and Horticultural Crops and theirManagement - I (Field CropsCourse Code: PATH371Time: 3HrsMax. Marks: 100 M

#### **SECTION-A**

Answer **ALL** questions

 $20 \times 1 = 20 \text{ M}$ 

Multiple Choice Questions

1. The citrus canker lesions are characterized by the over development of?

- A) Parenchymatous tissues.
- B) Epidermal tissues.
- C) Ectodermal tissues.
- D) Endodermal tissues.
- 2. A form canker in citrus is caused by?
  - A) Xanthomonas compestrispv. citri
- B) X. axonopodispv. citri.
- C) X. axonopodispv. aurantifolia.
- D) X. axonopodispv. citrumelo.
- 3. The symptoms of black arm in cotton appears...?
  - A) When bacteria attacks on stalk.
  - B) When bacteria attacks on internodes.

- C) When bacteria attacks on stem.
- D) When bacteria attacks on poor twigs.
- 4. The Lethal Dilution Effect is found in most.....?
  - A) Xanthomonas and other bacteria.
  - B) Pseudomonas and other bacteria.
  - C) RSD and other bacteria.
  - D) None of the above.
- 5. Which is known as true canker?
  - A) Mango canker.
- B) Citrus canker.
  - C) Butternut canker (no cure).
  - D) Tomato canker.
- 6. The casual organism of wilt of cotton wilt is?
  - A) Fusarium oxysporium.
  - B) Verticillium dahliae.
  - C) Both a and b.
  - D) None of the above.
- 7. Causal organism of wheat ear cockle?
  - A) Fungus.
  - B) Bacteria.
  - C) Virus.
  - D) Nematode.
- 8. Which type of parasite witchweed is?

A) Semi-root parasite.

- B) Semi-stem parasite.
- C) Root parasite.
- D) Stem parasite.
- 9. Management practice of RSD includes?
  - A) Disease free nursery.
  - B) Heat therapy of seed.

# C) Selection of seed from commercial crop.

- D) All of the above.
- 10. Grassy Shoot Disease was first noticed in India?
  - A) Madhya Pradesh.
  - B) Uttar Pradesh.
  - C) Maharastra.
  - D) Gujarat.

11. citrus greening is mainly confined to\_\_\_\_\_

12. Write an example for systemic fungicide\_\_\_\_\_

13. In bacteria variability is caused by\_\_\_\_\_

14. micrografting is used to produce the plants free from\_\_\_\_\_

15. the kamal bunt of wheat is caused by\_\_\_\_\_

16. \_\_\_\_\_discovered powdery mildew in India first time

17. VAM is a \_\_\_\_\_

18. In plants Buckling, puckering and blistering symptoms are produced by\_\_\_\_\_

19. The mature particle of a plant virus is generally known as\_\_\_\_\_

20. Mad cow disease caused by\_\_\_\_\_

# SECTION-B

## Answer any FOUR questions

 $4 \times 8 = 32 \text{ M}$ 

11. Write symptoms and management of Sheath rot, Stem rot, narrow brown leaf spot of Rice diseases?

12. Write symptoms and management Black or stem rust, orange rust, yellow rust of Wheat diseases?

13. Briefly explain about symptoms of anthracnose, rust, ergot, headmold, leaf blight.?

14. Enlist and explain diseases of Sugarcane?

15. Write in detail about white rust, downy mildew, powdery mildew of disesases of Mustard?

16. Explain about Cowpea diseases?

# SECTION-C

Answer any **FOUR** questions

 $4 \times 12 = 48 \text{ M}$ 

17. Briefly describe Bacterial leaf spot, Yellow Mosaic virus, Leaf crinkle, CuscutaBlackgram and Greengram diseases?

18. Explain about symptoms and management of Rhizoctonia blight, seed and seedling rot, rust, Soybean mosaic, Bacterial pustule Soybean diseases?

19. Enlist and explain about Diseases of rice?

20. Explain about diseases of cotton?

21. Enlist about diseases sorghum?

# 22. Enlist and explain about diseases of Bengal gram?

#### B.Sc. Agriculture and Rural Developments PRACTICAL SYLLABUS

Subject: Agriculture and Rural Development Semester: V Course Title: Diseases of Field and Horticultural Crops and their Management - I (Field Crops) Practical

Course Code: PATH 371P

No. of Hrs: 30

Credits: 1

# Objectives

- Explain identification and symptoms of diseases
- Explain management of diseases of various crops
- Explain control of diseases by natural methods

## **Course Outlines:**

After the completion of course students will able to

**CO1:** Explain symptoms, identification and histopathological studies of rice, Wheat, Sorghum and Bajra diseases.

**CO2:** Explain symptoms, identification and histopathological studies of Maize and Finger millet

**CO3:** Explain symptoms, identification and histopathological studies of Sugarcane and ground nut

**CO4:** Explain symptoms, identification and histopathological studies of Sunflower and Safflower diseases

**CO5:** Explain symptoms, identification and histopathological studies of Castor and sesamum diseases

## Experiments

Study of the symptoms, identification and histopathological studies of the following diseases.

- 1. Rice diseases
- 2. Wheat, Sorghum and Bajra diseases
- 3. Maize and Fingermillet diseases
- 4. Field visits for the diagnosis of crop diseases.
- 5. Sugarcane diseases
- 6. Tobacco diseases 6 Groundnut diseases
- 7. Field visits for the diagnosis of crop diseases.

- 8. Sunflower and Safflower diseases
- 9. Castor and sesamum diseases
- 10. Mustard diseases

# REFERNCES

1. Rangaswami, Gand K.Mahadevan. 2001. Diseases of crop plants in India. Prentice Hall of India Pvt.Ltd, New Delhi.

2. Singh, R.S. 2005. Plant Diseases. Oxford & IBH Publications, New Delhi

#### Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### B.Sc. Agriculture and Rural Developments SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Principles of Integrated Pest and Disease Management

Course Code: PATH 372

No. of Hrs: 30

Credits: 2

# Objectives

1. Citrus diseases.

- 2. Mango diseases.
- 3. Ber, guava and sapota diseases.
- 4. Field visits for the diagnosis of crop diseases.
- 5. Papaya, banana and pomegranate diseases

# **Course Outcomes**

CO1: Explain Guava, Papaya, Ber and Sapota diseases

CO2: Discuss Citrus, Guava, Papaya, Ber and Sapota diseases

CO3: Explain Banana diseases

CO4: Summarize Pomegranate diseases and vegetables diseases

CO5: Explain Turmeric and ginger diseases

# THEORY

# UNIT I (6 Hours)

Study of etiology, symptoms, host-parasite relationship and specific management practices of the following diseases.

1. Citrus diseases - Citrus canker, gummosis (Phytophthora and Diplodia), felt, tristeza and greening.

2. Mango diseases:anthracnose, malformation, bacterial leaf spot, powdery mildew, sooty mold, red rust and Loranthus.

3. Guava, Papaya, Ber and Sapota diseases –Guava: wilt and anthracnose.Papaya: foot rot, anthracnose, leaf curl and mosaic and powdery mildew.Ber: Powdery mildew. Sapota: Flat limb.

4. Banana and Pomegranate diseases –Banana: Panama wilt, bacterial wilt, Erwinia rhizome rot, Sigatoka,bunchy top, banana mosaic and banana bract mosaic. Pomegranate: Anthracnose and bacterial blight.

# UNIT II (6 hours)

1. Grapevine diseases – downy mildew, Powdery mildew, anthracnose, Alternaria leaf spot and rust. 2. Apple and Peach diseases –Apple: scab, powdery mildew, fire blight and crown gall Peach: leaf curl.

3. Chillies diseases - Damping off, die-back and fruit rot, Fusarium wilt, powdery mildew, Choanephorablight, Cercospora leaf spot, bacterial leaf spot, mosaic complex and leaf curl.

# UNIT III (6 Hours)

1. Brinjal and Okra diseases –Brinjal- Phomopsis blight and fruit rot, bacterial wilt and little leaf. Okra-Cercospora leaf spot, powdery mildew and Yellow Vein Mosaic.

2. Potato diseases - early and late blight, black scurf, common scab, wart, black leg, brown rot, leaf roll, mosaics, potato spindle tuber.

3. Tomato diseases - damping off, Ralstonia wilt, early blight, buck eye rot and leaf curl, Septoria leaf spot, bacterial canker, root knot, Tomato spotted wilt and mosaic.

## UNIT IV (6 Hours)

1. Crucifers and Cucurbits diseases –Cruciferous vegetables- Club root, white rust, Downy mildew, powdery mildew, Alternaria leaf spot and black rot. Cucurbits: downy mildew, powdery mildew, Cercospora leaf spot, Erwinia wilt and CMV.

2. Betelvine, onion and garlic diseases –Betelvine: Phytophthora root and stem rot, Sclerotial wilt, Fusarial wilt, Anthracnose. Onion and garlic: Smudge, smut, purple blotch, and Stemphylium blight.

3. Beans, Colocasia and Coriander diseases –Beans- anthracnose, rust, Bean common mosaic virus and bacterial blight. Colocasia: Phytophthora blight. Coriander- stem gall.

# UNIT V (6 Hours)

1. Coconut and oil palm diseases –Coconut- Stem bleeding, Ganoderma wilt, bud rot, grey blight and Tatipaka disease. Oil palm- Bunch rot and spear rot. Tea- blister blight Coffee- rust.

2. Turmeric, ginger and mulberry diseases –Turmeric- leaf spot, leaf blotch, rhizome rot Ginger: rhizome rot/soft rot, leaf spot. Mulberry- powdery mildew.

3. Rose- dieback, powdery mildew and black leaf spot. Marigold: Botrytis blight Chrysanthemum- wilt, stunt, Septoria blotch. Jasmine- rust. Crossandra – wilt

## REFERNCES

1. Rangaswami, G & Mahadevan, K.2001. Diseases of crop plants in India, Prentice Hall of India Pvt.Ltd, New Delhi.

2. Singh, R.S.2005. Plant Diseases. Oxford & IBH Publications, New Delhi

3. Pathak, V.N.2001. Diseases of Fruit crops. Oxford & IBH Publications, New Delhi

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

5. Chaube, H.S and V.S. Pundhir, 2012. Crop Diseases & Their Management. PHI Pvt.Ltd, New Delhi

## **Model Question Paper**

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Principles of Integrated Pest and Disease ManagementCourse Code: PATH372Time: 3HrsMax. Marks: 100 M

#### **SECTION-A**

Answer **ALL** questions

2**0**×**1** = **20** M

**Multiple Choice Questions** 

# 1. This weed has been eradicated by biological control

- A) Chrysanthemum
- B) Cactus
- C) Parthenium
- D) Eichhornia

# 2. The phenomenon of using a predator to control pests is

- A) artificial control
- B) biological control
- C) confusion technique
- D) genetic engineering

# 3. This is an effective plant insecticide

- A) Nicotine
- B) Cinerin
- C) Pyrethrin
- D) all of these

# 4. The pheromone coated paper strips in the confusion technique are thrown over an area to

- A) confuse males so that they are unable to locate females
- B) repel insects from a region
- C) confuse females so that they are unable to locate males
- D) attract insects and kill them

### 5. "Devine" and "Collego" are two agricultural substances used as

- A) Insect hormones
- **B)** Biofertilizers
- C) Bioherbicides
- D) Natural insecticides

### 6. Rotenone is a

- A) insect hormone
- B) natural insecticide
- C) bioherbicide
- D) natural herbicide

### 7. The wild growth of \_\_\_\_\_ is checked with Cochineal insect

- A) screwworm
- B) aphids
- C) Eichhornia
- D) Opuntia

### 8. Pyrethrin is extracted from

- A) Poa indica
- B) Helianthus annuus
- C) Azadirachta indica
- D) Chrysanthemum cinerariifolium

### 9. In 1981, the first bioherbicide developed was based on

- A) Azadirachta indica
- B) Bacillus thuringiensis
- C) Phytophthora infestans
- D) Phytophthora palmivora

### 10. Transgenic crop developed to tolerate herbicides is

- A) Tomato
- B) sunflower

C) Tobacco

D) both (a) and (b)

11. Little leaf' in brinjal is caused by a\_\_\_\_\_ 12. White blisters of crucifers' is caused by pathogen\_\_\_\_\_ Most widely used biocontrol agent is \_\_\_\_\_ 14 Yellow mosaic legumes was first reported India of in from 15. MLD and spiroplasma are mostly\_\_\_\_\_ 16. n rust cycle the cereal host is infected by\_\_\_\_\_ 17. Hot water treatment of seed is useful for control of 18. Give an example for fungicide\_\_\_\_\_ 19. Sigatoka disease of banana caused by 20. Panama wilt occur in \_\_\_\_\_ crop

### SECTION-B

### Answer any **FOUR** questions

 $4 \times 8 = 32 \text{ M}$ 

11. Enlist and explain about symptoms of diseases of Citrus?

12. Explain about control measures of diseases of mango?

13. Write symptoms of Panama wilt, bacterial wilt, Erwinia rhizome rot, Sigatoka, bunchy top, banana mosaic and banana bract mosaic diseases of banana?

14. Explain about diseases of pomegranate?

15. Explain about control measures of diseases of tomato?

16. Explain about symptoms of diseases of pomegranate?

### SECTION-C

Answer any **FOUR** questions

17. Briefly describe about symptoms and control measures of Jasmine rust Crossandra wilt?

18. Explain about diseases of Turmeric, ginger?

4×12 = 48 M

- 19. Explain about diseases of Crucifers and Cucurbits diseases?
- 20. Explain about diseases of onion and garlic?
- 21. Explain about diseases of potato?
- 22. Explain about diseases of guava?

### B.Sc. Agriculture and Rural Developments PRACTICAL SYLLABUS

Subject: Agriculture and Rural Development Semester: V Course Title: Principles of Integrated Pest and Disease Management Practical

Course Code: PATH 372P

No. of Hrs: 30

Credits: 1

### Objectives

- Explain identification and symptoms of various diseases in fruits crops
- Explain identification and symptoms of various diseases in vegetable crops
- Management of diseases in fruits and vegetables

### Course Outcomes

After the completion of course students will able to

**CO1:** Explain symptoms, Identification and histopathological studies of citrus and mango

**CO2:** Explain symptoms, Identification and histopathological studies of Ber, guava and sapota diseases

**CO3:** Discuss symptoms, Identification and histopathological studies of Papaya, banana and pomegranate diseases

CO4: Explain symptoms, Identification and histopathological studies of Grape and Apple diseases.

**CO5:** Summarise symptoms, Identification and histopathological studies of Chilli, brijnal and Bhendi disease

### PRACTICALS

Studies of symptoms, Identification and histopathological studies of the following diseases

1. Citrus diseases.

2. Mango diseases.

- 3. Ber, guava and sapota diseases.
- 4. Field visits for the diagnosis of crop diseases.
- 5. Papaya, banana and pomegranate diseases.
- 6. Grape and Apple diseases.
- 7. Chilli, brijnal and Bhendi diseases.
- 8. Field visits for the diagnosis of crop diseases.
- 9. Potato and tomato diseases

### REFERNCES

1. Rangaswami, G & Mahadevan, K.2001. Diseases of crop plants in India, Prentice Hall of India Pvt.Ltd, New Delhi.

2. Singh, R.S.2005. Plant Diseases. Oxford & IBH Publications, New Delhi

3. Pathak, V.N.2001. Diseases of Fruit crops. Oxford & IBH Publications, New Delhi

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

5. Chaube, H.S and V.S. Pundhir, 2012. Crop Diseases & Their Management. PHI Pvt.Ltd, New Delhi

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

### Scheme of Evaluation

### B.Sc. Agriculture and Rural Developments SYLLABUS

### Subject: Agriculture and Rural Development Semester: V Course Title: Rural Industrialization and Entrepreneurship

Course Code: RERD 203

No. of Hrs: 30 2

**Objectives:** 

To enable the students to understand nature of Industrialisation To make familiar the students about rural development process. To enrich the students about Industrial Labour.

# **Course Outcomes**

CO1: Rural Industrialisation 14 Hours Concept, Need and Importance

CO2: Growth of Rural Industries in India - Gandhian Approach and Modern

Approach

**CO3:** Problems and Remedies of Rural Industrialisation.

CO4: Growth and Structure of Rural Industries, Current Status, Measures to

Sustain Growth, Sickness - Remedial Measures

CO5: Definition, Role, Present Position,

### THEORY

### Units I

Rural Industrialisation 14 Hours Concept, Need and Importance - Growth of Rural Industries in India – Gandhian Approach and Modern Approach - Problems and Remedies of Rural Industrialisation.

### Unit II

Rural Industries in India 14 Hours Growth and Structure of Rural Industries, Current Status, Measures to Sustain Growth, Sickness – Remedial Measures.

### Unit III

Small Scale and Cottage Industries in Rural India 10 Hours Meaning, Definition, Role, Present Position, MSME – Industrial Policies and Programmes, Problems – KVIC and its Role.

Credits:

### Unit IV

Rural Industrial Financing 12 Hours Sources of Credit - Institutional and Non –Institutional -Role of Commercial Banks, Co-operatives, Gramina Banks and NABARD.

### Unit V

Rural Industrial Labour 10 Hours Meaning, Importance, Types - Organized and Unorganized Rural Industrial Labour – Rural Industrial Labour Problems - Labour Turn Over – Migration.

### **References:**

1 Vasant Desai: Rural Development in India, Himalaya Publishing House, Mumbai, 2012.

2 Dutt and Sundaram- Indian Economy, S.Chand Publications, New Delhi, 2013-07-02

3 S.K. Mishra and V.K. Puri- Economics of Development and Planning, Himalaya Publishing House, Mumbai, 2012.

### **Model Question Paper**

Subject: Agriculture and Rural DevelopmentSemester: VCourse Title: Rural Industrialization and EntrepreneurshipCourse Code: RERD203Time: 3HrsMax.

Max. Marks: 100 M

### SECTION-A

# Answer ALL questions M

2**0**×**1 = 20** 

Multiple Choice Questions

1. The term "Entrepreneur" has been derived from the word "entreprendre" which means:

A. To give

- B. To undertake
- C. To choose
- D. To decide
- 2. Entrepreneurship is a creative activity Said by:
- A. Frederick Harbison
- B. B. F. Hoselitz
- C. B. Higgins
- D. Joseph

3. What is the hallmark of a successful entrepreneur?

- A. Risk bearing capacity
- B. Persistence
- C. Flexibility
- D. Self-confidence

4. Which type of entrepreneurs utilizes a chance to introduce a new technique or new product?

- A. Innovative entrepreneur
- B. Instigated entrepreneur
- c. Initiative entrepreneur
- d. Fabian entrepreneur

5. In which state of India, the standard of education is highest?

- a. Tamil Nadu
- b. Andhra Pradesh

- c. Kerala
- d. Karnataka

### 6. Which phase is the phase of real training?

- a. Initial phase
- b. Training phase
- c. Post-training phase
- d. Follow up phase

### 7. "Seed Capital Scheme" is being operated by?

- a. IDBI
- b. SIDC
- c. ICICI
- d. IFCI

8. Calcutta "Y" Self- Employment Centre targets unemployed youths between?

- a. 18 to 30 years
- b. 16 to 25 years
- c. 18 to 25 years
- d. 20 to 30 years

9. In the 1995 – 96 periods what percentage of the total entrepreneurs were women entrepreneurs?

- a. 10 %
- b. 11.2%
- c. 13%
- d. 9%

10. Why the majority of women are unaware of technological developments?

- a. Low-risk bearing ability
- b. Low mobility
- c. Lack of education
- d. Low need for achievement

11. Entrepreneurship is a creative activity – Said by:\_\_\_\_\_

12. In \_\_\_\_\_\_\_state in India, the standard of education is highest

13. "Seed Capital Scheme" is being operated by\_

14. Calcutta "Y" Self-Employment Centre targets unemployed youths between\_\_\_\_\_

15. "Yashaswini Programme" held in\_\_\_\_\_palce

16. In long term capital, the repayment of money is arranged for what time period\_\_\_\_\_

17. BEP = (F/(S-V)) x 100 What does F stand for\_\_\_\_\_

18. Ownership capital is also known as\_\_\_\_

19. first SFC (State Financial Corporation) set up in Punjab was started in the year\_\_\_\_\_

20. IPR stands for\_\_\_\_\_

# SECTION-B

Answer any **FOUR** questions

11. Explain about Concept, Need and Importance Rural Industrialisation?

12. Explain about Types Organized and Unorganized Rural Industrial Labour

13. Briefly explain about MSME Industrial Policies and Programmes?

14. Explain about Growth and Structure of Rural Industries?

- 15. Write in detail about Role of Commercial Banks?
- 16. Explain about Small Scale and Cottage Industries in Rural India?

# SECTION-C

Answer any **FOUR** questions

4×12 = 48 M

 $4 \times 8 = 32$  M

17. Briefly describe about Gandhian Approach and Modern?

18. Explain about Approach Problems and Remedies of Rural Industrialisation?

19. Explain about Co-operatives, Gramina Banks and NABARD?

20. Explain about Rural Industrial Financing?

21. Explain about KVIC and its Role?

22. Explain about Problems and Remedies of Rural Industrialisation?

# SEMESTER - VI

### **B.Sc. Agriculture and Rural Development** SYLLABUS

### Subject: Agriculture and Rural Development Semester: VI Course Title: Rain fed Agriculture, WatershedManagement and Principles of OrganicFarming

Course Code: AGRO303

No. of Hrs: 30

Credits: 2

### Objectives

- To learn basic knowledge of rain fed agriculture and water shed management.
- To Study the crop adaptation and mitigation strategies, crop planning and crop management techniques.
- Main objective is to increase / stabilize production of crops, forage, fruits, fuel and timber in rainfed areas.
- Introduction of improved soil and moisture conservation measures, better crop and range land management practices.

### **Course Outcomes**

CO1:Understand about rainfed agriculture and its introduction,

problem and prospects in India.

CO2:Describe farming practices that rely on rainfall for

water.

CO3: Understand objective, principles and component of watershed

management.

CO4: Conservation of soil by adopting latest soil conservation techniques will help in

obtaining higher production of Rainfed crops.

CO5:Introduction of improved soil and moisture conservation

### THEORY

### UNIT I

1. Rainfed agriculture – introduction and definition – dimensions of the problem – area and production from dry lands in India and Andhra Pradesh –History of rainfed agriculture and watersheds in India.

2. Problems and prospects of rainfed agriculture in India – climate – rainfall pattern – distribution – variabilities of rainfall – short rainy season – high intensity rainfall

3. Problems and prospects of rainfed agriculture in India - soil characteristics – soil fertility status –soil moisture storage and retention capacity – heavy weed infestation-soil crust and their effect on crop growth and soils-its management.

4. Drought – definition – types of drought – effect of water deficits on physio morphological characteristics of the plants- mechanism of crop adaptation under moisture deficit condition - management strategies for drought.

### UNIT II

1. Tillage for rainfed crops – off-season tillage – primary tillage – secondary tillage – year-round tillage – sub soiling – setline cultivation – modern concepts of tillage-minimum tillage and zero tillage.

2. Soil erosion – definition – losses due to erosion – types of water and wind erosion – nature and extent of wind and water erosion – factors affecting erosion – universal soil loss equation

3. Management of crops in rainfed areas - Agronomic measures of soil and water conservation – choice of crop – crop geometry – tillage – contour cultivation – strip cropping – cover cropping – mulching – cropping systems and weed control - Mechanical measures of soil and water management.

### UNIT III

1. Watershed – definition – concept— objectives and principles of water shed management components of watershed development programme – factors affecting watershed management.

2. Water harvesting – importance, its techniques- Water harvesting structures – arid region – runoff farming – water spreading – micro catchments – semi arid region – farm ponds, check dams – percolation tank – dug wells – life saving irrigation

3. In-situ moisture conservation measures – bund forming – bunding, ridge and furrow system – conservation furrows- inter plot water harvesting, mulching – Broad Bed and Furrow (BBF) and levelling.

### UNIT IV

1. Fertilizer use in rainfed areas – use of organic manures – introduction of legumes in crop rotation– organic recycling and bio-fertilizer use in rainfed agriculture – time and method of fertilizer application

2. Efficient crops and varieties – cropping systems in rainfed areas – intercropping – advantages – efficient inter cropping systems in different rainfed regions of Andhra Pradesh

3. Contingent crop planning for aberrant weather conditions in red and black soils

### UNIT V

1. Evapotranspiration – measures to reduce evapotranspiration – weeding, use of mulches, chemicals, windbreaks and shelterbelts

2. Land capability classification – alternate land use system

3. Efficient utilization of water through soil and crop management practices - agronomic measures - mechanical measures for soil and water conservation – gully control – bench terraces – contour terracing – graded bund

### REFERNCES

1. Reddy, S. R. and Prabhakar Reddy, G. 2015. Dryland Agriculture. Kalyani Publishers.

2. Arnon,I. 1972. Crop Production in Dry Regions (Vol.I), Leonard Hill Pub. Co, London.

3. Dhruva Narayana, V.V., Sastry, G.S. and Patnaiak, V.S. 1999. Watershed Management in India. ICAR, New Delhi.

### **B.Sc. Agriculture and Rural Development MODEL QUESTION PAPER**

Subject: Agriculture and rural developmentsSemester: VICourse Title: Rain fed Agriculture, Watershed Management and Principlesof OrganicFarming

Course Code: AGRO 303

Time: 3Hrs

Max. Marks: 100 M

### **SECTION-A**

### Answer ALL questions

 $10 \times 2 = 20 \text{ M}$ 

- 1. 1. Propagation of plants through seeds are called as ()
  - A) Asexual
  - B) Sexual
  - C) Apomixes
  - D) Vivipary
- 2. Alley cropping is also known as---
  - A) Hedgerow intercropping
  - B) Avenue cropping 4
  - C) a &b
  - D) None
- 3. Cultivation of crops in regions with annual rainfall less than 750 mm is called as
  - A) Rainfed farming
  - B) Dry farming
  - C) Dryland farming
  - D) None
- 4. Length of growing period between 75 and 120 days present for
  - A) Rainfed farming
  - B) Dry farming
  - C) Dryland farming
  - D) None
- 5. Dryland Agriculture occupies-----% of cultivated area
  - A) 60
  - B) 40
  - C) 75
  - D) 50
- 6. Temporary moisture less condition in soil is called as-----

- A) Drought
- B) Famine
- C) Aridity
- D) Dry spell
- 7. Moisture Index (Im) value of -66.7 to -33.3 is for
  - A) Arid
  - B) Semi arid
  - C) Humid region
  - D) Per humid
- 8. ICRISAT classified the Semi-arid tropics (SAT areas) in India by adopting
  - A) Trolls classification
  - B) Koppen's classification
  - C) Hargreaves classification
  - D) Thornthwaite classification
- 9. Moisture availability index was given by?
  - A) Trolls
  - B) Koppen's
  - C) Argreaves
  - D) Thornthwaite
- 9.1 st dry land research station was started in the year
  - A) 1920
  - B) 1924
  - C) 1926
  - D) 1945

10. ICRISAT was established in the year

- A) 1972
- B) 1985
- C) 1974
- D) 1982

11. Stream flow or discharges means\_\_\_\_\_

- 12. The main causes of flood are\_\_\_\_\_
- 13. The major types of floods are\_\_\_\_\_
- 14. Flood frequency analysis based on\_\_\_\_\_

15. Flood frequency analysis based on\_\_\_\_\_

16. Range lands are the altitude varies from 1500 to 8600 m and includes 19 peaks over 7600 m, such as\_\_\_\_\_

17. Vegetation of Trans-Himalayan grazing land can be divided into\_\_\_\_\_

18. Himalayan Forest grazing lands cover\_\_\_\_\_

18 The hotter sandstone aspect consists of

19 The cooler sandstone aspect has occasional trews of\_\_\_\_\_

20 The major types of floods are\_\_\_\_\_

### **SECTION-B**

### Answer any FOUR questions

 $4 \times 8 = 32 \text{ M}$ 

21. Explain about the Rainfed agriculture?

22. Explain about Evapotranspiration and measures to reduce evapotranspiration

23. Discuss about Fertilizer use in rainfed areas?

24. Explain In-situ moisture conservation measures?

25. Write intercropping – advantages?

26. Briefly discuss Efficient utilization of water through soil and crop management practices?

### **SECTION-C**

### Answer any **FOUR** questions

27. Explai Contingent crop planning for aberrant weather conditions in red and black soils?

28. Explain Land capability classification?

29. Explain Problems and prospects of rainfed agriculture in India?

30. Explain Agronomic measures of soil and water conservation?

31. Explain inter plot water harvesting, mulching and Broad Bed and Furrow (BBF) and levelling.

32. Explain Rainfall analysis?

### $4 \times 12 = 48 \text{ M}$

### PRACTICAL SYLLABUS

Subject: Agriculture and rural developmentSemester: VICourse Title: Rain fed Agriculture, WatershedManagement and Principlesof OrganicFarming Practical

Course Code: AGRO 303P

No. of Hrs: 30

Credits: 1

### Objectives

- To understand climatic classification
- To understand the monsoons and cropping pattern
- To explain rainfall and calculation of wet spells, dry spells

### **Course Outcomes**

### After completion of the course students will be understand

CO1:Discuss climatic classification, rainfall analysis

CO2:Explain onset and withdrawal of monsoons and cropping pattern for different areas

CO3:outlinemeteorological data for rainfall variability

CO4:explainrainfall and calculation of wet spells,dry spells,and length of growing season.

### **EXPERIMENTS**

1. Climate classification.

2. Rainfall analysis - Mean, standard deviation, variance and CV.

3. Onset and withdrawal of monsoons and determination of length of growing crop season.

4. Study on cropping pattern of different dryland areas.

5. Mapping of dryland areas in India.

6. Interpretation of meteorological data for rainfall variability.

7. Scheduling of supplemental irrigation based on crop ET demand.

8. Critical analysis of rainfall and calculation of wet spells, dry spells , and length of growing season.

### REFERNCES

1. Reddy, S. R. and Prabhakar Reddy, G. 2015. Dryland Agriculture. Kalyani Publishers.

2. Arnon,I. 1972. Crop Production in Dry Regions (Vol.I), Leonard Hill Pub. Co, London.

3. Dhruva Narayana, V.V., Sastry, G.S. and Patnaiak, V.S. 1999. Watershed Management in India. ICAR, New Delhi.

### Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

### B.Sc. Agriculture and Rural Development SYLLABUSB.Sc. Agriculture and Rural Development SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VICourse Title: Agriculture Informatics

### COURSE CODE: SMCA 301

No. of Hrs: 15

Credits: 1

### Objectives

- 1. To create, capture, access and disseminate information to achieve a more productive and sustainable.
- 2. To use of agricultural resources.
- 3. To encourage non-profit, research professionals and business professionals.
- 4. In the exchange of information for development of knowledge systems.

### **Course Outcomes**

CO1: Explain Windows explorer- Creating folder - Copy and paste functions -

Control panel Notepad -WordPad etc.

CO2: Summarize MS word - Creating a document, saving and editing

**CO3:** Discuss Use of options from tool bars – Format - Insert and tools (Spelling and Grammar) - Alignment of paragraphs and text.

**CO4:** Explain to Creating a table - Merging of cells - columns and row width - Formats etc.

**CO5:** Discuss MS- Excel - Creating a spreadsheet - Alignment of rows - columns and cells using format tool bar.

### THEORY

### UNIT I

1. Introduction to computers- Advantages- Disadvantages- Applications - Anatomy of Computers- Input / output devices -Memory Concepts - Units of Memory - RAM - ROM - PROM - EPROM - EAPROM - Cache Memory.

2. Operating system - Definition and types - WINDOWS OS – Features – Desktop – Icons etc.

3. Applications of MS-Office - MS- Word - Creating - Editing and formatting a document. 4. MS Word - Features of good word processor - Mail merge – Drop cap-Auto text.Track changes – Equation editor etc.

### UNIT II

1. MS- Excel - Data presentation, Tabulation – Merging of cells and graph creation - Mathematical expressions.

2. MS- Excel - Data analysis tool pack – Pivot table and graph etc.

3. MS Access – Database - concepts and types - creating database - Uses of DBMS in agriculture.

### UNIT III

1. MS Access - Objects of data base - Types of fields etc.

2. Internet and World Wide Web (WWW) – Concepts - Components and creation of web.

3. HTML - XML coding

### UNIT IV

1. e-Agriculture - Concepts - Design and development - Application of innovative ways to use information and communication technologies (IT) in Agriculture.

2. ICT for Data Collection - Formation of development programmes - Monitoring and evaluation of Programmes - Computer Models in Agriculture statistical weather analysis and crop simulation models - Concepts - Structure - Inputsoutputs files - Limitation - Advantages and application of models for understanding plant processes - Sensitivity -Verification - Calibration and validation.

3. IT application for computation of water and nutrient requirement of crops -Computer controlled devices (automated systems) for Agri-input management -Smartphone mobile apps in Agriculture for farm advises - Market price - Postharvest management etc.

### UNIT V

1. Geospatial technology – Concepts – Techniques - Components and uses for generating valuable agri-information.

2. Decision support systems – Taxonomy – Components – Framework - Classification and applications in Agriculture - DSS - Agriculture Information/Expert System - Soil Information Systems etc for supporting Farm decisions.

3. Preparation of contingent crop-Planning and crop calendars using IT tools.

### REFERNCES

1. John Walkenbach, Herb Tyson, Michael R. Groh, FaitheWempen, Microsoft Office 2010 Bible

- 2. Bangia, Learning Ms Office 2010
- 3. Prof. Satish Jain and M. Geetha, MS-Office 2010 Training Guide
- 4. Johnson, Microsoft Office 2010.....on Demand
- 5. Kate Shoup, Microsoft Office 2010
- 6. Melanie Gass, It's All about You! Office 2010
- 7. Nancy Conner and Matthew MacDonald, Office 2010: The Missing Manual

### **MODEL QUESTION PAPER**

### Subject: Agriculture and Rural Development Semester: VI Course Title: Agriculture Informatics

### COURSE CODE: SMCA 301

### Time: 3Hrs

Max. Marks: 100 M

### **SECTION-A**

### Answer **ALL** questions

 $20 \times 1 = 20 \text{ M}$ 

1.MS-Word is an example of \_\_\_\_\_

- E) An operating system
- F) A processing device
- G) Application software
- H) An input device
- 2. Ctrl, Shift and Alt are called ..... keys.
  - A) modifier
  - B) Function
  - C) alphanumeric
  - D) adjustment

3. A computer cannot "boot" if it does not have the \_\_\_\_\_

- A) Compiler
- B) Loader
- C) Operating system
- D) Assembler
- 4. \_\_\_\_\_ is the process of dividing the disk into tracks and sectors
  - A) Tracking
  - B) Formatting
  - C) Crashing
  - D) Allotting
- 5. Junk e-mail is also called \_\_\_\_\_
  - A) Spam
  - B) Spoof
  - C) Sniffer script
  - D) Spool
- 6. Microsoft Office is an example of a
  - A) Closed source software

- B) Open source software
- C) Horizontal market software
- D) vertical market software

7. \_\_\_\_\_are attempts by individuals to obtain confidential information from you by falsifying their identity

- A) Phishing trips
- B) Computer viruses
- C) Phishing scams
- D) Spyware scams

8. By default, your documents print in \_\_\_\_\_ mode

- A) Landscape
- B) Portrait
- C) Page Setup
- D) Print View

9. Storage capacity of magnetic disk depends on

- A) disk pack in disk surface
- B) tracks per inch of surface
- C) bits per inch of tracks
- D) All of the above

10. Which of the following is a popular programming language for developing multimedia webpages.

- A) COBOL
- B) Java
- C) BASIC
- D) Assembler

11. The 'Annals of Agriculture' was published by \_\_\_\_\_

12. The book 'Element of Agricultural Chemistry' was published by \_\_\_\_\_

13. Experiments on effect of manures on crop were initiated by \_\_\_\_\_

- 14. Kharif, Rabi and Zaid word belong to \_\_\_\_\_
- 15. Climate pertains to a \_\_\_\_\_
- 16. Principles of mercury barometers was discovered by \_\_\_\_\_

17. Instrument used for measuring wind velocity is known as \_\_\_\_\_

18. The term PET was coined by \_\_\_\_\_

19. A rainy day called when rainfall received in 24 hrs\_\_\_\_\_

20. WWW stands for\_\_\_\_\_

### **SECTION-B**

### Answer any **FOUR** questions

### $4 \times 8 = 32 \text{ M}$

- 11. Explain about Decision support systems?
- 12. Explain about MS- Excel Creating a spreadsheet?
- 13. Discuss Applications of MS-Office?
- 14. Explain ICT for Data Collection?
- 15. Explain about Internet and World Wide Web (WWW)?
- 16. Explain MS word and creating a document, saving and editing?

### **SECTION-C**

Answer any **FOUR** questions

 $4 \times 12 = 48 \text{ M}$ 17. Explain about IT application for computation of water and nutrient requirement of crops?

18. Explain about Introduction to computers- Advantages- Disadvantages?

19. Explain about Data analysis using inbuilt tool packs test of significance.?

20. Explain about HTML - XML coding?

21. Explain Application of innovative ways to use information and communication technologies (IT) in Agriculture?

22. Explain about Preparation of contingent crop-Planning and crop calendars using IT tools.?

### B.Sc. Agriculture and Rural Development PRACTICAL SYLLABUS

# Subject: Agriculture and Rural DevelopmentSemester: VICourse Title: Agriculture Informatics PracticalSemester: VI

### COURSE CODE: SMCA 301P

No. of Hrs: 30

Credits: 1

### **Objectives:**

- To understand basics of computer
- To explain notepad, MS word
- To understand MS Excel

### **Course Outcomes**

CO1:Explain the basics of computer and tool bars

CO2:Discuss Notepad, MS word and Excel

CO3:Explaincreating a table, Merging of cells, columns and row width Formats

CO4:OutlineMS- Excel - Creating a spreadsheet and entering the formulas

**CO5:** Explain data analysis tool pack for testing of significance

### EXPERIMENTS

1. Booting of computer and it's shut down - Practicing Windows operating system - Use of mouse -Title bar – Minimum, maximum and close buttons - Scroll bars - Menus and tool bars.

2. Windows explorer- Creating folder - Copy and paste functions - Control panel Notepad -WordPad etc.

3. MS word - Creating a document, saving and editing

4. Use of options from tool bars – Format - Insert and tools (Spelling and Grammar) - Alignment of paragraphs and text.

5. Creating a table - Merging of cells - columns and row width - Formats etc.

6. MS- Excel - Creating a spreadsheet - Alignment of rows - columns and cells using format tool bar.

7. Entering formula expression through formula tool bar and use of in-built functions Sum – Average – Stdev – Maximum and minimum.

8. Data analysis using inbuilt tool packs test of significance.

### REFERNCES

1. John Walkenbach, Herb Tyson, Michael R. Groh, Faithe Wempen, Microsoft Office 2010 Bible

- 2. Bangia, Learning Ms Office 2010
- 3. Prof. Satish Jain and M. Geetha, MS-Office 2010 Training Guide
- 4. Johnson, Microsoft Office 2010.....on Demand
- 5. Kate Shoup, Microsoft Office 2010
- 6. Melanie Gass, It's All about You! Office 2010
- 7. Nancy Conner and Matthew MacDonald, Office 2010: The Missing Manual

### Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

### **B.Sc. Agriculture and Rural Development** SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VICourse Title: Crop Improvement-II (Fibre, Sugar, Starches, Narcotics,<br/>Vegetables, Fruits and Flowers) and Principles of SeedTechnology

### **COURSE CODE: GPBR 312**

### No. of Hrs: 30

### Credits: 2

### Objectives

- Improved varieties are developed through plant breeding.
- Its objectives are to improve yield, quality, disease-resistance, drought
- frost-tolerance and important characteristics of the crops. ...
- It is now clearly understood that within a given environment, crop improvement has to be achieved through superior heredity.

### **Course Outcomes**

**cO1:** Explain origin, distribution and different breeding methods

**CO2:** Discuss adopted for the development of varieties / hybrids in various field and horticultural crops

**CO3:** Explain about the plant genetic resources, centres of diversity and breeding for resistance to biotic and abiotic stresses

CO4: Learn about the procedure of production of hybrid seed in different crops.

**CO5:** Study about Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques

### THEORY

### UNIT I

1 Introduction – General breeding objectives – Concepts of breeding self-pollinated, cross pollinated and vegetatively propagated crops - Breeding populations relevance in crop improvement.

2 Fibres - Cotton and Jute- Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

3. Sugars and starches – Sugarcane - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments.

4. Sugars and starches – Potato and sweet potato - Origin – Distribution of species – wild relatives and forms – Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

### UNIT II

1. Narcotics - Tobacco- Origin – Distribution of species – Wild relatives and forms – breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments.

2. Vegetables - Tomato and Brinjal - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments.

3. Vegetables - Chilli and Okra - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments

### UNIT III

1. Vegetables-Cucumber, Cabbage and cauliflower - Origin – Distribution of species – wild relatives and forms – Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments.

2. Vegetables - Garlic and Onion - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

3. Vegetables - Gourds and Melons- Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

### UNIT IV

1. Fruit crops - Banana and Guava - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

2. Fruit Crops-Mango and Papaya - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and

modern innovative approaches) for development of hybrids / varieties-seed production technology of varieties and hybrids-Accomplishments.

3. Fruit crops - Lime, Lemons and Apple - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

### UNIT V

1. Fruit crops - Pomegranate and Sapota - Origin – Distribution of species – Wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids – Accomplishments.

2. Flower crops - Rose and Jasmine - Origin – Distribution of species – Wild relatives and forms – Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

3. Flower crops - Chrysanthemum and Marigold - Origin – Distribution of species – wild relatives and forms –Breeding objectives – Major breeding procedures (conventional and modern innovative approaches) for development of hybrids / varieties - Seed production technology of varieties and hybrids - Accomplishments.

### PRACTICALS

**CO1:** ExplainHybridization techniques and precautions to be taken - Floral morphology, selfing, emasculation and crossing techniques in field crops.

**CO2:** SummariseFloral biology, anthesis, pollination, selfing, emasculation and crossing techniques in field crops

**CO3:** ExplainFloral biology, anthesis, pollination, selfing, emasculation and crossing techniques in vegetables

**CO4:** DiscussFloral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Fruit crops

1. Hybridization techniques and precautions to be taken - Floral morphology, selfing, emasculation and crossing techniques in field crops.

2. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Cotton and Jute.

3. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Sugarcane and Tobacco.

4. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Tomato and Brinjal.

5. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Chilli and Okra. 6. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in and Cucumber, Cabbage and Cauliflower.

7. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Garlic and Onion.

8 Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Bitter gourd and Water melon.

9 Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Banana and Mango.

10 Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Papaya and Guava.

### REFERENCES

1. Allard, R.W. 1960. Principles of Plant Breeding. John Wiley & Sons, New York.

2. Phundan Singh. 2006. Essential of Plant Breeding. Kalyani Publishers, Ludhiana

3. Poehlman, J.M. and Borthakur, D. 1995. Breeding of Asian Field Crops. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

4. Sharma, J.R. 1994. Principles and Practice of Plant Breeding. Tata McGraw-Hill Publishing Co. Ltd., New Delhi.

5. Kalloo, G.1994. Vegetable Breeding. Panima Educational Book Agency, New Delhi.

6. Kumar, N. 2006. Breeding of Horticultural Crops - Principles and Practices. New India Publishing Agency, New Delhi.

7. George Acquaah.2012. Principles of Plant Genetics and Breeding. Blackwell Publishing Ltd., USA.

### **Model Question Paper**

Subject: Agriculture and rural developmentSemester: VICourseTitle:CropImprovement-II(Fibre, Sugar, Starches, Narcotics,Vegetables, Fruits andFlowers) and Principles of SeedTechnology

### **COURSE CODE: GPBR 312**

Time: 3Hrs

Max. Marks: 100 M

### **SECTION-A**

### Answer ALL questions

- 1. In cold places frost damage can be reduced in horticultural crops using these methods except
  - A) Overhead sprinklers at night
  - B) Green houses and shade nets
  - C) Wind breaks placement
  - D) Appropriate fungicide application
- 2. Disadvantages of natural vegetative propagation includes
  - A) lack of dispersal mechanisms
  - B) No fertilization is involved
  - C) area is quickly colonized
  - D) daughter plants can grow quickly
- 3. Onion and garlic are examples of
  - A) Rhizome
  - B) corm
  - C) stem tuber
  - D) bulb
- 4. Examples of Corm include
  - A) Gloriosa
  - B) Canna
  - C) Lallang
  - D) Ginger
- 5. A common example of stem tuber is
  - A) Ginger
  - B) Garlic
  - C) Onion
  - D) Potato
- 6. External agencies are not required in

### $10 \times 2 = 20 \text{ M}$

- A) natural vegetative propagation
- B) sexual reproduction
- C) bisexual reproduction
- D) trisexual reproduction
- 7. In cutting method of vegetative propagation, cuttings are mainly taken from
  - A) Leaves of parent plant
  - B) Roots or stems of parent plant
  - C) Shoots of parent plant
  - D) Buds of parent plant
- 8. Example of plant in which vegetative propagation is occurred by leaves is called
  - A) Cannabisnm
  - B) Chrysanthemum
  - C) Cryophyllum
  - D) Brassica
- 9. Example of natural vegetative propagation does not include
  - A) Corals
  - B) bulbs
  - C) corms
  - D) Rhizomes

10. Considering corms of natural vegetative propagation, buds are present at

- A) Front side of corm
- B) Backside of corm
- C) Top of corm
- D) End of corm

is

- 11. Polygonum type of embryo sac is\_\_\_\_\_
- 12. What is the function of filiform apparatus in an angiospermic embryo sac\_\_\_\_\_
- 13. The female gametophyte of a typical dicot at the time of fertilization

14. Polygonum type of embryo sac is \_\_\_\_\_

- 15. Both chasmogamous and cleistogamous flowers are present in \_\_\_\_\_
- 16. Even in absence of pollinating agents seed-setting is assured in \_\_\_\_\_
- 17. What is the function of filiform apparatus in an angiospermic embryo sac?\_\_\_\_\_
- 18. The female gametophyte of a typical dicot at the time of fertilization
- 19. Polygonum type of embryo sac is\_\_\_\_\_
- 20. Both chasmogamous and cleistogamous flowers are present in\_\_\_\_\_

### **SECTION-B**

### Answer any FOUR questions

### $4 \times 8 = 32 \text{ M}$

21. Explain about General breeding objectives?

22. Explain Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Cotton and Jute.?

23. Discuss Major breeding procedures conventional and modern innovative approaches for development of hybrids?

24. Explain Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in and Cucumber, Cabbage and Cauliflower.?

25. Explain about Fruit Crops-Mango and Papaya?

26. Explain Major breeding procedures?

### **SECTION-C**

Answer any FOUR questions  $4 \times 12 = 48$  M 27. Explain about Hybridization techniques and precautions?

28. Explain about Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Sugarcane and Tobacco?

29. Explain about Seed production technology of varieties and hybrids?

30. Explain Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Garlic and Onion.?

31. Explain about Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Chilli and Okra.?

32. Explain about Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Papaya and Guava?

### B.Sc. Agriculture and Rural Development PRACTICAL SYLLABUS

Subject: Agriculture and Rural Development Semester: VI Course Title: Crop Improvement-II (Fibre, Sugar, Starches, Narcotics, Vegetables, Fruits and Flowers) and Principles of Seed Technology Practical

### **COURSE CODE: GPBR 312P**

No. of Hrs: 30

Credits: 1

### Objectives

- To explain hybridization techniques
- To understand floral morphology
- To explain pollination, selfing, emasculation and crossing techniques in Fruit crops

### **Course Outcomes**

After completion of the course students will be understand

**CO1:**ExplainHybridization techniques and precautions to be taken - Floral morphology, selfing, emasculation and crossing techniques in field crops.

**CO2:**SummariseFloral biology, anthesis, pollination, selfing, emasculation and crossing techniques in field crops

**CO3:**ExplainFloral biology, anthesis, pollination, selfing, emasculation and crossing techniques in vegetables

**CO4:**DiscussFloral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Fruit crops

### EXPERIMENTS

1.Hybridization techniques and precautions to be taken - Floral morphology, selfing, emasculation and crossing techniques in field crops.

2. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Cotton and Jute.

3. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Sugarcane and Tobacco.

4. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Tomato and Brinjal.

5. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Chilli and Okra. 6. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in and Cucumber, Cabbage and Cauliflower.

7. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Garlic and Onion.

8 Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Bitter gourd and Water melon.

9 Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Bananaand Mango.

10 Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Papaya and Guava.

### REFERENCES

1. Allard, R.W. 1960. Principles of Plant Breeding. John Wiley & Sons, New York.

2. Phundan Singh. 2006. Essential of Plant Breeding. Kalyani Publishers, Ludhiana

3. Poehlman, J.M. and Borthakur, D. 1995. Breeding of Asian Field Crops. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

4. Sharma, J.R. 1994. Principles and Practice of Plant Breeding. Tata McGraw-Hill Publishing Co. Ltd., New Delhi.

5. Kalloo, G.1994. Vegetable Breeding. Panima Educational Book Agency, New Delhi.

6. Kumar, N. 2006. Breeding of Horticultural Crops - Principles and Practices. New India Publishing Agency, New Delhi.

7. George Acquaah.2012. Principles of Plant Genetics and Breeding. Blackwell Publishing Ltd., USA.
## SYLLUBUS

Subject: Agriculture and Rural DevelopmentSemester: VICourse Title: Pest of Horticultural Crops and their Management andBeneficial insects

## COURSE CODE: ENTO 332

No. of Hrs: 30

## Objectives

- primary objective of imparting adequate knowledge to students, both in theory and practice
- To diagnose a variety of horticultural crop problems related to insect and non insect pests,
- To comprehend their life histories and damages and to be able to recommend management strategies .

# **Course Outcomes**

**CO1:** Explain all major pests of crops as regards their taxonomic position, distribution, host range, life history, nature and symptoms of damage.

CO2: Explain Seasonal abundance and their management.

**CO3:** Discuss minor pests their taxonomic position, nature and symptoms of damage C

**CO4:** Explain Management have been covered with additional information wherever necessary

**CO5:** Summarize Major and minor pests have been differentiated by their text format

# THEORY

# UNIT I

General account on nature and type of damage by different arthropod pests. Scientific name, order, family, host range, distribution, marks of identification, bionomics, nature of damage, and management of major, minor insect pests and other important arthropod pests of various vegetable crops, fruit crops, plantation crops, ornamental crops, narcotics, spices and condiments.

1 Brinjal- Epilachna beetle, shoot and fruit borer, stem borer, mealy bug, aphid, leafhopper, lacewing bug, leaf webber and red spider mite- IPM practices.

2 Bhendi- Shoot and fruit borer, leafhopper and whitefly and spider mite -TomatoSerpentine leaf miner, South American Leaf miner/ Tomato pink worm, fruit borer and whitefly - IPM practices.

## Credits: 2

3 Cucurbits- Fruit flies, pumpkin beetles, semilooper, serpentine leaf miner and pumpkin leaf eating caterpillar - Coccinia-Coccinia gall fly and aphids - IPM practices.

4 Crucifers- Diamond back moth, cabbage head borer, leaf webber, aphid, painted bug, tobacco caterpillar and cabbage butterfly - IPM practices.

5 Potato- Tuber moth - Sweet potato - Sweet potato weevil, hairy caterpillar, tortoise beetle - Moringa- Hairy caterpillar, budworm, leaf webber and pod fly – Chillies Thrips, pod borers, aphid, mites, blossom midge - Amaranthus- Leaf eating caterpillar, stem weevil - IPM practices.

6-7 Mango- Leafhoppers, stem borer, nut weevil, fruit fly, shoot borer, fruit borer, mealybug, aphids, leaf webber, termites, thrips, red tree ant, leaf gall midges and red spider mite - IPM practices.

## UNIT II

1. Citrus- Butterfly, fruit sucking moths, leaf miner, psylla, rust mite, bark eating caterpillar, black fly and leaf mite.

2. Grapevine- Flea beetle, thrips, mealybug, stem girdler, stem borer, leaf eating caterpillars and root grub - IPM practices.

3. Cashew- Tree borer, shoot and blossom webber, tea mosquito bug, thrips and leaf miner Pomegranate- Butterfly, thrips and fruit sucking moths - IPM practices.

4. Guava- Tea mosquito bug, mealybug, fruit flies and spiralling whitefly – Sapota Leaf webber, parijatha hairy caterpillar, mealybugs - Ber- Fruit fly, fruit borer and fruit weevil.

5. Banana- Rhizome weevil, skipper, aphid and pseudostem weevil - Papaya whiteflies, mealybugs and thrips - Apple - Woolly aphid and Codling moth - Custard apple- Mealybug - IPM practices

6. Coconut- Black headed caterpillar, rhinoceros beetle, red palm weevil, slug, termites, scale and mite - Oil palm- Black headed caterpillar, rhinoceros beetle and red palm weevil - IPM practices.

#### UNIT III

1. Arecanut- Scales - Cocoa - Scales - Cardamom- Thrips - Pepper- Pollu beetle and shoot borer - Eucalyptus - Gall wasp - Neem - Tea mosquito bug and white grub - IPM practices.

2. Turmeric and ginger- Rhizome fly and Lace wing bug - Betelvine- Shoot bug and tobacco caterpillar - Onion- Thrips and Spodoptera exigua - Coriander- Aphids and leaf eating caterpillar - Rose- Thrips, scales, leaf eating caterpillars and chafer beetles - Jasmine- Stink bug, bud worm and gall mite - Chrysanthemum- Aphid- IPM

practices - Tobacco-Tobacco caterpillar, aphid, whitefly and stem borer - CoffeeWhite borer, red borer and green scale; Tea- Tea mosquito bug, thrips, red spider mite, pink mite, purple mite and scarlet mite- IPM practices.

3. Economically important mite, nematode (vegetables, citrus, banana and coconut), rodent (coconut) and bird pests of horticultural crops and their management.

4. Beneficial insects – Importance of silkworm, honeybee, lac insects, predators, parasitoids, pollinators, weed killers and scavengers.

5. Species of Silkworms - Characteristic features of Mulberry Silkworm, Tasar Silkworm, Eri Silkworm and Muga Silkworm and their hosts- Biology – Voltinism - Ahimsa silk.

6. Establishment of mulberry garden – Planting season and land preparation, preparation of planting material - Irrigation- spacing, varieties, planting inter cultivation, fertilization, irrigation, leaf harvest and leaf yield - Mulberry Planting under rainfed and irrigated conditions - Spacing and preparation of pits, planting, fertilization, inter-cultivation, maintenance, soil moisture conservation and leaf harvest - Pests and diseases of mulberry plants and their management - Rearing house, rearing equipment and appliances-rearing stand, chawki rearing trays, late age rearing trays, paraffin wax coated paper, bird feathers, bed cleaning nets, chop sticks, rubber foam, ant well, mountages, chopping knife, chopping board, feeding basins, disinfection and hygiene in rearing house.

## UNIT IV

1. Mulberry silkworm races - Grainage centres, brushing of silkworm larvae, young age and late age silkworm rearing - Effect of temperature, humidity, air current and photoperiod - Leaf quality and leaf maturity on larval growth and survival - Feeding of late instars, bed cleaning and bed spacing for IV and V instars

2. Mounting- mountages, mounting density, harvesting and assessment of cocoon yield and cocoon characters for marketing - Defective cocoons.

3. Silk worm diseases- Pebrine- Symptoms, mode of transmission, stages of contamination and intensity, detection and control - Viral diseases- Nucleopolyhedro Virus and Cytoplasmic Polyhedro Virus - Symptoms, prevention and control. Grasserie - Symptoms, source of contamination, prevention and control - Infectious Flacherie - Symptoms, prevention and control - Fungal Diseases- White muscardine-Source of infection, symptoms, prevention and control - Uzi fly – Biology, nature of damage and symptoms and management.

4. Beekeeping- Importance and multiple source of income - Species of Honey bees Rock bee, Little bee, Indian honey bee, European bee and Dammar bee - Bee biology Life cycle - Caste determination in honey bees- Structural adaptations of honeybees. 5. Commercial methods of rearing, – Different types of the hive- Equipment - Smoker, bee veil, gloves, honey extractor, queen gate, queen excluder sheet, drone extruder, drone trap, comb foundation sheet, dummy division board, swarm trap, bee brush, feeder, queen cage and queen cell protector - Colony management in different seasons, winter, summer and rainy seasons.

6. Bee pasturage – Different species of pollen and nectar yielding plants- Honey flow season and dearth period – Communication in bees – Round dance and wag tail dance-Management of bees for crop pollination – Queen bee substance -Honey extraction, testing of honey, honey composition and value, bee wax, pollen, royal jelly, propolis, venom and its uses.

## UNIT V

1. Enemies of bees and bee brood - Nature of damage and management of Greater wax moth, lesser wax moth, wax beetle, wasps, black ants, birds etc., - Nature of damage and management of honey bee - mites, Acarapiswoodi, Varroa jacobsoni and Tropilaelapsclareae.

2. Bee diseases – Nature of damage and management of American foul brood disease, European foul brood disease, Sac brood disease, Thai sac brood disease, Chalk brood, stone brood disease, Nosema and Amoeba disease - Colony collapse disorder in bees.

3. Lac insect- Different species, morphology, behaviour, host plants, inoculation methods, natural enemies of lac insect and their management - Lac production – Processing, different forms of lac- raw lac, seed lac, shellac and lac by - products. Recent applications of lac.

4. Identification of biological control agents - Insect predators and parasitoids, pathogens, entomopathogenic nematodes.

5. Insect orders bearing predators and parasitoids used in pest control and their key (Dictyoptera: identification characters Mantidae: Hemiptera: Reduviidae, Anthocoridae, Lygaeidae, Pentatomidae; Neuroptera: Chrysopidae, Myrmeleontidae, Hemerobiidae; Coleoptera: Carabidae, Cicindelidae, Coccinellidae; Diptera: Asilidae, Tachinidae, Syrphidae; Lepidoptera: Noctuidae, Lycaenidae, Epipyropidae, Pyralidae; Hymenoptera: Vespidae, Braconidae. Ichneumonidae. Chalcididae. Trichogrammatidae, Platygasteridae, Elasmidae, Eulophidae, Scelionidae and Strepsiptera).

6. Mass production/multiplication methods of predators (Cheilomenes and Chrysoperla) parasitoids (Goniozusnephantidis).

7. Important species of pollinators, weed killers, and scavengers and their significance.

#### REFERENCES

1. Vasantharaj David, B. and V.V. Rama Murthy (2016). Elements of Economic Entomology, Popular Book Depot, Coimbatore.

2. Butani, D.K. and Jotwani, M.G. 1984. Insects in Vegetables. Periodical Export Book Agency, New Delhi.

3. Butani, D. K. 1984. Insects and Fruits. Periodical Export Book Agency, New Delhi.

4. Ganga, G and Sulochana Chetty, 1997. Introduction to Sericulture, Oxford and IBH publishing Co. Pvt. Ltd., New Delhi

5. HisaoAragu 1994. Principles of Sericulture, Oxford and IBH publishing Co. Pvt. Ltd., New Delhi.

6. Singh, S.1975. Bee Keeping in India - Indian Council of Agriculture research, New Delhi.

7. Mishra, R.C. 1995. Honey Bees and Their Management in India – Indian Council of Agricultural Research, New Delhi.

8. Glover, P.M.1937. Lac cultivation in India. The Indian Lac research Institute, Ranchi

9. Abrol, D.P. 2010. Beekeeping: A Comprehensive Guide on Bees and Beekeeping. Scientific publishers, Jodhpur

10. Nair, MRGk. 1990. Monograph on Crop Pests of Kerala and their Control. Trissur Directorate of extension, Kerala agricultural University.

#### **MODEL QUESTION PAPER**

Subject: Agriculture and rural developmentSemester: VICourse Title: Pest of Horticultural Crops and their Management andBeneficial insects

#### **COURSE CODE: ENTO 332**

Time: 3Hrs

Max. Marks: 100 M

#### **SECTION-A**

Answer **ALL** questions

 $10 \times 2 = 20 \text{ M}$ 

- 1. Which is not a natural predator of BPH
  - A) Spiders.
  - B) Mirid bugs.
  - C) Red ants.
  - D) All of the above.
- 2. Grassy stunt virus disease is caused by
  - A) BPH.
  - B) Green leafhoppers.
  - C) White rice leafhoppers.
  - D) Zig-zag leafhoppers.

#### 3. The vector of 'Orange leaf' disease in rice is

- A) Zig-zag leafhoppers.
- B) Pink stem borer.
- C) Pink ants.
- D) Pale-headed stripe borer.
- 4. The virus disease tungro is associated with
  - A) BPH
  - B) White backed planthopper.
  - C) Green leafhoppers.
  - D) Rice blue leafhoppers.

- 5. Trichogramma japonicum is used mainly as bio-control agent of which insect in rice
  - A) Rice caseworm.
  - B) Rice leaf-folder.
  - C) Pink stem borer.
  - D) BPH.
- 6. Which is the scientific name and family of BPH?
  - A) Nilaparvatalugens, Delphacidae.
  - B) Sogaferafurcifera, Delphacidae.
  - C) N. virescens, Cicadellidae
  - D) Cofana spectra, Cicadellidae..
- 7. Which stage of BPH causes damage to paddy crop
  - A) Only adults.
  - B) Only nymphs.
  - C) Both a and b.
  - D) Only male.
- 8. The ETL for BPH is
  - A) 5-10 insects per hill.
  - B) 2-3 insects per hill.
  - C) 1 insect per hill.
  - D) 10-15 insects per hill.
- 9. Proper management practice for BPH is
  - A) Wider spacing, alternate drying of field, making alleys.
  - B) Closer spacing, regular drying of field.
  - C) Either a or b.
  - D) Late sowing of rice.
- 10. Hopper burn is a plant damage symptom which is caused by
  - A) Sogatellafurcifera.
  - B) Nilaparvatalugens.
  - C) Nephotettixvirescens.
  - D) Chodana spectra.
- 11. Pollyphagous insect-pest is..\_\_\_\_\_
- 12. Monophagous insect-pest is\_\_\_\_\_
- 13. Which is describe trichogrma\_\_\_\_\_
- 14. Vector of rice tungro virus is\_\_\_\_\_-

15.	Vector	of Grassy	Stunt Disease	is
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16. Harmful stage of citrus psylla is\_\_\_\_\_

17. Ear cockle of wheat is caused by\_\_\_\_\_

18. Use of pesticide is highest in\_\_\_\_\_

19. Family of rice gandhi bug is\_\_\_\_\_

20. Management practice of tundu disease includes\_\_\_\_\_

#### **SECTION-B**

Answer any FOUR questions

 $4 \times 8 = 32 \text{ M}$ 

11. Explain Different species of pollen and nectar yielding plants?

12. Explain Silk worm diseases?

- 13. Discuss inoculation methods, natural enemies of lac insect and their management?
- 14. Explain Nature of damage and management of American foul brood disease?
- 15. Explain IPM practices?
- 16. Explain Economically important mite, nematode?

#### **SECTION-C**

 $4 \times 12 = 48 \mathrm{M}$ 

Answer any **FOUR** questions 17. Explain about Establishment of mulberry garden?

18. Explain about Acquaintance with silkworm species and small-scale rearing of mulberry silkworm.?

19. Explain about Mulberry silkworm races?

20. Explain abountIdentification of biological control agents?

21. Explain about Identification of insect pests of coconut, arecanut, cocoa, cardamom

22. Explain about General account on nature and type of damage by different arthropod pests.?

#### B.Sc. Agriculture and Rural Development PRACTICAL SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VICourse Title: Pest of Horticultural Crops and their Management andBeneficial insects Practical

#### **COURSE CODE: ENTO 332P**

#### PRACTICALS

Credits: 1

Objectives

No. of Hrs: 30

- To explain the systems and identification of vegetables pests
- To explain the systems and identification of fruits pests
- To explain management of petsts

#### **Course Outcomes**

## After completion of the course students will be understand

**CO1:**Explain identification, symptoms and management of insect pests of solanaceous and malvaceous vegetables

**CO2:**Explain identification, symptoms and management of insect pests of crucifers and cucurbits

**CO3:**Discuss identification, symptoms and management of insect pests of tuber crops and chilli

CO4:Outline identification, symptoms and management of insect pests of fruit crops

**CO5:**Explain identification, symptoms and management of insect pests of spices and sericulture

## EXPERIMENTS

1. Identification of insect pests of Solanaceous and Malvaceous vegetables and their damage symptoms

2. Identification of insect pests of Cruciferous and Cucurbitacious vegetables and their damage symptoms

3. Identification of insect pests of leafy vegetables, potato, sweet potato, moringa and chilli and their damage symptoms (Potato and Chillies are Solanaceous crops).

4. Identification of insect pests of mango, cashew, citrus & banana and their damage symptoms.

5. Identification of insect pests of grapevine, pomegranate, sapota, papaya, apple, custard apple, ber and guava and their damage symptoms.

6. Identification of insect pests of coconut, arecanut, cocoa, cardamom, pepper, date palm & oil palm, eucalyptus and neem and their damage symptoms.

7. Identification of insect pests of spices, narcotics (turmeric, betel vine, onion, tobacco & ginger) and ornamental plants (jasmine, rose, chrysanthemum) and their damage symptoms.

8. Identification of economically important mite, nematode (vegetables, citrus, banana and coconut), rodent (coconut) and bird pests of horticultural crops and their management.

9. Acquaintance with silkworm species and small-scale rearing of mulberry silkworm.

#### REFERENCES

1. Vasantharaj David, B. and V.V. Rama Murthy (2016). Elements of Economic Entomology, Popular Book Depot, Coimbatore.

2. Butani, D.K. and Jotwani, M.G. 1984. Insects in Vegetables. Periodical Export Book Agency, New Delhi.

3. Butani, D. K. 1984. Insects and Fruits. Periodical Export Book Agency, New Delhi.

4. Ganga, G and Sulochana Chetty, 1997. Introduction to Sericulture, Oxford and IBH publishing Co. Pvt. Ltd., New Delhi

5. Hisao Aragu 1994. Principles of Sericulture, Oxford and IBH publishing Co. Pvt. Ltd., New Delhi.

6. Singh, S.1975. Bee Keeping in India - Indian Council of Agriculture research, New Delhi.

7. Mishra, R.C. 1995. Honey Bees and Their Management in India – Indian Council of Agricultural Research, New Delhi.

8. Glover, P.M.1937. Lac cultivation in India. The Indian Lac research Institute, Ranchi

9. Abrol, D.P. 2010. Beekeeping: A Comprehensive Guide on Bees and Beekeeping. Scientific publishers, Jodhpur

10. Nair, MRGk. 1990. Monograph on Crop Pests of Kerala and their Control. Trissur Directorate of extension, Kerala agricultural University.

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### **Scheme of Evaluation**

## **B.Sc. Agriculture and Rural Development** SYLLABUS

Subject: Agriculture and Rural Development Semester: VI Course Title: Diseases of Field and Horticultural Crops and their Management – II (Horticultural Crops)

Course Code: PATH372Credits: 2

No. of Hrs: 15

## Objectives

- To understand disease triangle
- To explain IPM
- To explain disease forecasting

## **Course Outcomes:**

**CO1:** Explain diseases of ber and guava

**CO2:** Explain diseases of banana and papaya

CO3: Explain diseases of vegetables

CO4: Discuss diseases of tomato and potato

## UNIT I

1. Integrated disease management – Introduction, concept, Total system approach, Subsystem of IPM, IPM strategies, Integration of practices, Benefits and limitations.

2. Disease triangle, Disease pyramid, Factors affecting disease epidemics, Disease incidence-disease severity, Area under disease progress curve, Descriptive disease scales in important crops with examples. Survey and surveillance of plant diseases: Objectives, methodology and reporting results. Use of Remote sensing technology in Plant Pathology.

3. Plant disease forecasting – meaning – advantages, methods in forecasting, information needed for forecasting, examples of disease forecasting models.

4. Classification of fungicides based on chemical group and antibiotics with examples.

# UNIT II

1&2. Methods of disease control: Host plant resistance – advantages– Flor's gene for gene hypothesis – types of resistance – vertical and horizontal resistance – mechanism of resistance. Cultural methods, mechanical methods and physical methods with examples. Biological control – Biocontrol organisms – mechanisms of biocontrol – examples- mass multiplication methods.

3. Integrated disease management in important crops: Rice, Groundnut, Cotton and Chillies 8. Integrated disease management in important crops – Mango, Banana, Citrus and Brinjal

# UNIT III

1. Economic importance of insect pests. Pest risk analysis - Calculation and dynamics of economic injury level and importance of Economic threshold level.

2. Methods of detection and diagnosis of insect pests – types of insect damage on crop plants based on the types of mouth parts (biting and chewing, piercing and sucking, lacerating and sucking, siphoning and degenerate types)

3. Ecological management of crop environment - Ecological principles – importance of ecosystem concept – ecological niche – Agro ecosystem components and services in management of crop environment.

# UNIT IV

1. Introduction to conventional and botanical pesticides for the insect pests and disease management.

2. Survey & surveillance and forecasting of Insect pests, Case histories of IPM programmes – success stories. Development and validation of IPM modules for major crops –

3. problem identification – Research and development of IPMs – Modules for major Agricultural and horticultural crops and validation.

# UNIT V

1 Implementation and impact of IPM (IPM module for Insect pest) - IPM modules for major field crops (paddy, sugarcane, cotton, pulses and ground nut) major vegetables (brinjal, tomato, okra, cabbage and cauliflower), mango and coconut – Impact studies of IPM modules and constraints in implementation.

2. Political, social and legal implication of IPM - Safety issues in pesticide uses – legislative measures – Awareness about IPM, Farmers participation – Government support.

3. Safety issues in pesticide uses – Pesticide risk assessment, management and communication, use in agriculture. Environmental impact – health effects – residues, resurgence and resistance – effect on nontarget organisms – Strengths and weaknesses of pesticides.

# **References:**

1. Dhaliwal, G. S. and Ramesh Arora 2001. Integrated pest management: Concepts and approaches, Kalyani Publishers Ludhiana.

2. Metcalf, R. L and Luckman, W. H. 1982. Introduction to insect pest management. Wiley inter science publishing, New York.

3. Larry P Pedigo 1991. Entomology and pest management, Prentice Hall of India Private Ltd., New Delhi.

4. Venugopala Rao, N., Umamaheswari, T., Rajendraprasad, P., Naidu, V.G and Savithri, P. 2004. Integrated Insect Pest Management. Agrobios (India) Limited, Jodhpur.

5. Chaube, H.S. and Ramji Singh. 2001. Introductory Plant Pathology. International Book Distribution Co., Lucknow. 136.

6. Mehrotra, R.S. 1980. Plant Pathology. Tata McGraw-Hill Publishing Co. Ltd., New Delhi.

7. Singh, R.S. 2002. Introduction to Principles of Plant Pathology. Oxford & IBH Publ. Co.P. Ltd., New Delhi.

8. Vidyasekharan, P. 1993. Principles of Plant Pathology. CBS Publishers and Distributors, New Delhi. 9. Y. L. Nene and P.N. Thaplial, 1993., Fungicides in Plant Disease Control. Oxford and IBH Publishing Co.

#### **MODEL QUESTION PAER**

#### Diseases of Field and Horticultural Crops and their Management – II (Horticultural

Crops)

Course Code: PATH372

Time: 3Hrs

Credits: 2

Max. Marks: 100 M

 $20 \times 1 = 20 \text{ M}$ 

#### **SECTION-A**

Answer ALL questions

Multiple Choice Questions

1. What is/are the objective(s) of pest surveillance

A. It is the a way of detecting different species of harmful pests.

B. It is the way of detecting the change in behavior of the pests.

C. IPM is a way in which natural enemy of different harmful insect-pests are found.

D. All of the above.

2. In pest surveillance .... involves the in-situ assessment of pests and diseases in the standing crop

- A) The fixed plot surveys.
- B) Roving survey.
- C) Both a and b.
- D) None of the above.
- 3. According to Food and Agriculture Organization IPM is a practice of..
  - A) Keeping pest level below Economic Threshold Level.
  - B) Keeping pest level below Economic Injury Level.
  - C) Keeping pest level below Damage Boundary Level
  - D) Keeping pest level below Environment Economic Threshold Level.
- 4. Which is not a component of IPM?
  - A) Biotechnological approach.
  - B) Legal method.
  - C) Behavioural method.
  - D)Left it on nature strategy.

- 5. Which is an example of pest outbreak?
  - A) Whitefly in brinjal.
  - B)Eriophyd mite in coconut.
  - C) Helicoverpa in okra.
  - D) All of the above.
- 6. As a intercrop in cauliflower crop, onion will reduce the level of incidence of..
  - A) Diamond backmoth.
  - B) Cabbage borer.
  - C) Plant pathogenic nematode.
  - D) Onion thrips.
- 7. Which is the best example trap crop in cauliflower?
  - A) Marigold.
  - B) Mustard.
  - C) Radish.
  - D) Amaranth.
- 8. What is the effect of high N in pest management?
  - A) It reduces pest incidence.
  - B) No effect.
  - C) It increases pest incidence.
  - D) All of the above.
- 9. Incidence of rice case worm is high in water logging condition. It can be managed

by reducing water at:

- A) 2 cm level.
- B) Field capacity.
- C) 3 cm level.
- D) 5 cm level.
- 10. Handpick method of pest control is common in..
  - A)Rice gundhi bug.
  - B) Cauliflower diamondback moth.
  - C) Mango mealy bug.
  - D) Caterpillar of lemon butterfly.

11. Solar heat treatment of sorghum grain kills red flour beetle it is a..\_\_\_\_\_

12. Grease banding around mango tree trunk is necessary to control\_\_\_\_\_

13. Methyl eugenol trap is effective against\_\_\_\_\_

14. As an intercrop in cauliflower crop, mustard will reduce the level of incidence

of\_\_\_\_\_

15. Expand EIL\_\_\_\_\_

16. give an example for sporadic pest\_\_\_\_\_

17. Expand NPV\_\_\_\_\_

18. Scientific name for tomato fruit borer\_\_\_\_\_

- 19. Expand IDM\_\_\_\_\_
- 20. Give an example for fungicide\_\_\_\_\_

#### **SECTION-B**

#### Answer any FOUR questions

 $4 \times 8 = 32 \text{ M}$ 

- 21. Explain Economic importance of insect pests
- 22. Explain about IPM

23. Discuss about IDM

- 24. Write short notes Survey & surveillance and forecasting of Insect pests
- 25. Explain about diseases of tomato
- 26. Explain about pests of brinjal

#### **SECTION-C**

#### Answer any FOUR questions

27. Explain introduction, concept, Total system approach, Subsystem of IPM, IPM strategies, Integration of practices, Benefits and limitations

28. Explain about Implementation and impact of IPM

- 29. Write in detail about cauliflower?
- 30. Write in detail about maize diseases?
- 31. Write in detail about pests of mango?
- 32. Explain about storage grain pests

# $4 \times 12 = 48 \text{ M}$

# B.Sc. Agriculture and Rural Development PRACTICAL SYLLABUS

Subject: Agriculture and Rural Development Semester: VI

Course Title: Diseases of Field and Horticultural Crops and their Management - II

(Horticultural Crops) –Practical

No. of Hrs: 30

Course Code: PATH372P

Credits: 1

## **Objectives:**

- To understand and identify the symptoms of various crop diseases
- To understand the control of various diseases
- To explain about bio control agents

## **Course outcomes**

CO1: Explain diseases of ber and guava

CO2: Explain diseases of banana and papaya

CO3: Explain diseases of vegetables

CO4: Discuss diseases of tomato and potato

# **Practicals:**

1. Identification of plant diseases based on symptoms and signs.

2. Laboratory methods used in the diagnosis of Plant diseases.

3. Methods of measurement of plant diseases, descriptive disease scales for important diseases. Plotting AUDP curves.

4. Methods to assess crop yield losses due to crop diseases with examples.

5. Identification of disease biocontrol agents – Trichoderma, Pseudomonas, Bacillus spp. – Laboratory isolation procedures.

6. Mass multiplication of biocontrol agents: Trichoderma and Pseudomonas.

7. Crop monitoring for assessment disease dynamics – Decision making. 8. IDM and non-IDM methods – Cost benefit analysis – Case studies.

#### **References:**

1. Dhaliwal, G. S. and Ramesh Arora 2001. Integrated pest management: Concepts and approaches, Kalyani Publishers Ludhiana.

2. Metcalf, R. L .and Luckman, W. H. 1982. Introduction to insect pest management. Wiley inter science publishing, New York.

3. Larry P Pedigo 1991. Entomology and pest management, Prentice Hall of India Private Ltd., New Delhi.

4. Venugopala Rao, N., Umamaheswari, T., Rajendraprasad, P., Naidu, V.G and Savithri, P. 2004. Integrated Insect Pest Management. Agrobios (India) Limited, Jodhpur.

5. Chaube, H.S. and Ramji Singh. 2001. Introductory Plant Pathology. International Book Distribution Co., Lucknow. 136.

6. Mehrotra, R.S. 1980. Plant Pathology. Tata McGraw-Hill Publishing Co. Ltd., New Delhi.

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8. Vidyasekharan, P. 1993. Principles of Plant Pathology. CBS Publishers and Distributors, New Delhi. 9. Y. L. Nene and P.N. Thaplial, 1993., Fungicides in Plant Disease Control. Oxford and IBH Publishing Co.

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### **Scheme of Evaluation**

#### **B.Sc. Agriculture and Rural Development** SYLLABUS

Subject: Agriculture and Rural DevelopmentsSemester: VICourse Title: Post-harvest Management and Value Addition of Fruits andVegetables

## **COURSE CODE: HORT 381**

No. of Hrs: 30

Credits: 2

#### Objectives

- 1.The students are expected to gain knowledge on various management technologies on pre- harvest and post harvest of fruits and vegetables.
- 2.Students are also expected to gain knowledge on conventional and modern packaging methods. Importance of post harvest technology of horticultural crops
- 3.Maturity indices, harvesting and post harvest handling of fruits and vegetables
- 4. Maturity and ripening process

#### **Course Outcomes**

**CO1:** Explain Various methods of packaging materials and transport, Packaging technology

**CO2:** Discuss various Methods of storageprecooling, pre storage treatments, low temperature storage, controlled atmosphere storage

**CO3:** Explain Chemicals used in Ripening

**CO4:** Summarize Irradiation and low cost storage structures

**CO5:** Explain Factors affecting ripening can be physiological, physical, or biotic

## **THEORY:**

#### UNIT I

1. Scope and Importance of post-harvest technology of fruits and vegetables- Extent and possible causes of post-harvest losses- Causes of postharvest losses.

2. Pre-harvest factors affecting postharvest quality, maturity, ripening and shelf life of fruits and vegetables – Environmental factors (Temperature, Light, Rainfall, Wind, Relative humidity) – Cultural factors – (Rootstock, Variety, Mineral nutrients, growth regulators, Irrigation, pruning, thinning, girdling) – Maturity – Pest and diseases.

3. Changes occurring during ripening – Ripening definition- Climacteric and nonclimacteric fruits – Metabolic changes - Maturation of seeds – Colour – Texture -Changes in carbohydrates- Changes in aromatic volatiles - Changes in organic acids – Fruit abscission – Changes in respiration rate – Development of surface waxes – Changes in tissue permeability. 4. Causes for deterioration of harvested fruits and Vegetables -Respiration and factors affecting respiration rate – Transpiration and factors affecting transpiration - Ethylene –Mechanical damage – Pest and Diseases.

## UNIT II

1. Postharvest diseases and disorders - Heat, chilling and freezing injury.

2. Harvesting and field handling – Methods of harvesting – Post harvest handling – Pre-cooling - Sorting and grading – Disinfestation – Post harvest treatments (Waxing, Wrapping, de-greening, ripening).

3. Storage – Methods of storage – Traditional storages (In-situ, pit storage, high altitude, clamp storage, wind breaks, cellars, barns, Night ventilation, Evaporative cool storage ZECC) - Improved storage methods (Refrigerated storage, modified atmospheric storage, controlled atmospheric storage, hypobaric storage).

# UNIT III

1. Value addition – Concept – Scope and importance of fruit preservation in India – Status of fruit preservation in India.

2. Principles and methods of preservation – Principles of preservation – Preservation methods – High temperature, low temperature, drying, filtration, chemicals, food additives, fermentation, carbonation, antibiotics, irradiation etc.

3. Intermediate moisture foods - Jam, jelly, marmalade – Problems in Jam making important considerations and problems in Jelly making- Problems in marmalade making.

## UNIT IV

1. Preserve, candy – Concepts and Standards – Flow chart for manufacturing of preserve and candy – Problems in preservation of preserve and candied fruits – Glazed fruits/vegetables.

2. Fruit beverages –Fermented (Juices, Ready to serve, Nectar, cordial, Squash, crush, Syrup, Fruit Juice concentrate, Fruit Juice, Powder, Carbonated beverages) and non-fermented beverages (Wine, Champagne, Port, Sherry, Tokay, Muscat, Perry, Nira, Feni, Cider) – Preparation and preservation of unfermented fruit beverages.

3. Tomato processing - Concepts and Standards – Tomato juice – Tomato puree and paste – Tomato sauce/ketchup- Tomato chutney/pickle –Tomato cocktail – Tomato soup – Canned tomatoes.

#### UNIT V

1. Drying/dehydration of fruits and vegetables – Factors affect the rate of drying – Advantages of dehydration over sun drying – Process of drying/dehydration of fruits and vegetables – Spoilage of dried fruits and vegetables - Freezing – Methods of freezing.

2. Canning of fruits and vegetables – Selection of fruits and vegetable - Causes of spoilage of canned foods – Testing for defects - Containers for packing of canned products – Tin containers, glass containers.

3. Packaging of products - Definition – Properties of good packaging material – Different packaging materials for fresh fruits and vegetables for export – Cushioning materials – Purpose – Characteristics of cushioning material.

#### REFERENCES

1. Rathore, N.S., Mathur, G.K., Chasta, S.S. 2012. Post-harvest Management and Processing of Fruits and Vegetables. ICAR, New Delhi.

2. Srivastava, R.P. and Sanjeev Kumar. 2002. Fruit and Vegetable Preservation: Principles and Practices. International Book Distribution Company, Lucknow.

3. Giridharilal, G.S., Siddappa and Tondon, G.L. 2007. Preservation of Fruits and Vegetables. ICAR, New Delhi.

4. Mitra, S.K. 2005. Post-Harvest Physiology and Storage of Tropical and Subtropical Fruits. CABI Publishers, Kolkatta.

#### **Model Question Paper**

#### **COURSE No: HORT 381**

Subject: Agriculture and rural development Semester: VI Course Title: Post-harvestManagementandValueAdditionof Fruits andVegetables

#### **COURSE CODE: HORT 381**

Time: 3Hrs

#### **SECTION-A**

 $20 \times 1 = 20 \text{ M}$ 

Max. Marks: 100 M

- Answer ALL questions
- 1. Percentage of jam in acid is
- A) 0.2 0.3.
- B). 0.3 0.4.
- C). 0.5 0.6.
- D). 0.1 0.2.
- 2. TSS of jam is
  - A). 50 60%.
  - B). 70%-72% .
  - C). 81 -82%
  - D). 68 70%
- 3. Which fruit is rich in pectin low acid
  - A). Pineapple.
  - B). Cherry.
  - C). Sour peach.
  - D). Apple.
- 4. Tartaric acid is best for the preparation of?
  - A). Jam.
  - B). Jelly.
  - C). Marmalade.
  - D). All of the above.

5. Syneresis is a term which is used with?

A). Jam.

B). Jelly.

C). Marmalade.

D). Pickle.

- 6. Aroma in apple is due to?
  - A). 2- methyl butyrate.
  - B). 2 hexanal.
  - C). Hexanal.
  - D). All of the above.
- 7. Major acid present in Apple is?

A). Tartaric.

B). Malic.

- C). Glycolic.
  - D). Aspartic.
- 8. Premature setting in jam can be controlled by?
  - A). Adding more sugar.
  - B). Adding less amount of sugar.
  - C). Replacing sugar using water.
  - D). Altering temperature.

9. Nira is prepared from?

- A). Orange.
- B). Palm.
- C). Apple.
- D). Cherry.
- 10. Papain is prepared from?
  - A). Papaya.
  - B). Coconut.

C). Pear.

D). Gum of french bean.

#### **SECTION-B**

Answer any FOUR questions

 $4 \times 8 = 32 \text{ M}$ 

- 11. Explain Storage Methods of storage?
- 12. Explain about Pre-harvest factors affecting postharvest quality, maturity?
- 13. Discuss about Changes occurring during ripening?
- 14. Explain Fruit beverages?
- 15. Explain dehydration of fruits and vegetables?
- 16. Explain Postharvest diseases and disorders?

#### **SECTION-C**

Answer any **FOUR** questions 17. Explain Intermediate moisture foods?

 $4 \times 12 = 48 \text{ M}$ 

18. Explain about Scope and Importance of post-harvest technology of fruits and vegetables?

19. Explain about Principles and methods of preservation?

20. Explain about Value addition - Concept - Scope and importance of fruit

preservation in India?

21. Explain about Tomato processing - Concepts and Standards?

22. Explain about Extent and possible causes of post-harvest losses- Causes of

postharvest losses?

## B.Sc. Agriculture and Rural Developments SYLLABUS B.Sc. Agriculture and Rural Development PRACTICAL SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VICourse Title: Post-harvest Management and Value Addition of Fruits andVegetables practical

#### **COURSE CODE: HORT 381P**

No. of Hrs: 30

Credits: 1

#### **Objectives:**

- Explain postharvest techniques and processing
- Explain preparation of Jam, jellies
- Explain preparation of RTS

#### **Course Outcomes:**

At the end of the course student will be able to

CO1: Explain different types of packaging containers for shelf-life extension

CO2: Explain preparation of jams and jelly

CO3: Discuss preparation of RTS

CO4: Explain preparation of squash and nectar

#### **EXPERIMENTS**

- 1. Applications of different types of packaging containers for shelf-life extension.
- 2. Effect of temperature on shelf life and quality of produce.
- 3. Demonstration of chilling and freezing injury in vegetables and fruits.
- 4. Extraction and preservation of pulps and juices.
- 5. Preparation of jam.
- 6. Preparation of jelly.
- 7. Preparation of RTS.
- 8. Preparation of nectar.
- 9. Preparation of squash.

#### REFERENCES

1. Rathore, N.S., Mathur, G.K., Chasta, S.S. 2012. Post-harvest Management and Processing of Fruits and Vegetables. ICAR, New Delhi.

2. Srivastava, R.P. and Sanjeev Kumar. 2002. Fruit and Vegetable Preservation: Principles and Practices. International Book Distribution Company, Lucknow.

3. Giridharilal, G.S., Siddappa and Tondon, G.L. 2007. Preservation of Fruits and Vegetables. ICAR, New Delhi.

4. Mitra, S.K. 2005. Post-Harvest Physiology and Storage of Tropical and Subtropical Fruits. CABI Publishers, Kolkatta.

#### **Scheme of Evaluation**

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

## **B.Sc. Agriculture and Rural Development** SYLLABUS

# Subject: Agriculture and Rural DevelopmentSemester: VICourse Title: Communication Skills and Personality Development

# **COURSE CODE: AEXT 391**

#### No. of Hrs: 30

## Credits: 2

## Objectives

- Developing effective communication skills(spoken and written).
- Become self-confident individuals by mastering inter-personnel
- skills, team management skills, and leadership skills

# **Course Outcomes**

**CO1**: ExplainNonverbal communication skills - Practicing conscious body postures and

movements.

CO2: Overview of verbal communication skills

**CO3:** Learn practicing listening and note taking and writing skills.

CO4: Practicing oral presentation skills.

**CO5:** Practicing writing of field diary and lab record - Indexing, footnote and bibliographic procedures.

# THEORY

# UNIT I

1. Communication - Meaning and process of communication, verbal and nonverbal communication.

2. Communication skills - Structural and functional grammar.

3. Listening and note taking, writing skills, oral presentation skills.

4. Voice modulation basics and their usage for meaningful impact on people.

# UNIT II

1. Field diary and lab record; indexing, footnote and bibliographic procedures.

2. Reading and comprehension of general and technical articles and precise writing - summarizing, abstracting; individual group presentations.

3. Extempore, impromptu and prepared presentations, public speaking; group discussion - Organizing seminars and conferences.

## UNIT III

1. Human behaviour - Domains and components of behaviour.

2. Personality and personality development - Meaning, scope, importance, factors influencing personality - Traits and type, approaches.

3. Personality theories.

## UNIT IV

1. Importance of wants, desires, needs, drives, motives, aspirations, interests, objectives and goals in personality development.

2. Transactional analysis, - Importance, methods and strategies.

3. Negotiation skills, stress management and conflict management - Meaning, concept, steps and techniques.

#### UNIT V

1. Emotional intelligence - Meaning, concept and importance.

2. Creativity - Meaning, concept, components and characteristics of creative people.

3. Team work - Meaning, concept, characteristic features of effective teams, types of teams, factors affecting and role of team work.

#### REFERENCES

1. Dangi K.L., S.S. Sisoda, Pravesh Singh Chauhan and Yogita Ranavat. A Text Book of Communication Skills. Agrotech Publications.

2. Mangal S.K. 2016. Essentials of Educational Psychology. PHI Learning Private Ltd., New Delhi.

3. Nirajkumar. 1997. A Genesis of Behavioural Science. Gyan Publishing House, New Delhi.

4. Eric Berne. 1964. Games People Play-The Psychology of Human Relationship. Grove Press Publishers.

- 5. Thomas Anthony Harris. 1967. I am Ok You are Ok. Harper Publishers.
- 6. Scott Bill. 1981. Skills of Negotiating.

7. Goleman Daniel. 1995. Emotional Intelligence.

8. Ratan Reddy B and Supriya Reddy. Soft Skills for Professional Excellence.

9. Shivkhera. 2002. You can win. MacMillan Publishing Company. New Delhi

10. Shivaraman K. 2009. Communication Skills. APH

# **B.Sc. Agriculture and Rural Development MODEL QUESTION PAPER**

Subject: Agriculture and rural develop VI	ment Semester:
Course Title: Communication Skills and Per	rsonality Development
COURSE CODE: AEXT 391	
Time: 3Hrs M	Max. Marks: 100
SECTION-A Answer ALL questions	$10 \times 2 = 20 \text{ M}$
1. Communication is a non stop	
(A) paper	
(B) process	
(C) programme	
(D) plan	
2. Communication is a part of skills.	
(A) soft	
(B) hard	
(C) rough	
(D) short	
3. The is the person who tran	smits the message.
(A) receiver	
(B) driver	
(C) sender	
(D) cleaner	
4 is the person who notices and	l decodes and attaches some meaning
to a message.	
(A) ·	
(A) receiver	
(B) driver	
(C) sender	

(D) cleaner

5. Message is any signal that triggers the response of a \_\_\_\_\_

- (A) receiver
- (B) driver
- (C) sender
- (D) cleaner

6. The response to a sender's message is called \_\_\_\_\_

- (A) food bank
- (B) feedback
- (C) food
- (D) back

7. \_\_\_\_\_ context refers to the relationship between the sender and the receiver

- (A) back
- (B) physical
- (C) cultural
- (D) chronological

7. \_\_\_\_\_ context refers to the similarity of backgrounds between the sender and the receiver.

- (A) physical
- (B) social
- (C) chronological
- (D) cultural

9.\_\_\_\_\_ refers to all these factors that disrupt the communication.

- (A) nonsense
- (B) noise
- (C) nowhere
- (D) nobody

10.Environmental barriers are the same as \_\_\_\_\_ noise.

- A) physiological
- B) psychological
- C) physical
- D) sociological

11. "Spectroscopes" instrument is used by \_\_\_\_\_

12. the fascinating areas of language learning is \_\_\_\_\_

- 13. Listening process involves\_\_\_\_\_
- 14. Trumpet horn bagpipes are in the category of \_\_\_\_\_\_
- 15. Semantic markers are used as \_\_\_\_\_
- 16. 'C' stands for carbon and 'Ca' stands for calcium are examples of
- 17. The oldest form of communication is \_\_\_\_\_
- 18. The big step forward in communication is \_\_\_\_\_
- 19. It is the system where each symbol stood for a and syllable and vowels were not

indicated.

20. \_\_\_\_\_ is a word or a phrase, which helps us to express what we are trying to say.

#### **SECTION-B**

Answer any FOUR questions

11. Explain Communication - Meaning and process of communication, verbal and nonverbal communication.

12. Explain about Human behaviour - Domains and components of behaviour.?

13. Discuss about Personality theories.?

14. Explain Importance of wants, desires, needs, drives, motives, aspirations, interests, objectives and goals in personality development.

15. Explain Personality and personality development?s

16. Explain Transactional analysis, - Importance, methods and strategies.?

#### **SECTION-C**

Answer any **FOUR** questions

17. Explain Voice modulation basics and their usage for meaningful impact on people?

18. Explain about Communication skills - Structural and functional grammar.?

19. Explain about Personality and personality development - Meaning, scope, importance, factors influencing personality - Traits and type, approaches.?

20. Explain about Negotiation skills, stress management and conflict management - Meaning, concept, steps and techniques.?

21. Explain about Importance of wants,?

22. Explain about Listening and note taking, writing skills, oral presentation

 $4 \times 8 = 32 \mathrm{M}$ 

 $4 \times 12 = 48 \text{ M}$ 

#### PRACTICAL SYLLABUS

## B.Sc. Agriculture and Rural Development Subject: Agriculture and Rural Development Semester: VI Course Title:Communication Skills and Personality Development Practical

Course code: AEXT 391P

No. of Hrs: 30

Credits: 1

#### Objectives

- To explain verbal communication skills
- To understand listening and note taking and writing skills
- To understand and practicing oral presentation skills

#### **Course Outcomes**

After completion of the course students will be understand

CO1:Explain communication and nonverbal communication skills

CO2:Explain verbal communication skills

**CO3:**Discuss oral communication skills

**CO4:**Explain reading and comprehension skills

## EXPERIMENTS

1. Communication - Meaning and process of communication.

2. Overview of nonverbal communication skills, signs of body language.

3. Nonverbal communication skills - Practicing conscious body postures and movements.

4. Overview of verbal communication skills.

5. Practicing listening and note taking and writing skills.

6. Practicing oral presentation skills.

7. Practicing writing of field diary and lab record - Indexing, footnote and bibliographic procedures.

8. Practicing reading and comprehension of general and technical articles.

## REFERENCES

1. Dangi K.L., S.S. Sisoda, Pravesh Singh Chauhan and Yogita Ranavat. A Text Book of Communication Skills. Agrotech Publications.

2. Mangal S.K. 2016. Essentials of Educational Psychology. PHI Learning Private Ltd., New Delhi.

3. Nirajkumar. 1997. A Genesis of Behavioural Science. Gyan Publishing House, New Delhi.

4. Eric Berne. 1964. Games People Play-The Psychology of Human Relationship. Grove Press Publishers.

- 5. Thomas Anthony Harris. 1967. I am Ok You are Ok. Harper Publishers.
- 6. Scott Bill. 1981. Skills of Negotiating.
- 7. Goleman Daniel. 1995. Emotional Intelligence.
- 8. Ratan Reddy B and Supriya Reddy. Soft Skills for Professional Excellence.
- 9. Shivkhera. 2002. You can win. MacMillan Publishing Company. New Delhi
- 10. Shivaraman K. 2009. Communication Skills. APH

#### **Scheme of Evaluation**

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

## **B.Sc. Agriculture and Rural Development** SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VICourse Title: Farm Management, Production and Resource Economics

# COURSE CODE: AECO 341

No. of Hrs: 30

Credits: 2

# Objectives

1. Assist farm managers in determining the best use of resources.

2. Assist policy makers in determining the consequences of

alternative public policies

3. On output, profits and resource use on farms.

4. Given the changing needs, values and goals of the society.

# **Course Outcomes**

**CO1:**Assist farm managers in determining the best use of resources, given the changing needs, values and goals of the society.

**CO2:**Assist policy makers in determining the consequences of alternative public policies on output, profits and resource use on farms.

**CO3:** Evaluate the uses of theory of firm for improving farm management and understanding the behaviour of the farm as a profit maximizing entity.

**CO4:**Evaluate the effects of technical and institutional changes on agricultural production and resource use.

**CO5:** Determine individual farm and aggregated regional farm adjustments in output supply and resource use to changes in economic variables in the economy.

Subject

# THEORY

# UNIT I

1. Meaning and concept of farm management, definitions, objectives and relationship with other sciences - Importance of study of farm management - Farm management problems in India. 2. Meaning and definitions of types and systems of farming and their characteristics - Changing structure of land holdings in India - Characteristics of small, marginal and tenant farm holdings.

3. Concept of production function and its types, use of production function in decision -Making on a farm - Seven principles of farm management.

4. Factor - Product relationship – Law of variable proportions – Definition, graphical and arithmetical explanation with the help of an example.

## UNIT II

1. Determination of optimum input and optimum output and decision rules.

2. Factor-Factor relationship, resources and types - Substitutes and complements, variable and fixed resources - Iso-quants - Iso-cost lines - Meaning and characteristics - Principle of least cost combination/ Principle of factor substitution - Explanation and decision rules.

3. Product-Product relationship - Iso- product curves and Iso-revenue lines - Meaning and characteristics - Principle of optimum product combination - Law of equimarginal returns/ principles of opportunity cost, decision rules.

# UNIT III

1. Types of enterprises and their characteristics - Principle of comparative advantage.

2. Meaning and concept of cost, cost function /cost-output relationship - Types of production costs and their interrelationship - Importance of costs in managing farm business - Minimum loss principle (Cost Principle) and decision rules - Time comparison principle – compounding and discounting.

3. Farm inventory - Meaning and importance of taking inventory on farm business - Different methods of appraisal and valuation of farm resources and products.

# UNIT IV

1. Farm planning and budgeting - Meaning and importance, partial budgeting, enterprise budgeting and complete budgeting, steps in farm planning and budgeting.

2. Linear Programming-Meaning - Definition, LP mathematical model specification, importance in farm decision making, basic assumptions, limitations.

3. Concepts of risk and uncertainty in agriculture production, nature and sources of risks and uncertainty and management strategies.
#### UNIT V

1. Economy and environmental linkages - How economic activity affects life on a planet with limited resources and a fragile environment - Concepts of natural resource economics - Ecological equilibrium, direct use value and indirect use value, willingness to accept and willingness to pay, contingent valuation, opportunity cost, discounting, societal cost - benefit analysis, consumer surplus, carbon sequestration - Unique properties of natural resources.

2. Environmental costs of economic growth - Sustainable development - Positive and negative externalities in agriculture - Inefficiency and welfare loss, solutions.

3. Important issues in economics and management of common property resources of land, water, pasture and forest resources etc. - India's environmental policy.

#### REFERENCES

1. Bishop, C.E. and W. D. Tousaint. 1958. Introduction to Agricultural Economic Analysis. John Wiley and Sons, London.

2. Heady, Earl O. 1964. Economics of Agricultural Production and Resource Use. Prentice Hall of India, Private Limited, New Delhi

3. S.S. Johl, J.R. Kapur. 2006. Fundamentals of Farm Business Management.

4. Kalyani Publishers, New Delhi.

5. Kahlon, A.S. and Karam Singh. 1965. Principles of Farm Business Management. Kalyani Publishers, New Delhi.

6. Raju, V.T. and D.V.S. Rao. 2006. Economics of Farm Production and Management. Oxford & IBH Publishing Co. Pvt. Limited, New Delhi

7.<u>www.core\_economics.org</u>

#### **MODEL QUESTION PAPER**

Subject: Agriculture and rural developmentSemester: VI Course Title: **Farm Management, Production and Resource Economics** 

#### **COURSE CODE: AECO 341**

Time: 3Hrs

Max. Marks: 100 M

#### **SECTION-A**

#### Answer ALL questions

 $10 \times 2 = 20 \text{ M}$ 

- 1. Mines and Fishes are subject to the law of: ( )
  - I) Diminishing return
  - J) Increasing return
  - K) Constant return
  - L) None of the above
- 2. Which of this statement are correct?
  - A) Agriculture economic may be taken as the branch of both of agriculture and economics
  - B) Agriculture economic is more intimately related to economics then to agriculture
  - C) Agricultural economics is nothing but application of economic principles to agriculture
  - D) All of these
- 3. When we study a problem from particular to general, the method is known as?
  - A) Deductive method
  - B) Inductive method
  - C) Both (a) and (b)
  - D) None of the above
- 4. Name the market in which permanent or durables commodities are traded:
  - A) Long period market
  - B) Short period market
  - C) Secular market
  - D) Bullion market
- 5. Net capital ration is equal to:
  - A) Total assets/Total liabilities
  - B) Total liabilities/Total assets
  - C) Total assets/Current liabilities
  - D) None of the above
- 6. Net return per hectare is:
  - A) Overall efficiency measure
  - B) Partial efficiency measure

- C) Specific efficiency measure
- D) None of the above
- 7. When variable cost is zero, the total cost will be?
  - A) Equal to variable cost
  - B) Equal to fixed cost
  - C) Equal to average variable cost
  - D) None of the above
- 8. Opportunity cost is:
  - A) Cost of supplementary enterprise
  - B) Cost of next best alternative foregone
  - C) Cost of cultivation
  - D) Cost of production
- 9. Optimizing the use of farm resources on an individual farm level. It is a:
  - A) Farm management
  - B) Production economics
  - C) Agricultural marketing
  - D) Macro economics
- 10. Who has contributed the modern theory of interest?
  - A) Knut Wicksell
  - B) Gunnar Myrdal
  - C) J.R. Hicks
  - D) R.G.Hawtrey
- 11. The process of finding the future value of a present sum is called:\_\_\_\_\_\_
- 12. John invested \$4,000 of retirement savings in a load mutual fund. The expected annual rate of return is 6%. How many years will it take for the \$4,000 to double? Utilize the Rule of 72 when calculating the answer.\_\_\_\_\_
- 13. An upward trend of market prices is referred to as a \_\_\_\_\_
- 14. Farmer Smith has a debt-to-asset ratio of 55%. His debt-to-equity ratio must be\_\_\_\_\_
- 15. Which of the following would cause an increase in the price of an agricultural commodity\_\_\_\_\_\_
- 16. The selling of a commodity futures contract to protect a producer from price fluctuations in the market place at the time the product is sold is called:\_\_\_\_\_\_
- 17. In Missouri which of the following is not taxed as personal proper\_\_\_\_\_
- 18. The best indication that a farmer is making financial progress year-to-year is

- 19. The ability of larger firms to be more profitable than smaller firms in the same industry is an example of\_\_\_\_\_\_
- 20. The person who makes transactions for farmers hedging is\_\_\_\_\_

#### SECTION-B

Answer any **FOUR** questions  $4 \times 8 = 32$  M

11. Explain about Farm planning and budgeting?

12. Explain about Environmental costs of economic growth?

13. Discuss about Concepts of risk and uncertainty in agriculture production, nature and sources of risks?

14. Explain Making on a farm - Seven principles of farm management.?

15. Explain Determination of most profitable level of inputs use and output in farm production process.

16. Explain Determination of least cost combination of inputs ?

#### SECTION-C

#### Answer any **FOUR** questions

17. Explain Application of equi-marginal returns/opportunity cost principle in allocation of farm resources.

 $4 \times 12 = 48 \text{ M}$ 

18. Explain about Meaning and concept of farm management, definitions, objectives and relationship with other sciences?

19. Explain about Different methods Computation of depreciation cost of farm assets.?

20. Explain abountImportant issues in economics and management of common property resources of land, water, pasture and forest resources?

21. Explain about Importance of study of farm management - Farm management problems in India. ?

22. Explain aboutDetermination of optimum input and optimum output and decision rules.?

#### AGRICULTURAL FINANCE AND CO-OPERATION PRACTICAL SYLLABUS

Subject: Agriculture and rural developmentSemester: VICourse Title: Farm Management, Production and Resource EconomicsPractical

COURSE No: AECO341P No. of Hrs: 15

Credits: 1

#### Objectives

- To explain Different methods Computation of depreciation cost of farm assets
- To explain Determination of least cost combination of inputs
- To understand Application of equi-marginal returns

#### **Course Outcomes**

After completion of the course students will be understand

CO1: Explain communication and nonverbalcommunication skills

**CO2:** Explain verbal communication skills

CO3: Discuss oral communication skills

CO4: Explain reading and comprehension skills

#### EXPERIMENTS

1 & 2. Different methods Computation of depreciation cost of farm assets.

3. Determination of most profitable level of inputs use and output in farm production process.

4. Determination of least cost combination of inputs

5. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources.

6. Selection of most profitable enterprise combination.

7 & 8. Farm holding surveys.

#### REFERENCES

1. Bishop, C.E. and W. D. Tousaint. 1958. Introduction to Agricultural Economic Analysis. John Wiley and Sons, London.

2. Heady, Earl O. 1964. Economics of Agricultural Production and Resource Use. Prentice Hall of India, Private Limited, New Delhi

- 3. S.S. Johl, J.R. Kapur. 2006. Fundamentals of Farm Business Management.
- 4. Kalyani Publishers, New Delhi.

5. Kahlon, A.S. and Karam Singh. 1965. Principles of Farm Business Management. Kalyani Publishers, New Delhi.

6. Raju, V.T. and D.V.S. Rao. 2006. Economics of Farm Production and Management. Oxford & IBH Publishing Co. Pvt. Limited, New Delhi

7. www.core\_economics.org

#### Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### **B.Sc. Agriculture and Rural Development** SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VICourse Title: Agricultural microbiologySemester: VI

#### COURSE CODE: AMBE 373

No. of Hrs: 16

#### **Objectives:**

- To understand introduction to microbiology and fermentation
- To understand microbial nutrition
- To explain biological nitrogen cycle
- To explain biofertilizers

#### **Course outcomes**

CO1: Understand about Nutritional media and their preparations

**CO2:** Isolation of azotobacter from soil

CO3: Isolation of Rhizobium from legume root nodule

CO4: Staining and microscopic examination of microbes.

**CO5:** Enumeration of bacteria by pour plate method.

#### UNIT-I

1. Introduction- Definition- The hidden world of microbiology- How microbes evolved on earth- General classification of microbes-Microorganisms and principles of microbiology- Scope of microbiology. Brief History of microbiology - Spontaneous generation theory- Contributions of Antony Van Leeuwenhoek Francesco Redi-Lazzaro Spallanzani- Franz Schulze- Schroder and Von Dusch- Louis Pasteur- John Tyndall.

2. Role of microbes in fermentation-Contributions of Cagnaird Latour-Theodor Schwann, F.Kutzing- Louis Pasteur - Germ theory of disease - Contribution of Hippocrates-Louis Pasteur- Robert Koch - Pure Culture Methods- Joseph ListerRobert Koch- Beijerinck-Winogradsky- Francois Appert- Schroder and Von DushJohn Tyndall.

3. Protection against infection-Contributions of Edward Jenner- F. Loeffler-BehirngKitasasto- Louis Pasteur - Applied aspects of Microbiology- Agricultural microbiology-Industrial microbiology-Food Microbiology - Medical microbiology – Water Microbiology - Geochemical Microbiology- Pollution microbiology – Air microbiology – Exo-Microbiology - Microbial biotechnology.

Credits:1

4. Morphological types of Bacteria , Bacteria cell Structure- External and internal cell structures- Differences between Prokaryotes and Eukaryotes.

#### UNIT -II

5. Microbial Nutrition- Autotrophy - Chemoautotrophy- Photoautotrophy

6. Heterotrophy – Metabolic pathways-Glycolysis-HMP-ED-TCA cycle.

7. Growth of Microorganisms - Cell Division - Growth cycle of bacteria [ Lag phase, Log phase, Stationary and Death phase]- Generation time- Growth rate- Growth yield-Synchronous - Diauxic growth.

#### UNIT-III

8. Bacterial genetics- Genetic recombination- Transformation-ConjugationTransduction- Plasmids- Transposon.

9. Role of microbes in fertility of soils and plant growth - Rhizosphere-RhizoplanePhyllosphere-Phylloplane - Microflora- Carbon cycle- Carbon dioxide fixation.

10. Nitrogen cycle - Mineralisation- Immobilisation- Nitrification-DenitrificationNitrogen Fixation - Phosphorus cycle, phosphorus solubilisation – Oxidation – Reduction - Sulphur cycle-Oxidation and reduction.

#### UNIT-IV

11. Biological nitrogen fixation - Symbiotic- Associative- Asymbiotic- Nitrogen fixation In Azolla - Blue green algae - Actinorhizal symbiosis - Frankia, Phosphate solubilizing microorganisms - Bacillus - Pseudomonas- Mycorrhiza for Phosphorous uptake.

12. PGPR Organisms - Bacillus – Pseudomonas – Azotobacter – Azospirillum - Rhizobium - Microbes in human welfare.

13. Types of fermentations - Batch - Batch fed- Continuous - Solid State Fermentations, Common microbial fermentations-Alcohol- Lactic acid- Butyric acid-Formic acid - Butanediol- Propionic Acid- Mixed Acid - Fermentation technology-Alcoholic beverages production.

#### UNIT-V

14. Biofertilizers (Bacterial-Cyanobacterial-Fungal) production technology- Silage Production Technology.

15. Biopesticides- Viruses (Nucleo polyhedrosis virus - Granular viruses) – Bacteria (Bacillus thuringiensis, Bacillus papilliae) - fungi (Beauveria - Verticillium) - Protozoa (Malamebalocustae-MattesiaSpp)-Mode of action.

16. Biofuel Production- Biodegradation - Biogas, Biomanures and Composting Technologies

#### References

1. Microbiology. Pelczar, J.r., M.J.E.C.S.Chan and Krieg, N.R. (5th Ed.) 2015. McGraw Hill Publishers, New York.

2. Microbiology. Prescott, L.M., Harley, J.P. and Klein, D.A. (9th Ed.) 2014. McGraw Hill Publishers, New York.

3. Brock Biology of Microorganisms.Madigan, M.,Martinko, J.M and Parker, J. (14Ed.) 2015. Prentice hall of India Pvt Ltd., New Delhi.

4. Soil Microbiology: Subba Rao, N.S. (4th Ed.) 2014. Oxford and IBH Publishing Company Pvt. Ltd., New Delhi.

5. Microbiology A Laboratory Manual: James, C and Natile, S. (10th Ed.) 2014. Pearson India Education Services Pvt. Ltd., South Asia.

6. Experiments in Microbiology, Plant Pathology and Biotechnology. Aneja, K.R.2011. New Age International (P) Ltd., Publishers, New Delhi.

#### **Model Question Paper**

#### Course Title: Agricultural microbiology Semester: VI

#### **COURSE CODE: AMBE 373**

Time: 3Hrs

#### **SECTION A**

20X1=20M

Max. Marks: 100 M

#### Answer all the questions

- 1. Rhizobium has symbiotic association with
  - A) Legumes
  - B) Non-legumes
  - C) Sugarcane
  - D) Paddy
- 2. Fumaric acid is produced by
  - A) Asperigillusterrus
  - B) A. fumigats
  - C) A. niger
  - D) Rhizopus nigricans
- 3. Which of the following is a free living nitrogen fixing organism?A) Rhizobium
  - B)Azatobacter
  - C) E.coli
  - D)Bacillus
- 4. Example of Beneficial microbe plant soil interactions
  - A) Organic matter decomposition
  - B) Nitrogen fixation
  - C) Mycorrhiza fungi
  - D) All of the above
- 5. Commensalism refers to the relationship of two organisms
  - A) Live side by side, but have no effect on each other
  - B) Where one benefits at the expense of other
  - C) Mutually beneficial
  - D) None of the above
- 6. The co factor required by the nitrogenase enzyme is
  - A) Cobalt
  - B) Molybdenum
  - C) Nickel
  - D) Boron
- 7. Which of the following is an example for nitrifying bacteria

- A) Nitrosomonas
- B) Nitrobacter
- C) Pseudomonas
- D) All above
- 8. Exponential growth in bacteria would be expected during \_\_\_\_\_ phase of growth curve
  - A) Lagphase
  - B) logphase
  - C) stationary phase
  - D) Deceleration phase
- 9. Chemolithotrophs obtain their energy from organic compounds and carbon from A) CHO
  - B) CH3OH
  - C) C2H8OH
  - D) CO2
- 10. Fruitjuices which have undergone alcoholic fermentation by yeasts include
  - A) Beer
  - B) Wine
  - C) Rum
  - D) Malt

11. Theprocess of phagocytosis was discovered by\_\_\_\_

- 12. Scientist who demonstrated that open tubes of broth remained free of microbes when air was free of dust \_\_\_\_\_\_
- 13. Eukaryotic Protists that contain chlorophyll and are capable of photosynthesis are \_\_\_\_\_\_ (Give an Example)
- 14. Antony Von Leewenhoek described the microbial world which he observed as
- 15. The spontaneous formation of living beings from non living matter is known as
- 16. Yeasts are \_\_\_\_\_\_ anaerobes which have two alternate pathway of energy yielding mechanisms either in the presence of oxygen or in the absence of oxygen.
- 17. Ferdinand cohn demonstrated that certain bacteria are heat resistant under unfavourable conditions \_\_\_\_\_\_
- 18. The branch of Microbiology which deals with isolation and identification of causative organisms from samples using different diagnostic procedures is called as \_\_\_\_\_\_
- as \_\_\_\_\_\_
  19. \_\_\_\_\_\_ bacteria helps in bioleaching of copper and uranium from low grade ores of these metals.

#### **SECTION-B**

#### Answer any FOUR questions

- 21. a) Define Microbiology? Discuss in detail about different microbial groups?b) Write about carbon cycle?
- 22. Differentiate between
  - a) Gram +ve and Gram ve bacteria cell
  - b) Prokaryotic and Eukaryotic characters
- 23. Explain about the bacterial structures which are external to cell walls?
- 24. Discuss in detail about the
  - a. Fermentor and its types?
  - b. Vaccines and Antibiotics?
- 25. Enumerate the steps involved in Nitrogen cycle and examples of biological Nitrogen fixing bacteria?
- 26. Write short notes on the following:
  - a) Spores
  - b) Fermentation

#### **SECTION-C**

#### Answer any FOUR questions

#### $4 \times 12 = 48 \text{ M}$

 $4 \times 8 = 32$  M

- 27. Write short notes on the following:
  - a) Louis Pasteur
  - b) PSB
  - c) ATP
- 28. What is Biopesticide? Discuss about different types of biopesticides with suitable examples?
- 29. write in brief about Saccharomyces cererisae
- 30. Describe the steps involved in silage making technology?
- 31. Write about Rhizobium host specificity?
- 32. Write the Role of macro nutrients and micro nutrients in biosynthesis and energy production of bacteria?

#### B.Sc. Agriculture and Rural Development PRACTICAL SYLLABUS

#### Subject: Agriculture and Rural Development Course Title: Agricultural microbiology Practical

Semester: VI

#### COURSE CODE: AMBE 373P

No. of Hrs: 30

Credits: 1

#### Objectives

- To understand introduction to microbiology
- To understand and explain about lab experiments
- To understand methods of sterilization

#### **Course outcomes:**

CO1: Explain microbiology and equipments

CO2: Summarise methods of sterilization

CO3: Explain staining and microscopic examination of biofertilizer organism

CO4: Discuss isolation of Azotobacter

CO5: Summarise isolation of VAM by different methods

#### Practical

1. Introduction to microbiology laboratory and its equipments.

2. Microscope- Parts, principles of microscopy, resolving power and numerical aperture.

3. Micrometry-Measurement of size of microorganisms.

4. Methods of sterilization.

5. Bacterial staining procedures-Simple staining - Gram's staining and Endospore staining.

6. Nutritional media and their preparations.

7 & 8. Enumeration of microbial population in soil- Bacteria, fungi and actinomycetes.

9 Methods of isolation, purification and maintenance of microbial cultures.

10 Isolation of Rhizobium from legume root nodule.

#### References

1. Microbiology. Pelczar, J.r., M.J.E.C.S.Chan and Krieg, N.R. (5th Ed.) 2015. McGraw Hill Publishers, New York.

2. Microbiology. Prescott, L.M., Harley, J.P. and Klein, D.A. (9th Ed.) 2014. McGraw Hill Publishers, New York.

3. Brock Biology of Microorganisms.Madigan, M.,Martinko, J.M and Parker, J. (14Ed.) 2015. Prentice hall of India Pvt Ltd., New Delhi.

4. Soil Microbiology: Subba Rao, N.S. (4th Ed.) 2014. Oxford and IBH Publishing Company Pvt. Ltd., New Delhi.

5. Microbiology A Laboratory Manual: James, C and Natile, S. (10th Ed.) 2014. Pearson India Education Services Pvt. Ltd., South Asia.

6. Experiments in Microbiology, Plant Pathology and Biotechnology. Aneja, K.R.2011. New Age International (P) Ltd., Publishers, New Delhi.

#### **Scheme of Evaluation**

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

#### **B.Sc. Agriculture and Rural Development** SYLLABUS

#### Subject: Agriculture and Rural DevelopmentSemester: VI Course Title: Fundamentals of plant biotechnology

#### Course code: BICM-302

No. of Hrs: 30

Credits: 2

Objectives:

- To understand introduction to biochemistry
- To understand about carbohydrates
- To explain lipids
- To explain fats

#### **Course Outcomes**

**CO1:** Assist in micro propagation units

**CO2:** Determine the structures of proteins

CO3: Determine the structures and functions of RNA and DNA

CO4: Brief description about enzyme activity

CO5: Brief description about metabolism of lipids

#### UNIT-I

1 Introduction – Historical aspects of Biochemistry– Scope, impact and importance of Biochemistry in plant sciences -Properties of water – PH – Buffers. 171

2 Carbohydrates– Classification - Structures – Monosacharides – Structural aspects – mutarotation - Reducing and oxidizing properties.

3 Oligosaccharides and polysaccharides-Funtions of carbohydrates

4 Lipids - Fatty acids - Structures and properties - Functions of lipids

5 Lipids - Classification – Storage lipids and membrane lipids – Saponification, hydrogenation, Iodine number and Acid value.

6 Amino acids - Structures - Classification - Zwitterions - Titration

7 Peptides – Oligopeptides – Cyclic and acyclic peptides – Malformin, Glutathione, Gramicidin – Functions of peptide

#### UNIT -II

8 Proteins –Importance - Classification - Properties of proteins –Isoelectric PH – Denaturation - Protein sequencing – Edman degradation method

9 Proteins – Structural organization – Primary, secondary, tertiary and quaternary structures and forces involved in stabilizing proteins

10 Enzymes – Characteristics of enzymes – Chemical nature, speed, specificity, active site - activation energy – Mechanism of enzyme action.

11 Classification of enzymes - Isoenzymes - Multienzyme complex - Allosteric enzymes and coenzymes.

12 Measurement of enzyme activity – Factors effecting enzyme activity – Enzyme Inhibition – MM & LB plots

13 Nucleic acids – Functions – Structures of nitrogen bases – Nucleosides – Nucleotides in RNA and DNA.

#### UNIT-III

14 Various types of DNA and RNA – Secondary structure of B-DNA and t-RNA.

15 Metabolism – Anabolism and Catabolism – Stages of respiration – Overall metabolic view of carbohydrates, proteins and lipids.

16 Metabolism of carbohydrates – Glycolysis – Aerobic and anaerobic.

17 Tricarboxylic Acid (TCA) cycle-Glyoxalate cycle - Electron transport chain

18 Metabolism of lipids –Biosynthesis of fatty acids and tri acyl glycerol

19 Catabolism of lipids  $\alpha$ ,  $\beta$  &  $\gamma$  oxidation of fatty acids in brief and  $\alpha$  oxidation in detail.

#### UNIT -IV

20 Protein Biosynthesis and post translational modifications

21 Secondary metabolites - Terpenoids - Alkaloids - Phenolics - Importance

22 Biotechnology – Major – Concepts and importance – Applications of plant biotechnology.

23 Introduction to plant tissue culture – History – Scientists - Terminology – Steps in general tissue culture – Types of sterilization and nutrient media – Types of cultures – Organ cultures, cell suspension culture, callus culture, pollen culture and their applications.

24 Micropropagation – Procedure techniques – Organogenesis and embryogenesis – Problems – Advantages – Limitations. 172

25 Anther culture – embryo culture – Ovule culture – Somatic embryogenesis - Synthetic seeds and its applications.

#### UNIT-V

26 Protoplast isolation and fusion – Somatic hybridization – Cybrids – Somaclonal variations and applications in crop improvement – Cryo preservation

27 Recombinant DNA methods - Introduction to genetic engineering – Definitions – Gene cloning - Vectors.

28 & 29Gene transfer methods – Indirect methods (Agrobacterium) and direct methods (physical-gene gun method; chemical-PEG mediated and other methods) with case studies / examples.

30 Transgenic plants – Present status - Applications in crop improvement – Limitations – biotechnology regulations.

31 Polymerase chain reaction (PCR) – Procedure and applications.

32 Markers - Morphological, biochemical and molecular markers – RFLP, RAPD and SSR – Marker assisted selection for crop improvement.

#### **References:**

1. David L. Nelson, Michael M.Cox; W.H. Freeman.Lehninger Principles of Biochemistry, 6th Edition 2. Biochemistry, Dr.U.Satyanarayana, Dr.U. Chakrapani, Books and Allied(P) Ltd, Kolkata

3. Biochemistry, S.N.Gupta, Rastogi Publications, First Edition, 2011

4. Introduction to Plant Biotechnology by HS Chawla (3rd Edition), Oxford & IBH Publishing Co. Pvt Ltd., New Delhi.

#### **MODEL QUESTION PAPER**

Subject: Agriculture and rural development Course Title: <b>Fundamentals of plant biotechnology</b>	Semester: VI	
COURSE CODE: : BICM-302		
Time: 3Hrs	Max. Marks: 100 M	
SECTION-A		

 $20 \times 1 = 20 \text{ M}$ 

Answer **ALL** questions

- 1) Nucleic acids were first discovered in 1868 by
  - a) Griffith
  - b) Holley
  - c) Meischer
  - d) Crick
- 2) The three nucleotides of t-RNA arm will form base pairs with complementary codon in m-RNA during translation is
  - a) DHU arm
  - b) T4C arm
  - c) Anticodon arm
  - d) Acceptor arm
- Enzymes which hydrolyses α1-4 glycosic bonds in starch at random internally and yields a mixture of dextrins
  - a)  $\beta$  amylase
  - b) diastase
  - c)  $\alpha$  amylase
  - d) glucoxidase
- 4) The number of ATP molecules synthesized in Hexose monophosphate pathway is a) 12ATP
  - b) 36ATP
  - ) 24 ATD
  - c) 34ATP
  - d) 16ATP
- 5) The first enzyme involved in synthesis of Triacyl glycerol is
  - a) GPAT
  - b) AGPAT
  - c) PAP
  - d) DGAT
- 6) The following terpene is used for the control of intestinal worms
  - a) Digitoxin

- b) Cinoele
- c) Santonin
- d) Steroid
- 7) Glyphosate is a herbicide which resembles the substrate involved in lignin synthesis and kills the weeds. The substrate is
  - a) Phosphoenol pyruvate
  - b) Pyruvate
  - c) Oxaloacetate
  - d) Glucose
- 8) The compounds which contain a central  $\alpha$ -carbon atom to which NH<sub>3</sub>, COOH, Hatom and R groups are attached
  - a) Amino acetate
  - b) Oxalosucccinate
  - c) Amino acids
  - d) Phosphatidic acid
- Isocitrate is oxidized to oxalosuccinate an unstable intermediate, which undergoes the following reaction to form α-ketoglutarate
  - a) Dehydrogenation
  - b) Deamination
  - c) Decarboxylation
  - d) Phosphorylation
- 10)The enzyme system that catalyze the synthesis of saturated long chain fatty acids from Acetyl CoA and Malonyl CoA are called
  - a) Acetyl Co A synthetase
  - b) Fatty acid synthetase
  - c) Malonyl synthetase
  - d) NADPH synthetase
  - 11. The basic emperical formula of polyhydroxy aldehydes or ketones or their condensation products is known as \_\_\_\_\_\_
  - 12. The predominant type of monosaccharides found in nature are \_\_\_\_\_ and
  - 13. Prostaglandins synthesized from unsaturated fatty acid is \_\_\_\_\_
  - 14. The number of milligrams of KOH required to neutralize the free fatty acids present in 1kg of fat is \_\_\_\_\_\_
  - 15. When the valency of the carbon atom is satisfied by four different groups then that particular carbon atom is called as \_\_\_\_\_\_

- 16. The Carboxyl group of C-terminus of peptide forms a peptide bond with N-terminal amino group to form \_\_\_\_\_\_
- 17. TFathe term \_\_\_\_\_\_ of protein refers to the percentage of ingested protein absorbed into blood stream after the process of digestion is completed.
- 18. If the enzyme catalyzes only one reaction by acting on single type of substrate then the type of specificity it exhibits is known as \_\_\_\_\_\_
- 19. \_\_\_\_\_ is defined as a substrate concentration at half maximum velocity which is expressed as moles/litre.
- 20. The enzymes which catalyze the removal of groups in the presence of H<sub>2</sub>O are

#### **SECTION-B**

#### Answer any FOUR questions

- 1. Write short notes onSignificance of biochemistry in Agriculture
- 2. Discuss in detail about the steps involved in TCA cycle along with structures and Energetics.
- 3. List out the enzymes involved in the  $\beta$  oxidation of fatty acids
- 4. Describe about the types of enzyme inhibitors with graphical representation and Coenzymes
- 5. Define the following:
  - a) Polysaccharides
  - b) Translation
- 6. Define the following:
  - c) Isoenzymes
  - d) Phenolic compounds
  - e) ETC

#### **SECTION-C**

#### Answer any FOUR questions

#### $4 \times 12 = 48 \text{ M}$

 $4 \times 8 = 32 \text{ M}$ 

- 7. Briefly explain the steps involved in tissue culture techniques? Explain about merits, limitations and application of plant tissue culture in crop improvement?
- 8. Discuss about Micropropagation? Problems- Applications- Advantages and Limitations of Micropropagation?
- 9. a) What is Genetic Engineering? Write about the General approach for genetic Engineering in plants?
- 10. Explain about the method of cloning DNA in bacteria?
- 11. Explain Pentose phosphate pathway?
- 12. Write the Steps involved in metabolism?

#### B.Sc. Agriculture and Rural Development PRACTICAL SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VI Course Title:Fundamentals of plant biotechnology Practical

#### Course code: BICM302P

No. of Hrs: 30

Credits: 1

#### Practical

1 Preparation of solutions, pH and buffers.

2 Qualitative tests for carbohydrates.

3 Qualitative tests amino acids.

4 Estimation of amylose in rice.

5 Estimation of reducing sugar/Total soluble sugars.

6 Estimation of proteins by Lowrys method.

7 Extraction of oil from oil seeds by soxhlet apparatus.

8 Effect of PH, temperature and substrate concentration on enzyme action.

9 Paper chromatography / TLC demonstration for seperation of amino acids.

10 Sterilization techniques.

#### **References:**

1. David L. Nelson, Michael M.Cox; W.H. Freeman.Lehninger Principles of Biochemistry, 6th Edition 2. Biochemistry, Dr.U.Satyanarayana, Dr.U. Chakrapani, Books and Allied(P) Ltd, Kolkata

3. Biochemistry, S.N.Gupta, Rastogi Publications, First Edition, 2011

4. Introduction to Plant Biotechnology by HS Chawla (3rd Edition), Oxford & IBH Publishing Co. Pvt Ltd., New Delhi.

#### Scheme of Evaluation

S.No.	Experiment	Marks (50)
01	Major Experiment	15Marks
02	Minor Experiment	10Marks
03	Viva	10Marks
04	Record	10Marks
05	Skills	05Marks

## **SEMESTER - VII**

#### **B.Sc. Agriculture and Rural Development** SYLLABUS

### Subject: Agriculture and Rural DevelopmentSemester: VIICourse Title: Rural Agricultural Work Experience (RAWE) and Agro-Industrial Attachment (AIA)

Course Code: RAWE No. of Hours: 20 weeks

#### Objectives

1. To Study the agricultural graduates with clear vision about the rural community.

- 2. To Learn professional competency and self-confidence among the agricultural graduates to handle the present and emerging demands of agricultural sector.
- 3. To acquaint students with the various developmental agencies, their approaches and strategies and major programmes of agricultural development.

#### **Course Outcomes**

CO1:Summarize on-campus training from various faculties before step into the

village attachment and Agro-industrial attachment

CO2: Learn and understand issues related to farming and ruraldevelopment in a natural setting

on real-time basis.

**CO3**: Course provides opportunities for the students to attach with the agri related industries and make them know about the functioning them.

CO4: Students will propose a project based on his interest and concerned specialists will assist

them to complete their project.

**CO5:** The course also provides opportunities for the students to learn about the functioning of

the extension organisations viz., state 15 agricultural departments, KVK's, and research stations.

#### Duration wise activities performed during RAWE

S.No.	Activity	Duration
1	Orientation & Placement	2 weeks
2	Survey of Village	
3	Agronomical Interventions	
4	Plant Protection Interventions	
5	Soil Improvement Interventions (Soil sampling and testing)	15 weeks
6	Fruit and Vegetable Production Interventions	
7	Food Processing and Storage Interventions	
8	Animal Production Interventions	
9	Extension and Transfer of Technology Activities	
10	Agro-Industrial Attachment	2 weeks
11	Project Report Preparation, Presentation & Evaluation	1 weeks

Credits:0+20

# SEMESTER - VIII

#### B.Sc. Agriculture and Rural Development SYLLABUS

Subject: Agriculture and Rural DevelopmentSemester: VIIICourse Title: AELP-Agriculture Experiential Learning ProgrammeCredits: 0+20Course code: AELPCredits: 0+20Hours :20 weeksCredits: 0+20

#### Objectives

1. To Study professional skills and knowledge through hands on experience

2. To build confidence and ability to work in project mode

3. To acquire enterprise management capabilities.

#### **Course out comes**

**CO1:** Students will produce biocontrol agents like Trichoderma, Pseudomonas and biofertilisers like phosphor-bacteria for commercial marketing

CO2: Students will produce hybrid seeds of vegetables for commercial production and marketing.

CO3: Students will analyse soil health and provide management solutions to farmers.

**CO4**: Student will produce, Mushrooms, honey and vermicompost using their practical knowledge on commercial bee keeping.

**CO5**: Students will know the different agribusiness opportunities and will get necessary managerial skills

Agricultural Experiential Learning Programme (AELP) This programme will be undertaken by the students preferably during the VIII semester for a total duration of 20 weeks with a weightage of 0+20 credit hours. The students will register for any of two modules (of 0+10 credit hours each) listed below:

1. Production Technology for Bio-agents and Bio-fertilizers

- 2. Seed Production and Technology
- 3. Mushroom Cultivation Technology
- 4. Soil, Plant, Water and Seed Testing
- 5. Livestock and Poultry Production Technology
- 6. Hybrid Seed Production Technologies
- 7. Floriculture and Landscaping
- 8. Food Processing
- 9. Commercial Horticulture
- 10. Agriculture Waste Management
- 11. Organic Production Technology
- 12. Commercial Sericulture
- 13. Agri-business management