2nd YEAR	IV SEM	1.	**Principles of Organic Farming** (Core subject)	4+2=6
		2.	**Fundamentals of Crop Physiology** (Core subject)	4+2=6
		3.	**Principles of Seed Technology** (Core subject)	4+2=6
		4.	**Breeding of Field Crops** (Core subject)	4+2=6
		5.	**Introduction to Production Economics and Farm Management** (Core subject)	4+2=6
		6.	**Horticulture** (Core subject)	4+2=6
				Credits 24+12=36

ANDHRA UNIVERSITY
B. Vocational course
AGRICULTURE
2020-21 Admitted Batch
II Year – Semester IV

PRINCIPLES OF ORGANIC FARMING
(CREDITS 4+2=6)

UNIT - I

- Organic farming – definition – need – scope – principles – characteristics - relevance to modern agriculture.
- Different eco friendly farming systems- biological farming, natural farming, regenerative agriculture – permaculture - biodynamic farming.
- Relevance of organic farming to A.P, India, and global agriculture and future prospects- advantages - barriers.

UNIT - II

- Initiatives taken by the central and state governments, NGOs and other organizations for promotion of organic agriculture in India.
- Organic nutrient sources and their fortification – organic manures- methods of composting
- Green manures- bio fertilisers – types, methods of application – benefits and limitations.

UNIT - III

- Nutrient use in organic farming-scope and limitations.
- Nutrient management in organic farming.
- Organic ecosystem and their concepts.
- Choice of crops and varieties in organic farming – crop rotations – need and benefits – multiple cropping.

UNIT - IV

- Fundamentals of insect, disease and weed management under organic mode of production-cultural-biological methods-non chemical pest & disease management.
- Botanicals- pyrethrum, neem seed kernel extract, neem seed powder, soluble neem formulations, neem oil.
- Operational structure of NPOP – other agencies for organic production.

UNIT - V

- Inspection – certification - labelling and accreditation procedures for organic products.
- Processing, - economic consideration and viability.
- Marketing and export potential of organic products – national economy

PRINCIPLES OF ORGANIC FARMING (PRACTICAL)

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

References

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

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2020-21 Admitted Batch
II Year Semester- IV
PRINCIPLES OF ORGANIC FARMING
MODEL QUESTION PAPER
SECTION – A

Time: 3 Hours Maximum: 75 Marks

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

1. What are the essential characteristics of Organic Farming?
2. What is Vermicomposting and write about Vermiculture.
3. What are the desirable characters of Green Manuring?
4. Write about the use of Bio fertilizers in Organic Faring?
5. Write about weed management in Organic farming.
6. Write breifly about Regenerative Agriculture.
7. Write about the Economic considerations of Organic Culture.
8. Write about different types of Biofertilizers used in Organic Farming.

SECTION - B

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

1. a) Write about the Principles of Organic farming.

(OR)

b) What are the components in organic farming for Sustainable crop production?

2. a) What are the Advantages of Organic farming?

(OR)

b) What are the Government policies on promoting Organic farming?

3. a) Write about different types of Organic manures.

(OR)

b) Write briefly about Biological methods of Insect pest Management in Organic farming?

4. a) Write about the Operational structure of NPOP.

(OR)

b) Write about the Accredition procedures for Organic Products.

5. a) Write about the concepts of Organic ecosystem.

(OR)

b) Write about the Marketing and Export potential of Organic farming.

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II Year Semester- IV
FUNDAMENTALS OF CROP PHYSIOLOGY
(CREDITS 4+2=6)

UNIT – I

Introduction to Crop Physiology and its importance in Agriculture.

Plant cell - The endomembrane system - Plasma membrane, endoplasmic reticulum, nuclear envelope, golgi apparatus, vacuole and endosomes - Structure and functional characteristics - Plastids, mitochondria, oil bodies, peroxisomes and glyoxysomes - Structure and functions.

UNIT – II

Absorption of water - Diffusion and osmosis - water potential and its components - Importance of water potential – Active and passive uptake of water – Stomatal complex – Transpiration – Water use efficiency – Water use efficiency of C3, C4 and CAM plants – Water requirement / Transpiration ratio

Factors affecting WUE.

Mineral nutrition of plants – Essential mineral elements – Criteria of essentiality of mineral elements – Mengel`s classification of mineral nutrients - Nutrient uptake mechanisms - Functional roles of N, P, K, S Ca and Mg – Functional roles of Fe, Mn, Cu, Zn, B, Mo, Cl, Na, Co and Si –Deficiency symptoms of macro and micro nutrients.

Assimilation of mineral nutrients – Nitrate assimilation – Ammonium assimilation in plants – Biological nitrogen fixation – Free-living and symbiotic bacteria – Nodule formation – Nitrogenase enzyme complex.

UNIT – III

Photosynthesis – Reactions of photosynthesis – Energy synthesis – Principle of light absorption by plants – Light reactions - Cyclic and non cyclic photophosphorylation – CO_2 fixation – C3 and C4 pathways – Significance of C4 pathway – CAM pathway and its significance – Photorespiration and its significance – Photosynthetic efficiency of C3, C4 and CAM plants - Factors affecting photosynthesis (light, CO_2, temperature and water stress) - Relationship of photosynthesis and crop productivity.

Respiration – Energy balance – Significance of respiration – Oxidative Pentose Phosphate Pathway (OPPP) and its significance – Growth respiration and maintenance respiration – Alternate respiration – Salt respiration – Wound respiration.

Lipid metabolism – Biosynthesis of fatty acids in plastids – Functions of lipids Significance of lipids in plant metabolism.

UNIT – IV

Physiology of flowering – Photoperiosism and flowering – Importance of photoperiodism – Classification of plants based on photoperiodic responses

Perception of photoperiodic stimulus – Biological clock – Phytochrome – Flowering hormones – Vernalization and flowering – importance of vernalization in agriculture.

Plant growth regulators – Auxins – Occurrence, transport, biosynthesis, mode of action and physiological roles – Commercial uses.– Gibberellins – occurrence, transport, biosynthesis, mode of action and physiological roles – Commercial uses – Cytokinins – Occurrence, transport, biosynthesis, mode of action and physiological roles – commercial uses – ABA – Occurrence, transport, biosynthesis, mode of action and physiological roles

– Commercial uses – Ethylene – Ocurrence, transport, biosynthesis, mode of action and

physiological roles – Commercial uses.

Senescence and abscission – Definition – Classification of senescence – Physiological and biochemical changes that occur during senescence - Prevention of leaf and flower senescence – Abscission and its relationship with senescence.

UNIT – V

Post harvest physiology – Dormancy – Types of dormancy – Advantages and disadvantages of dormancy - Causes of dormancy – Remedial measures for breaking seed dormancy - Fruit ripening - Climacteric and non climacteric fruits – Metabolic changes during fruit ripening - Hormonal regulation of fruit ripening – Ripening induction and ripening inhibition – Use of hormones in increasing vase life of flowers. Metabolic changes during seed development - Seed viability and seed vigor - Tests of viabilityandvigor- Physiologicalmaturity, harvestablematurity- Indices of physiological maturity in crops - Seed germination - Metabolic changes during seed germination.

FUNDAMENTALS OF CROP PHYSIOLOGY (PRACTICAL)

Solutions- Preparation, Seed vigor and viability tests, optimum conditions for seed germination, leaf area measurement, Growth analysis, Measurement of water status in plants, Measurement of water potential, Measurement of Stomatal frequency and index photosynthetic pigments- Absorption spectrum , Leaf anatomy of C3 and C4 plants, Measurement of photosynthesis – Hill's reaction, Measurement of photosynthesis by IRGA, Effect of plant growth regulators on plant growth. Diagnosis of nutrient deficiency symptoms in crops, Yield analysis

References

Taiz, L. and Zeiger, E. 2010. *Plant Physiology* 5th edition, Sinauer Associates, Sunderland, MA, USA.

Gardner, F.P., Pearce, R.B., and Mitchell, R.L. 1985. *Physiology of Crop Plants.* Scientific Publishers, Jodhpur.

Noggle, G.R. and Fritz, G.J., 1983. *Introductory Plant Physiology.* 2nd Edition. Prentice Hall Publishers, New Jersey, USA.

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II Year Semester- IV
FUNDAMENTALS OF CROP PHYSIOLOGY
MODEL QUESTION PAPER
SECTION – A

Time: 3 Hours Maximum: 75 Marks

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

1. Write about the structure and functions of Endoplasmic Reticulum.
2. Write about the Factors effecting the Water use Efficiency.
3. Write about Non cyclic Phosphorylation.
4. Write Briefly about Biological Nitrogen fixation.
5. Describe the classification of plants based upon Photoperiodism.
6. Write about the types of Senescence.
7. What are the factors effecting Fruit ripening and write about climacteric and non-climacteric fruits.
8. Write about the metabolic changes during Seed development.

SECTION - B

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

1. a) Elaborate the structure and function of Cell wall in plants.

(OR)

b) Write about the Chloroplasts and describe its ultra structure.

2. a) Write about the components of Water potential and its Importance.

(OR)

b) Write breifly about the Functions of NPK in nutrition of Plants.

3. a) Write about C4 Photosynthetic carbon assimilation cycle.

(OR)

b) Explain Oxidative Pentose pathway and its significance.

4. a) Write about the Physiological role of Auxins in Plants.

(OR)

b) Write about Physiological and Biochemical changes that occur during Senescence and methods to prevent leaf and flower senescence.

5. a) Elucidate the remedial measures for breaking Seed dormancy.

(OR)

b) Write about tests of seed viability and vigor.

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II Year Semester- IV
PRINCIPLES OF SEED TECHNOLOGY
(CREDITS 4+2=6)

UNIT I - Introduction to seed and seed quality

Seed - definition - Seed structure - Seed development and maturation Germination - phases of seed germination

Dormancy - types of seed dormancy - Seed senescence - causes of seed senescence Seed quality characteristics - significance

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

UNIT II - Principles of seed production

Seed replacement rate and varietal replacement - Seed Multiplication Ratio - Seed renewal period. Causes of varietal deterioration and maintenance Genetic and agronomic principles of seed production Factors affecting quality seed production

Methods of seed production of varieties and hybrids.

UNIT III - Seed production techniques of agricultural crops

Floral biology and pollination behavior - seed production techniques of varieties and hybrids of: rice, maize, cotton varieties and hybrids – Bt cotton

UNIT IV - Seed production techniques of vegetable crops

Floral biology and pollination behavior - seed production techniques of varieties and hybrids of: tomato, snakegourd, bittergourd ,ashgourd, ribbed gourd and bottlegourd

UNIT V - Post harvest seed handling techniques Threshing - methods

Drying - methods of seed drying - advantages and disadvantages Seed processing – definition - importance

Seed cleaning and grading - upgrading - equipments - working principles

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

PRINCIPLES OF SEED TECHNOLOGY (PRACTICAL)

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

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II Year Semester- IV
PRINCIPLES OF SEED TECHNOLOGY
MODEL QUESTION PAPER
SECTION – A

Time: 3 Hours Maximum: 75 Marks

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

1. Explain the safe guards for maintenance of genetic purity of seed.
2. Write a note on seed production methods for hybrids.
3. Explain seed production technology of Cotton.
4. What is seed dormancy? Explain different types seed dormancy?
5. Write about different classes of seeds.
6. Write about seed production technology of cucurbits.
7. What are the factors affecting quality seed production.
8. what is senescence? Write about significance along with it's causes.

SECTION - B

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

1. a) Give a detailed note on seed production technology of Rice.

(OR)

b) Discuss the procedure followed for Maize seed production technology.

2. a) Explain generation system of seed multiplication in seed supply chain.

(OR)

b) What is seed drying and explain different methods of seed drying along with principles and requirements.

3. a) Write about seed production technology of Tomato.

(OR)

b) Describe planning, layout and establishment of seed processing plant.

4. a) Write about seed cleaning and grading.

(OR)

b) Write a detailed note on importance, types and equipment required for seed treatment.

5. a) i) Describe the causes of varietal detioration.
ii) Write the procedures for seed production of varieties.

(OR)

b) What is seed? Explain seed structure and phases of it's germination.

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II Year Semester- IV
BREEDING OF FIELD CROPS
(CREDITS 4+2=6)

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

UNIT–I: Cereals

Rice, Wheat, Grain and fodder Maize, Grain and fodder Sorghum

UNIT – II: Millets

Pearl millet , Finger millet , Foxtail millet, Kodo millet, Little millet, Proso millet, Barn yard millet**.**

UNIT–III : Pulses

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

UNIT – IV: Oilseeds

Groundnut, Sesame, Mustard, Sunflower and Safflower, Coconut, Oil palm

UNIT–V : Fibres and Sugars Cotton, Jute, Mesta, Sugarcane, Sugar beet

BREEDING OF FIELD CROPS (PRACTICAL)

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

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

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II Year Semester- IV
BREEDING OF FIELD CROPS
MODEL QUESTION PAPER
SECTION – A

Time: 3 Hours Maximum: 75 Marks

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

1. Draw the flowcharts for origin of Diploid, Tetraploid and Hexaploid Wheat.
2. Write about the latest classification of Sorghum given by Harlan and De Wet.
3. Write about the 3 basic type of crosses made in Hybridization of Sugar cane?
4. What are the main reasons for Low yields of Pulses compared to Cereals.
5. Write about the Prognetarors and desirable plant type in Chick pea.
6. Write about the types of cultivated species in Cotton.
7. Write about the classification of Cultivated Species of Rice?
8. Write about Breeding techniques of Finger millet.

SECTION - B

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

1. a) Write about the breeding techniques for developing Hybrid Rice.

(OR)

b) Elucidate the Objectives of Plant Breeding.

2. a) Write about the Objectives for Breeding of Red Gram.

(OR)

b) Write about the classification of Ground Nut and why it is called as an unpredictable crop.

3. a) Explain Head to row and remnant seed method and Hetrosis breeding in Sunflower.

(OR)

b) Write about the Taxonomy of Brassica crops and their economic characters.

4. a) Write elaborately about the Breeding procedures in Cotton.

(OR)

b) Write about bolting and Photoperiod induction in Sugar beet.

5. a) Write about the Breeding procedures for disease and abiotic stress resistance in Sugar cane.

(OR)

b) Write about the Breeding objectives of Soybean.

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II Year Semester- IV
INTRODUCTION TO PRODUCTION ECONOMICS AND FARM MANAGEMENT
(CREDITS 4+2=6)

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

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

UNIT 2: Factor – Product Relationship

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

UNIT 3: Factor – Factor Relationship

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

UNIT 4: Product – Product Relationship

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

UNIT 5: Farm Planning and Budgeting

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

INTRODUCTION TO PRODUCTION ECONOMICS AND FARM MANAGEMENT PRACTICAL

Computation of depreciation cost of farm assets. Determination of most profitable level of inputs use in a farm production process. Application of equi-marginal returns/ opportunity cost principle in allocation of farm resources. Determination of least cost combination of inputs. Selection of most profitable enterprise combination. Farm holding survey. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises. Farm business analysis, Preparation of farm plan and budget, farm records and accounts and profit & loss accounts. Collection and analysis of data on various resources in India. Seminar on selected topics.

B. Vocational course
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II Year Semester – IV
INTRODUCTION TO PRODUCTION ECONOMICS AND FARM MANAGEMENT
MODEL QUESTION PAPER

Time: 3 Hours Maximum: 75 Marks

SECTION – A

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

1. Define farm management? Explain it's scope.
2. What is farm plan? What are the key features of good farm plan.
3. Write down the advantages and disadvantages of diversified farming.
4. Differentiate between farm budgeting and linear programming.
5. What is production economics and list out it's objectives.
6. Differentiate law of variable proportions and returns to scale.
7. What is isoquant? List out it's characteristics.
8. What are the basic production problems?

SECTION – B

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

1. a) List out the economic principles applied in farm management. Explain in detail law of variable proportions.

   (OR)

   b) Elaborate systems of farming in detail
2. a) Explain law of returns with the help of graphs and tables.

   (OR)

   b) i) What is risk and uncertainty. Explain the sources of risk and uncertainty.
   ii) What are methods reducing the risk and uncertainty.
3. a) Explain the key features of three stages of production function.

   (OR)

   b) Explain the least cost combination of inputs by graphical, algebraic and arithmetic methods.
4. a) Explain and draw different types of product-product relationships.

   (OR)

   b) What is farm planning and budgeting. Explain the basic steps in farm planning and budgeting.
5. a) i) Production possibility curve
   ii) Ridge lines

   (OR)

   b) Determine optimum combination of products in algebraic, graphic and tabular methods.

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II Year Semester- IV
HORTICULTURE
(CREDITS 4+2=6)

UNIT-I

1. Horticulture – Definition - Divisions of horticulture with suitable examples.
2. Scope and importance of horticulture - Importance of horticulture in terms of income, employment generation, industry, religious, aesthetic, food & nutritive value and export.
3. Horticultural classification based on soil, climate and botanical classification.
4. Climate and soil for horticultural crops - Influence of environmental factors on horticultural crop production – Temperature, humidity, wind, rainfall and solar radiation – Influence of soil factors – Soil type, pH, EC.

UNIT-II

5. Propagating structures- Plant propagation- Methods - Sexual and asexual – Propagation by cuttings – Definition of cutting – Stem cuttings – Leaf cuttings – Root cuttings.
6. Propagation by Layering - Types of layering (tip, simple, compound, mound, trench, air layering) - Natural modifications of layering (runners, suckers, stolon, offset)- Propagation by separation - Bulbs, corms; division (rhizome, stem tuber, tuberous roots).
7. Grafting, budding -Rootstock and scion selection – Grafting methods – Attached scion methods of grafting, simple or approach grafting, detached scion methods of grafting (side grafting - Veneer grafting, apical grafting- epicotyl grafting, double, soft wood grafting, cleft grafting, tongue grafting, whip grafting) - Graft incompatibility – Types – Translocated and localized incompatibility; Budding – Methods of budding – T-budding, inverted T-budding, patch budding and ring budding - Top working.

UNIT-III

8. Principles of orchard establishment – Points to be kept in mind while selecting site for the establishment of orchards - Principles and steps in orchard establishment - Layout of orchards – Systems of planting - Square, rectangle, quincunx, hexagonal and contour systems of planting-their merits anddemerits.
9. Principles and methods of training and pruning - Definition of training, objectives and training, principles and methods of training of fruit crops - Open centre, closed centre and modified leader systems their merits and demerits - Definition of pruning, objectives of pruning, principles and methods of pruning of fruit crops.
10. Juvenility and flower bud differentiation – Methods for shortening juvenility - Application of growth regulators (Gibberellins, Auxins, cytokinins, Abscissic acid, Ethylene), environmental methods (photoperiod, temperature) - Cultivation techniques (grafting, pruning, girdling, irrigation, nutrition) - Bearing habits of fruit trees.

UNIT-IV

11. Unfruitfulness, factors (physiological, phylogenical, management, parasitical, climatological) pollination - Self and Cross pollination, pollinizers and pollinators Fertilization and parthenocarpy – Types.
12. Types of vegetables Gardens – Kitchen Garden, market garden, truck garden, vegetable forcing, garden for processing, seed production garden and floating garden. Ornamental garden types – Formal – Informal – Wild Garden – Parts/ features of an ornamental garden.
13. Lawn making – Selection of Grass – Bermuda grass – Korean grass – Poa grass – Fescue grass – Kentucky blue grass - Grasses for shady areas – Site Selection – Soil Preparation of soil – Drainage – Digging – Manuring and grading – Methods of planting – Sowing of seeds – Dibbling – Turfing – Maintenance of lawn – Mowing – Rolling – Sweeping –Scraping – Raking – Weeding – Irrigation – Top dressing with compost and fertilizers - Diseases and other problems – Fairy ring – Pale Yellow Laws.

UNIT-V

14. Use of plant bio-regulators (PBR) in horticulture – Introduction – Applications of PBR in fruit crops.
15. Irrigation methods in horticulture crops - Different methods followed in horticultural crops (check basin, furrow, ring basin, basin, flood, pitcher, funnel, drip and sprinkler).
16. Fertilizer application- Different methods of application to horticultural crops- Broad casting, top dressing, localized placement, contact placement Band placement, row placement, pellet, foliar application, starter solution, fertigation.

HORTICULTURE (PRACTICAL)

1. Identification of garden tools.
2. Identification of horticultural crops.
3. Layout of different planting systems.
4. Layout of kitchen garden.
5. Preparation of nursery bed (raised and flat beds) and sowing of seeds.
6. Practice of different asexual methods by divisions.
7. Practice of different asexual methods by cuttings.
8. Practice of different asexual methods by grafting.
9. Practice of different asexual methods by budding.
10. Practice of different asexual methods by layering.
11. Training and pruning of fruit trees.
12. Transplanting and care of vegetable seedlings.
13. Making of herbaceous and shrubbery borders.
14. Preparation of potting mixture, potting and repotting.
15. Fertilizer application in different crops.
16. Visits to commercial nurseries/orchard.

References

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

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2020-21 Admitted Batch
II Year Semester- IV
HORTICULTURE
MODEL QUESTION PAPER
SECTION – A

Time: 3 Hours Maximum: 75 Marks

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

1. Write about the influence of Humidity and Rainfall on Horticulture crops.
2. Write about the advantages of Seed Propagation.
3. What are the types of propagation by Separation?
4. Write about T or Shield budding.
5. What are the responses of plants to pruning?
6. What are the cultural causes for unfruitfulness in fruit trees?
7. What is parthenocarpy and write about its types.
8. Write briefly about the maintenance of lawn.

SECTION - B

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

1. a) Write about divisions of Horticulture with examples.

(OR)

b) What are the criteria for the selection of a site for orchard establishment?

2. a) Explain about different systems of planting in Horticultural crops.

(OR)

b) Explain different types of Layerings in Plant propagation.

3. a) Write about the systems of Training in Fruit crops with merits and demerits.

(OR)

b) Write about the Practical applications of Plant growth regulators in Horticulture crops.

4. a) Write briefly about the types of Vegetable gardens.

(OR)

b) Mention various methods of Irrigation of Horticultural crops and explain about Drip and sprinkler Methods.

5. a) Write about the importance of Horticulture crops in National economy.

(OR)

b) Write about different methods of fertilizer application in Horticultural crops.

3RD YEAR	**V SEM**	1.	**Weed & Water Management** (Core subject)	4+2=6
		2.	**Farm power & Machinery** (Core subject)	4+2=6
		3.	**Rain fed Agriculture & Water shed Management** (Core subject)	4+2=6
		4.	**Pests of Horticultural Crops & Productive Entomology** (Core subject)	4+2=6
		5.	**Fungicides & Plant disease Management** (Core subject)	4+2=6
		6.	**Production Technology for Fruits and Vegetables** (Core subject)	4+2=6
				Credits 24+12=36

ANDHRA UNIVERSITY
B. Vocational course
AGRICULTURE
2020-21 Admitted Batch
III Year – Semester V

WEED AND WATER MANAGEMENT
(CREDITS 4+2=6)

UNIT–I : Weed Biology and Ecology Weeds:

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

UNIT–II : Herbicides

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

UNIT–III : Importance and History of Irrigation

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

UNIT–IV : Crop Water Requirement and Management

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

UNIT–V : Methods of Irrigation

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

WEED AND WATER MANAGEMENT (PRACTICAL)

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

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AGRICULTURE
2020-21 Admitted Batch
III Year – Semester V
FARM POWER AND MACHINERY
(CREDITS 4+2=6)

UNIT I:

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

UNIT II:

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

UNIT III:

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

UNIT IV:

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

UNIT V:

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

FARM POWER AND MACHINERY (PRACTICALS)

Study of different components of I.C. engine - To study air cleaning and cooling system of engine - Familiarization with clutch – Transmission - Differential and final drive of a tractor - Familiarization with lubrication and fuel supply system of engine - Familiarization with brake – Steering - Hydraulic control system of engine - Learning of tractor driving - Familiarization with operation of power tiller - Implements for hill agriculture - Familiarization with different types of primary and secondary tillage implements - Mould plough - Disc plough and disc harrow - Familiarization with seedcum-fertilizer drills their seed metering mechanism and calibration - Planters and transplanter - Familiarization with different types of sprayers and dusters - Familiarization with different inter-cultivation equipment - Familiarization with harvesting and threshing machinery.

TEXT BOOKS:

1. JagdishwarSahay (1977), Elements of Agricultural Engineering, Standard Publications, New Delhi.
2. Pakirappa and Naresh V (2014), Energy sources and power plant engineering, radiant Publishing House, Hyderabad.
3. Michel A.M, and Ojha T.P, Principles of Agricultural Engineering, Vol.I, Jain Brothers, New Delh

ANDHRA UNIVERSITY
B. Vocational course
AGRICULTURE
2020-21 Admitted Batch
III Year – Semester V
RAIN FED AGRICULTURE AND WATERSHED MANAGEMENT
(CREDITS 4+2=6)

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.

UNIT - II

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.
5. 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.
6. 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

UNIT - III

7. 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.
8. Watershed – definition – concept— objectives and principles of water shed management components of watershed development programme – factors affecting watershed management.
9. 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

UNIT - IV

10. *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 leveling.
11. 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
12. Efficient crops and varieties – cropping systems in rainfed areas – intercropping – advantages – efficient inter cropping systems in different rainfed regions of Andhra Pradesh

UNIT - V

13. Contingent crop planning for aberrant weather conditions in red and black soils.
14. Evapotranspiration – measures to reduce evapotranspiration – weeding, use of mulches, chemicals, windbreaks and shelterbelts
15. Land capability classification – alternate land use system
16. 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

RAIN FEDAGRICULTURE ANDWATERSHED MANAGEMENT (PRACTICAL)

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.
9. Calculation of effective rainfall.
10. Determination of moisture availability index.
11. Study of cultural practices for mitigating moisture stress(mulching, plant density, depth of sowing, thinning and leaf removal).
12. Visit to watershed.
13. Field demonstration on soil & moisture conservation measures.
14. Field demonstration of water harvesting structures.
15. Study of farm ponds as a source of supplemental irrigation.
16. Visit to rainfed research station.

References

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.
4. Jeevananda Reddy,S.2002. Dryland Agriculture in India: An agro-climatological and agro-meteorological perspective. B S publications.

ANDHRA UNIVERSITY
B. Vocational course
AGRICULTURE
2020-21 Admitted Batch
III Year Semester – V
PESTS OF HORTICULTURAL CROPS & PRODUCTIVE ENTOMOLOGY
(CREDITS 4+2=6)

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

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

UNIT IV

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

PESTS OF HORTICULTURAL CROPS & PRODUCTIVE ENTOMOLOGY (PRACTICAL)

2. Morphology of mulberry plant – description – distinguishing characters of promising mulberry genotypes. Nursery bed preparation – care in selection of planting materials – Biofertilizer treatment in nursery.

3. Main field preparation – methods of planting, methods of irrigation - Identification of nutrient deficiency symptoms – corrective measures.

4. Identification of weeds – Herbicide application method. Pruning methods – leaf / shoot harvest–

preservation of leaves.

5. Identification of pests of mulberry and damage symptoms.
6. Identification of symptoms of diseases and nematodes of mulberry.
7. Morphology of silkworm – different stages – Identification of races by cocoon shape, colour and larval marking –Dissection of mouth parts and silk glands.
8. Rearing house and appliances – Methods of disinfection. Incubation of eggs – methods – Chawki rearing – brushing – feeding.
9. Silkworm rearing – shelf and shoot rearing – skill involved in brushing – feeding moulting care – bed cleaning – spacing – mountages — spinning and cocoon harvest.
10. Identification of pests and diseases of silkworm – damage – symptoms - Mass multiplication of hyperparasitoid.
11. Integrated Farm System with Sericulture in Integrated Farming system – Mechanization in sericulture.
12. Eri silkworm – morphology – food plants – methods of rearing – methods of spinning – Tasar silkworm – morphology – food plants – early and late instar larval rearing.
13. Apiculture - Bee species – comparison- castes of bees, bee behaviour and bee dance; Apiary management practices – bee pasturage, foraging, seasonal variations; Bee products – properties and uses; Effect of agricultural inputs on bee activity – pesticide poisoning;
14. Lac insect- biology-strains-natural enemies of lac insect and lac products;

ANDHRA UNIVERSITY
B. Vocational course
AGRICULTURE
2020-21 Admitted Batch
III Year Semester – V
FUNGICIDES AND PLANT DISEASE MANAGEMENT
(CREDITS 4+2=6)

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

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

UNIT V

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

FUNGICIDES AND PLANT DISEASE MANAEMENT (PRACTICAL)

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

ANDHRA UNIVERSITY
B. Vocational course
AGRICULTURE
2020-21 Admitted Batch
III Year Semester – V
PRODUCTION TECHNOLOGY FOR FRUITS AND VEGETABLES
(CREDITS 4+2=6)

UNIT – I

Mango, Banana, Citrus and Grape - 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.

UNIT – II

Guava, Sapota, Papaya and Pomegranate - 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.

UNIT – III

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.

Tomato, 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 - Physiological disorders - Disease and pest control and seed production

UNIT – IV

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.

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.

Melons – Watermelon and Muskmelon - Botanical name – Family - Origin - Area - Production - Improved varieties and cultivation practices such as time of sowing

Planting distance - Fertilizer requirements - Irrigation - Weed management - Harvesting –

Yield – Production of seedless watermelons - Storage

Physiological disorders - Disease and pest control and seed production.

UNIT – V

Cole crops- Cabbage and Cauliflower -Botanical name – Family - Origin - Area - production - Improved varieties and cultivation practices such as time of sowing

Planting distance - Fertilizer requirements - Irrigation - Weed management - Harvesting - Yield –Storage - Physiological disorders - Disease and pest control and seed production.

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.
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.

UNIT – VI

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.

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.

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.

PRODUCTION TECHNOLOGY FOR FRUITS AND VEGETABLES (PRACTICAL)

1. Identification of vegetables and their seeds.
2. Identification of Fruit 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 Fruits.
7. Physiological disorders of vegetable crops.
8. Intercultural operations in vegetable crops.
9. Fertilizers application methods.
10. Seed extraction methods in vegetables.
11. Seed extraction methods in Fruits.
12. Harvest indices and maturity standards of vegetable crops.

13. Harvesting and preparation for market.
14. Economics of vegetables and Fruits cultivation.
15. Visit to vegetable farmer fields.
16. Visit to vegetable markets to study marketing problems.

References

1. Pranab Hazra, 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

3rd YEAR	**VI SEM**	**Crop Production** (Field work)	0+4=4
		Crop Protection (Field work)	0+4=4
		Agricultural Economics (Project Work)	0+4=4
		Rural Extension (Project Work)	0+4=4
		Agricultural Entrepreneurship (Project Work)	0+4=4
			Credits 0+20=20

ANDHRA UNIVERSITY
B. Vocational course
AGRICULTURE
2020-21 Admitted Batch
III Year - Semester VI
CROP PRODUCTION
(CREDITS 0+4=4)

- Raising Field crops- Participation and documentation of each and every agronomic practices related to the respective crop grown from Land preparation to Harvest and collection of Biometric data at all important stages of the crop**.**
- Record & Viva Voce- Record writing for the respective crop grown mentioning all cultivation practices followed from Land preparation to Harvest and Viva Voce.
- Participation: 50 Marks
- Record & Viva Voce: 50 Marks

ANDHRA UNIVERSITY
B. Vocational course
AGRICULTURE
2020-21 Admitted Batch
III Year - Semester VI
CROP PROTECTION
(CREDITS 0+4=4)

- Management of Insect pests and Diseases- Participation and documentation of each and every Plant Protection activity related to the respective crop grown from Land preparation to Harvest and collection of Insect or Disease damage Herbarium or Samples.
- Record & Viva Voce- Record writing for the respective crop grown mentioning all Plant Protection activity followed from Land preparation to Harvest and Viva Voce.
- Participation: 50 Marks
- Record, Herbarium/Specimen & Viva Voce: 50 Marks

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AGRICULTURE
2020-21 Admitted Batch
III Year - Semester VI
AGRICULTURAL ECONOMICS
(CREDITS 0+4=4)

- Cost of Cultivation- Collection and documentation of the costs incurred in each and every Cultivation practice done in the respective crop grown from Land preparation to Harvest.
- Visit to a Rural Cooperative Bank or Society and learning about their Operational Procedures and Documentation of the visit.
- Record & Viva Voce- Record writing for the respective crop grown mentioning the total cost of cultivation from Land preparation to Harvest and Viva Voce.
- Participation: 50 Marks
- Record & Viva Voce: 50 Marks

ANDHRA UNIVERSITY
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AGRICULTURE
2020-21 Admitted Batch
III Year - Semester VI
RURAL EXTENSION
(CREDITS 0+4=4)

- Visit to a village and conducting Filed visits and Farmer meetings.
- Visit to an Agricultural enterprise or processing unit, learning the operational procedures and Documentation of the visit.
- Record & Viva Voce- Record writing for the activities like Field visit, Farmer meetings and Agricultural enterprise or processing unit and Viva Voce.
- Participation: 50 Marks
- Record & Viva Voce: 50 Marks

ANDHRA UNIVERSITY
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AGRICULTURE
2020-21 Admitted Batch
III Year - Semester VI
AGRICULTURAL ENTERPRENUERSHIP
(CREDITS 0+4=4)

- Participation in An Agricultural entrepreneurship activity and gaining hans on experience on any one Agricultural processing or input manufacturing or value addition process and income generation from the activity throughout the semester.
- Participation in Entrepreneurship activity: 50 Marks
- Project Thesis and Viva Voce: 50 Marks

Andhra University

A.M.A.L College, Anakapalle

B.Vocational course

AGRICULTURE

2020-21 Admitted batch

Semester IV, V & VI

Andhra University
A.M.A.L College, Anakapalle
B. Vocational Course
AGRICULTURE

2020-21 Admitted batch

SEMESTER- IV

S. No	Courses	Name of the subject	Total marks	Mid sem exam	Sem end exam	Teaching hours	Credits
1	Core subject	Principles of Organic Farming (Theory)	100	25	75	4	4
		Principles of Organic Farming (Practicals)	50	--	50	2	2
2	Core subject	Fundamentals of Crop Physiology (Theory)	100	25	75	4	4
		Fundamentals of Crop Physiology (Practicals)	50	--	50	2	2
3	Core subject	Principles of Seed Technology (Theory)	100	25	75	4	4
		Principles of Seed Technology (Practicals)	50	--	50	2	2
4	Core subject	Breeding of Field Crops (Theory)	100	25	75	4	4
		Breeding of Field Crops (Practicals)	50	--	50	2	2
5	Core subject	Introduction to Production Economics and Farm Management (Theory)	100	25	75	4	4
		Introduction to Production Economics and Farm Management (Practicals)	50	--	50	2	2
6	Core subject	Horticulture (Theory)	100	25	75	4	4
		Horticulture (Practicals)	50	--	50	2	2
		Total	**900**	**150**	**750**	**36**	**36**

Semester-V

S. No	Courses	Name of the subject	Total marks	Mid sem exam	Sem end exam	Teaching hours	Credits
1	Core subject	Weed & Water Management (Theory)	100	25	75	4	4
		Weed & Water Management (Practicals)	50	--	50	2	2
2	Core subject	Farm power & Machinery (Theory)	100	25	75	4	4
		Farm power & Machinery (Practicals)	50	--	50	2	2
3	Core subject	Rain fed Agriculture & Water shed Management (Theory)	100	25	75	4	4
		Rain fed Agriculture & Water shed Management (Practicals)	50	--	50	2	2
4	Core subject	Pests of Horticultural Crops & Productive Entomology (Theory)	100	25	75	4	4
		Pests of Horticultural Crops & Productive Entomology (Practicals)	50	--	50	2	2
5	Core subject	Fungicides & Plant disease Management (Theory)	100	25	75	4	4
		Fungicides & Plant disease Management (Practicals)	50	--	50	2	2
6	Core subject	Production Technology for Fruits & Vegetables (Theory)	100	25	75	4	4
		Production Technology for Fruits & Vegetables (Practicals)	50	--	50	2	2
Total			**900**	**150**	**750**	**36**	**36**

Semester-VI

S. No	Courses	Name of the subject	Activity/Visit	Record& Viva voce	Credits
1	Field work	Crop Production (Practical)	50	50	4
2	Field work	Crop Protection (Practical)	50	50	4
3	Project work	Agricultural Economics (Practical)	50	50	4
4	Project work	Agricultural Extension (Practical)	50	50	4
5	Project work	Agricultural Entrepreneurship (Practical)	50	50	4
Total			**250**	**250**	**28**