

1. INTRODUCTION

Sustainable agricultural production is becoming a challenging task in view of depleting land & water resources unpredictable climatic conditions and rising population growth rate. However, the problem can be tackled by adopting intensification and diversification in agricultural systems and raising productivity levels through education, training, research, technology adoption and institutional support. Farmer remains at the center stage in the whole system and this entrepreneurship can be made more productive by developing his competency levels both in technical and managerial skills. A trained manpower serves and acts as a guiding force in exploiting potentials in agricultural production in general and crop production in particular. Vocational initiative is an important link between education and production functions. An emphasis is laid, therefore, on developing competencies among students through improvement of their skill – set.

Curriculum for a vocational course should contain ingredients of (i) selection of competencies for on-the-job performance (ii) instructional programmes on principles and elements of a particular study subject and for development of skills to perform practical activities and (iii) developing capabilities to start either agricultural business or attain gainful employment.

The additional efforts are made for the value addition of course syllabus in terms of adequate exposure to cultivation of medicinal

/ aromatic plants, seed production & processing, microirrigation, landscape designing, nursery management etc., which will widen the scope of employability of students and throw open many job opportunities in different sectors.

The students who pass out vocational course at 10+2 stage are likely to absorb themselves in various sectors or initiate own agricultural business. The present competency based curriculum on Crop Production offers possible employment opportunities and job description giving details of responsibilities and skill sets required for efficient performance. It will serve as a foundation in organization of instructional programmes for theory and practical classes and to prepare instructional material such as book writing, poster and chart preparations, practical manuals and even production of video programmes.

The competency based curriculum on Crop Production will also help in structuring apprenticeship training programmes and serve as a guide to the employers with regard to measuring competency of the students. The focused practicals will also bridge the gaps between theory and practice. Apart from the course content, it has also given information on possible requirement of laboratory equipment, workshop materials, farm implements, spraying equipment and other materials used as inputs in crop production. It also provides list of collaborating institutions and on-the-job training sites, besides curriculum outlines for each OJT site.

The competency based curriculum on Crop Production was first developed in 1993 and revised in 2000 and re-revised in the present Working Group Meeting held at Board of Intermediate Education, Hyderabad during January, 2005 (list of experts is given elsewhere). The curriculum on "Crop Production" will be useful to various agencies engaged in implementation of vocational education and to those who are looking for employing appropriate technical manpower. It will also serve as a guide for curriculum development in sub-disciplines of the vocation.

2. OBJECTIVES OF THE COURSE

1. To develop man power with scientific knowledge and skills for sustainable crop production
2. To develop capability for gainful employment
3. To develop capabilities for world of work of service sector
4. To provide the elements and principles of crop production with reference to:
 - Climate and weather parameters including agroclimatic zones of the region
 - Soil characteristics of the region
 - Tillage practices
 - Irrigation water management including microirrigation techniques
 - Dryland farming, Soil & water conservation and watershed management
 - Manures and fertilizers
 - Efficient crops and cropping systems and Contingency crop planning
 - Plant protection – Pests, diseases, weed management, bio-control and IPM technologies
 - Nursery management and landscape designing
 - Production technology for field, commercial and horticulture crops
 - Sustainable agriculture practices
 - Harvest and post harvest handling
 - Marketing guidelines

5. To develop all necessary skills in practical crop production
6. To develop abilities for organization of farmers meeting, field days, crop seminar and such other extension activities
7. To train students for developing entrepreneurship in seed production and agro-input supply
8. To develop capabilities and competencies for agribusiness
9. To provide knowledge about the functioning of cooperative societies
10. To provide knowledge about credit facilities and supporting schemes
11. To acquaint with farm accounting and record maintenance
12. To develop competency in computing cost of cultivation and balance sheet preparation

3. SKILLS TO BE PROVIDED

1. Identification of field problems – nature and extent
2. Conducting field demonstrations
3. Organizing field days
4. Conducting of on-farm trials
5. Organizing crop production campaigns
6. Preparation of cropping scheme
7. Assisting in layout and conduct of field trials
8. Identification and handling of agro-meteorological instruments
9. Maintaining meteorological instruments and observatory
10. Recording of weather data
11. Interpretation of weather data
12. Analysis of rainfall and interpretation
13. Familiarization and use with primary and secondary tillage implements
14. Familiarization and use with seeding equipment
15. Seed bed preparation and methods of planting
16. Identification of crops and varieties
17. Assessment of labour requirement for operations
18. Acquaintance, use and maintenance of farm records
19. Calculation of seed requirement for various crops
20. Demonstrating seed treatment
21. Identification of organic manures

22. Demonstrating Rhizobium inoculation
23. Identification of organic and concentrated organic manures
24. Identification and growing of green manure crops
25. Preparation of vermi-compost and use in field and horticulture crops
26. Identification of nutrient deficiency symptoms
27. Application of fertilizers (time, method and rate)
28. Identification of pest and disease problems
29. Acquaintance with special operations like earthing up, propping, desuckering, nipping, pruning etc in various field and horticulture crops
30. Identification of weeds in different crops and their control measures
31. Use of pesticides, herbicides and other chemicals
32. Use of plant protection and herbicide equipment
33. Preparation and use of bio-pesticides
34. Soil sampling and analysis for various plant nutrients
35. Familiarization and use of soil testing equipment
36. Identification of commercial inorganic fertilizers
37. Calculation of fertilizer needs of crops
38. Detection of adulteration in fertilizers
39. Determination of soil physical properties
40. Assessment of irrigation water quality and familiarization with Indian water quality standards
41. Determination of water holding properties of soils

42. Familiarization with drip and sprinkler irrigation methods
43. Calculation of crop water requirements
44. Identification of land capability class, characterization of soil losses due to erosion, suggestion of soil and water conservation practices
45. Managing crops in fields
46. Selection of site and orchard layout
47. Raising nursery and transplanting procedures
48. Recording of biometric observations
49. Cleaning and grading of produce
50. Acquaintance with seed certification procedures
51. Rouging in seed production plots
52. Identification of maturity in various crops
53. Determination of moisture content in seed
54. Practice in cleaning, grading, drying, packaging, tagging and storage
55. Computation of cost of production of crops
56. Familiarization and processing of loan application
57. Preparation and use of audio-visual aids
58. Preparation of exhibits, charts and display boards
59. Managerial skills, ability to convince, exposure to different communication media

4. JOB OPPORTUNITIES

A) WAGE EMPLOYMENT

1. Village Level Assistant / Village Level Worker / Village Extension Worker
2. Field Assistant / Farm Assistant / Fieldman / Agriculture Assistant / Agriculture Extension Officer / Village Extension Officer (Including equivalent positions in Command Area Development Agency, Dryland Development Projects, Drought Prone Area Programme)
3. Field Investigator / Field Demonstrator / Village Coordinator
4. Meteorological Observer
5. Plant Observer / Scouting
6. Plant Protection Assistant
7. Laboratory Assistant
8. Seed Production Assistant
9. Seed Grader
10. Processing Assistant in processing plants
11. Agriculture Marketing Assistant
12. Farm Storage Assistant
13. Cane Assistant / Cane Inspector
14. Soil Conservation Assistant / Watershed Management Assistant
15. Secretary to Agricultural Cooperative Societies
16. Agricultural Assistant in Grameena Banks

17. Salesman / Helper in Inputs Wholesale Shops/Farmer's Service Societies / Agro-Services Centres
18. Vocational Instructor (Crop Production)

B) SELF EMPLOYMENT

19. Agri-Input Supplier
20. Seed Grower
21. Crop Producer
22. Custom Service
23. Contractor / Contract Farming

6. SCHEME OF INSTRUCTION AND EXAMINATION

Annual Scheme of Instruction and Examination for Vocational Courses 1st & 2nd Year

SUBJECTS	THEORY		PRACTICALS		TOTAL	
	Periods	Marks	Periods	Marks	Periods	Marks
Part – A						
1. English	185	75	—	—	185	75
2. G.F.C.	185	75	—	—	185	75
Part – B						
3. Vocational subjects						
Paper – I	160	50	160	50	320	100
Paper – II	160	50	160	50	320	100
Paper – III	160	50	160	50	320	100
Part – C						
4. On the Job Training	—	—	210	50	210	50
TOTAL	840	300	690	200	1540	500

Scheme of Instruction per Week for Vocational Courses

SUBJECTS	Theory	Practicals	Total
Part – A			
1. Communication Skills / English	6	—	6
2. G.F.C.	4	2	6
Part – B			
3. Vocational subjects			
Paper – I	5	5	10
Paper – II	5	5	10
Paper – III	5	5	10

7. SYLLABUS

PART A: LANGUAGE AND GENERAL FOUNDATION COURSE

PART B: VOCATIONAL THEORY AND PRACTICE

FOR PAPER 1 TO VI GIVEN BELOW IN DETAIL

Ist Year

PRINCIPLES OF CROP PRODUCTION

PAPER – I THEORY

TIME: 160 PERIODS

AGRICULTURE (Marks: 2.5 and Periods: 8)

- Terminology – Agriculture, Agronomy & its relationship with basic sciences.
- Classification of crop plants and Factors influencing crop growth and development
- Indian and Andhra Pradesh Agriculture – Land & water resources and Food scenario.
- National & International Institutes of agriculture research in India.
- Agroclimatic zones of Andhra Pradesh

AGROMETEOROLOGY (Marks: 15.0 and Periods: 48)

- Terms & Definitions – Weather & Climate.
- Atmosphere – composition & vertical divisions.
- Monsoon types and impact on agriculture operations
- Wind, Solar radiation, Air temperature, Soil temperature, Atmospheric pressure, Humidity & Evaporation and their utility in crop production.
- Clouds – various types and cloud seeding.
- Drought and their effects on crop production.
- Weather forecasting – Importance, Types, crop-weather diagrams, synoptic charts, and utility of weather forecasting.

- Weather hazards and their mitigation – cyclones, depressions, tsunamis, frost, hailstorms, hurricanes and tornado.
- Remote sensing and its application in agriculture.

TILLAGE AND TILTH (Marks: 10.0 and Periods: 32)

- Definition, Objectives and Factors influencing tith.
- Characteristics of a good seedbed.
- Types of tillage – Primary tillage, secondary tillage & intercultural operations.
- Primary & Secondary tillage implements – Ploughs, Harrows, Cultivators, Ridger, Rotovator, Leveler, Puddler.
- Seeding implements – Seed drills, Ferti-cum-seed drill.
- Modern concepts of tillage – Minimum tillage, Zero tillage and Stubble mulch farming.

CROPPING SYSTEMS (Marks: 5.0 and Periods: 16)

- Concept of cropping system & Terminology of multiple cropping.
- Intercropping – Principles, advantages and limitations.
- Relay cropping and Sequence cropping.
- Crop rotation – Principles and advantages.
- Cropping scheme and cropping intensity.
- Examples of sustainable cropping systems for dryland and irrigated conditions of AP.

SEEDS AND SOWING (Marks: 5.0 and Periods: 16)

- Seed – Characteristics of a good quality seed.
- Germination requirements – water, temperature, oxygen & light.
- Seed dormancy Seed treatment.

- Viability, purity and germination.
- Sowing – Time of sowing, Seed rate & calculation of seed requirement
- Methods of sowing – direct seeding, nursery raising and transplanting.

WEED MANAGEMENT (Marks: 10.0 and Periods: 32)

- Common weeds, Losses and benefits
- Weed ecology and classification
- Crop-weed association and competition
- Methods of weed control
- Classification of herbicides
- Herbicide formulations, Herbicide application & Adjuvants and Safeners
- Mode of action of herbicides and Selectivity of herbicides
- Chemical weed control in different crops and Integrated weed management.

SUSTAINABLE AGRICULTURE (Marks: 2.5 and Periods: 8)

- Introduction and Definition.
- Factors affecting ecological balance
- Major components of sustainable agricultural systems
- Organic farming – definition, principles, relevance to modern agriculture & components of organic farming.
- Bio-control agents and Bio-pesticide

PRACTICAL

TIME: 160 PERIODS

1. Visit to meteorological observatory to study the meteorological equipment (6)
2. Layout plan of standard meteorological observatory (6)
3. Measurement of rainfall by rain gauge (6)
4. Recording of evaporation by USWB Class A pan evaporimeter(4)
5. Measurement of wind velocity and direction, atmospheric pressure and relative humidity (4)
6. Recording of ambient and soil temperature (6)
7. Study and interpretation of weather data (6)
8. Study of primary tillage implements (6)
9. Study of secondary tillage implements (6)
10. Study of seeding equipment (8)
11. Determination of purity, viability and germination percentage(12)
12. Preparation of seed bed for nursery (6)
13. Participation in Rhizobium inoculation and seed treatment (6)
14. Calculation of seed rate per ha for different crops (4)
15. Study of important cropping pattern, crop sequences and intercropping systems in a selected village (10)
16. Preparation of a cropping scheme and calculation of cropping intensity (6)
17. Identification of weeds and Herbarium preparation (10)
18. Familiarization of herbicide label information (4)
19. Study of herbicide application equipment (6)
20. Calculation of herbicide doses (4)

21. Study of phytotoxicity symptoms of herbicides in different crops(8)
22. Herbicide application and precautionary measures (6)
23. Visit to an organic farm – observation on resource allocation, recycling of inputs and economics (8)
24. Preparation of NPV solution (8)
25. Preparation of NSKE and Neem oil (4)

PRACTICAL EXAMINATION WEIGHTAGE

Particulars	Weightage	Marks
1. Record & Herbarium	30%	15.0
2. Final Practical Examination		
a) Written part	10%	5.0
b) Viva Voice	50%	25.0
c) Spotting	10%	5.0
TOTAL	100%	50.0

NOTE:

In subjects where herbarium component is not there the total marks will be allotted to record work only

SOIL AND WATER MANAGEMENT

PAPER – II

THEORY

TIME: 160 PERIODS

SOIL IN RELATION TO PLANT GROWTH

(Marks: 5.0 and Periods: 16)

- Components of a mineral soil.
- Soil reaction – acidity & alkalinity.
- Ion exchange - cation & anion exchange capacity.
- Soil texture and Soil structure.
- Soil organic matter and its effect on soil properties, C: N ratio.
- Study of soil microorganisms.
- Soil fertility and Soil productivity.

MINERAL NUTRITION, MANURES AND FERTILIZERS

(Marks: 15.0 and Periods: 48)

- Essential elements – Classification, Criteria of essentiality, Functions and deficiency symptoms.
- Nutrient uptake by plants – Nutrient supply & Nutrient absorption.
- Manures – Bulky and concentrated organic manures & their importance in soil fertility
- Biogas plants, Green manuring – types & crops and Vermicomposting.
- Fertilizers – Properties of commercial Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Sulphur and Micronutrient containing fertilizers and complex fertilizers.
- Biofertilizers – types and methods of preparation and use in field and horticulture crops.
- Fertilizer application methods.
- Balanced fertilization and Integrated nutrient management.
- Soil test based fertilizer recommendations.

IRRIGATION WATER MANAGEMENT

(Marks: 15.0 and Periods: 48)

- Definition and objectives.
- Soil moisture availability – Field capacity, permanent wilting point, available soil moisture and water retention curves.
- Water requirement of crops – crop water requirement, effective rainfall, critical stages for irrigation, effective root zone depth and moisture extraction pattern.
- Scheduling of irrigation – climatological, soil and plant approaches.
- Water management practices for major field and horticultural crops of AP.
- Measurement of irrigation water.
- Methods of irrigation – surface, sprinkler and drip irrigation.
- Irrigation efficiencies.
- Quality of irrigation water.
- Drainage – Surface and subsurface methods.

DRYLAND AGRICULTURE (Marks: 15.0 and Periods: 48)

- Characteristics Dryland & Rainfed agriculture.
- Problems of dryland agriculture – Climatic & Soil.
- Soil erosion – Water & wind erosion, Losses due to erosion & Land capability classification.
- Soil & Moisture conservation – Agronomic, Mechanical & agrostological measures.
- Water harvesting & Protective irrigation.
- Efficient crops & cropping systems for drylands.
- Contingency crop planning for aberrant weather conditions.
- Alternate land use systems.
- Watershed management – Watershed concept, Principles, Objectives and Components of watershed management.

PRACTICAL
TIME : 160 PERIODS

1. Description of soil profile in the field (5)
2. Soil sampling (5)
3. Determination of soil pH (3)
4. Determination of electrical conductivity of soil water extract (3)
5. Determination of organic carbon, nitrate, phosphate and potassium by the use of rapid soil test kit (8)
6. Determination of carbonate and bicarbonate ions in soil water extract (5)
7. Preparation of enriched farm manure (5)
8. Vermi-compost making (8)
9. Study and identification of straight and complex fertilizers (3)
10. Quick tests for identification of important fertilizers (4)
11. Detection of adulteration in fertilizers (4)
12. Visit to a soil testing laboratory and participating in testing of soil samples (8)
13. Participation in different methods of fertilizer application (7)
14. Study of procedures and participation in use of biofertilizers for field and horticulture crops (6)
15. Identification of green manure crops (3)
16. Working out quantities and doses of fertilizers for application in the field (4)
17. Determination of soil bulk density (6)
18. Calculation of soil porosity (3)
19. Determination of soil textural separates by hydrometer method(4)

20. Determination of soil moisture by gravimetric method (6)
21. Determination of field capacity by field method (4)
22. Estimation of soil infiltration rate (6)
23. Estimation of crop water requirements (6)
24. Laying out of check basin, ring basin, border strip and furrow irrigation (6)
25. Demonstration of drip and sprinkler irrigation methods in the field (6)
26. Assessment of quality of irrigation water – pH and EC (3)
27. Measurement of runoff by drum technique (4)
28. Analysis of rainfall and interpretation (3)
29. Study of agronomic measures of soil and water conservation (4)
30. Visit to alternate land use systems farm at ANGRAU Research stations (6)
31. Visit to CRIDA and ICRISAT (6)
32. Visit to a watershed project area (6)

PAPER – III (FIRST YEAR)
FARM MANAGEMENT AND
AGRICULTURAL EXTENSION
(Theory: 160 Periods)

- 1. Introduction to farm management (Periods : 20)**
Definition, Nature and Scope of Farm Management; Management of farm with respect to land, labour, capital and organization.
- 2. Farm records (Periods : 25)**
Maintenance, Importance and book keeping in relation to the following farm records;
a) Diary b) Cash book c) Wage register d) Stock registers of agricultural equipment, livestock, fertilizers and insecticides e) Inventory.
- 3. Agricultural marketing (Periods : 30)**
Definition and importance of agricultural marketing; Classification of markets; Functions of markets; Defects in the present marketing system; steps taken to safeguard the farmers; Regulated markets- functions and advantages; marketing channels of food grains, oil seeds; concept of Rythu Bazar.
- 4. Farm credit (Periods : 15)**
Meaning, Definition, need and classification of farm credit; sources of credit; NABARD and its functions; crop insurance.
- 5. Agricultural cooperation (Periods:30)**
Definition, meaning, aims and principles of cooperation; cooperative credit societies; Non-credit activities, multipurpose cooperatives; different functions of farmers cooperatives.
- 6. Agricultural extension (Periods : 40)**
Extension education – meaning, objectives; differences between formal education and extension education; audio-visual aids; communication-process and problems; mass communication-media; leadership- qualities, principles and types; self-help; group dynamics; method and result demonstrations; exhibitions; farmers training centers; Krishi Vigyan Kendras; DATTC; Rythumithra; PRA.

PAPER – III (FIRST YEAR)
FARM MANAGEMENT AND
AGRICULTURAL EXTENSION

Practicals (160 Periods)

1. Computation of cost of cultivation of rice crop. (8)
2. Computation of cost of cultivation of groundnut crop. (8)
3. Computation of cost of cultivation of redgram crop. (8)
4. Computation of cost of cultivation of sugarcane crop. (8)
5. Computation of cost of cultivation of mango/Tomato. (8)
6. Study of different types of farm records maintained in the farm-(10)
 - a. Maintenance of diary
 - b. Inventory
 - c. Livestock Register.
7. Visit to Grameena Bank / PACS. (8)
8. Study the effective use of Audio – Visual aids. (8)
9. Preparation of Exhibits. (8)
10. Preparation of Charts. (8)
11. Preparation of display boards. (8)
12. Visit to Radio and T.V stations. (8)
13. Visit to method demonstration trials. (8)
14. Visit to result demonstration trials. (8)
15. Visit to Krishi Vigyan Kendras to acquaint with their activities. (8)
16. Visit to farmer’s training centers. (8)
17. Visit to Rythu Bazar to collect information on market prices and price fixation. (10)
18. Study of different market channels of agricultural commodities, like food grains, oil seeds etc.,. (10)
19. Visit to ANGRAU- Research fields. (10)

Paper I
SECOND YEAR
MANAGEMENT OF FIELD AND
COMMERCIAL CROPS

THEORY

TIME: 160 Periods

Area, production and productivity in India and AP. Climatic and soil requirements. Study of the agronomic practices viz., land preparation, improved and recommended varieties for AP, seed rate, seed treatment, spacing, sowing time, manures, fertilizers and bio fertilizers, irrigation schedules, interculture, weed control, insect and disease control measures, IPM, harvesting, processing, grading, marketing and quality standards.

		Periods	Marks (%)
Cereals and millets	: Rice, Maize, Jowar, Bajra and Ragi	45	28
Pulses	: Redgram, Greengram, Blackgram and Bengalgram	25	16
Oilseeds	: Groundnut, Sunflower, Castor, Sesamum and Safflower	35	22
Fibres	: Cotton and Mesta	25	15
Sugar crops	: Sugar cane	16	10
Narcotics	: Tobacco	14	9
Total		160	100

PRACTICALS

TIME: 160 PERIODS

1. Identification of various crops of region and state (6)
2. Study of varietal characteristics of important crops(Rice, Maize, Redgram, Groundnut, Castor, Cotton, Sugarcane and Tobacco) (4)
3. Participation in seed treatment (8)
 - a) Fungicides seed treatment to all crop seeds
 - b) Imida cloprid seed treatment for cotton and chillies to control sucking pests
 - c) Chlorpyriphos seed treatment for groundnut to control rootgrub
4. Participation in Rhizobium seed treatment in legumes (4)
5. Participation in raising different methods of rice nurseries (8)
 - a) Wet bed method
 - b) Dry bed method
 - c) Dapog method
6. Participation in raising seed bed of SRI paddy nursery (6)
7. Participation in puddling with APAU puddler (4)
8. Participation in seed bed preparation for sowing of ID crops (6)
9. Seed rate and fertilizer calculations (6)
10. Participation in fertilizer application and sowing the crop (6)
11. Observation of seedling emergence and calculation of plant population per unit area for crops like groundnut, redgram, jowar and cotton (6)
12. Participation in preemergence application of herbicides (6)
 - a) Atrazine for cereal crops
 - b) Pendimethalin for oilseed crops

13. Participation in intercultivation and thinning operations (6)
14. Participation in collection of biometric data (8)
15. Participation in earthing up in sugarcane and tobacco (8)
16. Estimation of gypsum requirement and application in groundnut(8)
17. Study of top dressing N & K fertilizers (6)
18. Study and identification of nutrient deficiency symptoms in cotton/ sugarcane/ groundnut/rice (8)
19. Participation in propping up in sugarcane, detopping and desuckering in tobacco (6)
20. Participation in Retting in mesta (8)
21. Participation in collection of herbarium(pests, diseases and nutritional disorders) (8)
22. Visit to near by progressive farmers fields (8)
23. Visit to near by Research stations/ICAR institutes/KVK etc. (8)
24. Visit to nearby processing units (8)

PAPER II SECOND YEAR MANAGEMENT OF HORTICULTURE CROPS (Theory: 160 Periods)

1. Introduction (Periods : 6)

Definition, Importance and Scope of Horticulture;
Divisions of Horticulture.

2. Nursery Management (Periods : 16)

Types of Nursery beds; Preparation of Nursery beds;
Propagation methods; Handling of Nursery plants.

3. Landscaping (Periods : 16)

Importance; elements and principles of landscape design;
ornamental avenues; establishment and maintenance of lawns.

4. Production of fruit crops (Periods : 21)

Commercial cultivation of the following crops with respect to area, production & productivity, climate, soil, varieties, propagation, different systems of planting, manures & fertilisers, irrigation requirement, intercultivation & weed control, plant protection, training, pruning harvesting and post harvest guidelines.

4.1. Mango

4.2. Banana

4.3. Citrus

5. Production of vegetable crops (Periods : 22)

Commercial cultivation of the following crops with respect to origin, area, production & productivity, climate, soil, varieties, planting, manures & fertilisers, irrigation requirement, intercultivation & weed control, plant protection harvesting and post harvest guidelines.

5.1. Tomato

5.2. Lady Finger

5.3. Brinjal

5.4. Leafy Vegetables

6. Production of flower crops (Periods : 22)

Commercial cultivation of the following crops with respect to origin, area, production, climate, soil, varieties, propagation, manures & fertilisers, irrigation requirement, intercultivation & weed control, plant protection, harvesting, grading, packing and post harvest guidelines.

6.1. Rose

6.2. Jasmine

6.3. Tuberose

6.4. Crossandra

7. Production of plantation crops (Periods : 15)

Commercial cultivation of the following crops with respect to origin, area, production, climate, soil, varieties, propagation, planting, manures & fertilisers, irrigation requirement, intercultivation & weed control, plant protection, harvesting, post harvest guidelines and processing.

7.1. Cashewnut

7.2. Coconut

7.3. Betelvine

8. Production of spice crops (Periods : 22)

Commercial cultivation of the following crops with respect to origin, area, production & productivity, climate, soil, varieties, propagation, planting, manures & fertilisers, irrigation requirement, intercultivation & weed control, plant protection, harvesting, post harvest guidelines and processing.

8.1. Chillies

8.2. Turmeric

8.3. Ginger

8.4. Onion

9. Production of Medicinal crops (Periods : 10)

Commercial cultivation of the following crops with respect to origin, area, production, climate, soil, varieties, propagation, planting, manures & fertilisers, irrigation requirements, intercultivation & weed control, plant protection, harvesting, post harvest guidelines and processing

9.1. Ashwagandha

9.2. Coleus

10 Production of Aromatic crops (Periods : 10)

Commercial cultivation of the following crops with respect to origin, area, production, climate, soil, varieties, propagation, planting, manures & fertilisers, irrigation requirement, intercultivation & weed control, plant protection, harvesting, post harvest guidelines and processing

10.1. Lemongrass

10.2. Citronella

PAPER III (SECOND YEAR)
MANAGEMENT OF HORTICULTURE CROPS
PRACTICALS

(160 Periods)

1. Visit to orchards and identification of fruit crops. (8)
2. Planting and care of fruit plants. (8)
3. Study of bearing habit in fruit crops. (8)
4. Interculture operation in fruit trees. (8)
5. Study of methods of irrigation in fruit crops. (8)
6. Application of manures and fertilizers for mango / citrus. (8)
7. Identification and control of insect pests, diseases and special problems in Mango. (8)
8. Identification and control of insect pests, diseases and special problems in Citrus. (8)
9. Identification and control of insect pests, diseases and special problems in Banana. (8)
10. Visit to fruit markets. (8)
11. Visit to vegetable farm to study the system of cultivation. (8)
12. Identification of various vegetable seeds. (8)
13. Preparation of nursery beds and raising of seedlings. (6)
14. Application of manures and fertilizers for vegetable crops. (8)
15. Identification of important insect pests, diseases and deficiency symptoms of vegetables and their control. (8)
16. Identification of commercial flowers. (6)
17. Training and pruning in Rose. (8)
18. Visit to florist shops and flower market. (8)
19. Application of manures and fertilizers in Cashewnut / Coconut. (8)
20. Visit to plantation crop fields. (8)
21. Visit to Herbal garden. (4)

PAPER – III (SECOND YEAR)

SEED PRODUCTION AND PROCESSING

(Theory: 160 Periods)

1. Introduction to seed production (Periods : 10)

Definition of seed; Importance of seed; Characteristics of good seed; Classes of seed; Agencies involved in seed production.

2. General principles of seed production (Periods : 15)

- A. Genetic principles- deterioration; Importance safeguards for maintaining genetic purity during seed production- control seed source, preceding crop requirements, isolation, roguing of seed fields, seed certification;
- B. Agronomic principles- selection of a suitable agro-climatic region, selection of seed plot, isolation of seed crops, preparation of land, seeds and sowing, roguing supplementary pollination, weed control, disease and insect control, manures & fertilizers, irrigation, harvesting of seed crops, drying of seeds and storage.

3. Seed production of self and cross-pollinated crops like rice, jowar, maize, bajra, sunflower and cotton. (Periods : 25)

4. Hybrid seed production of rice, maize, sunflower, castor and cotton. (Periods : 20)

5. Hybrid seed production of vegetables – tomato, bhendi and cucurbits. (Periods : 20)

6. Seed processing (Periods : 20)

SEED DRYING; SEED TREATMENT; SEED STORAGE

7. Seed testing (Periods : 25)

- A. Seed sampling
- B. Seed purity
- C. Seed germination
- D. Seed viability
- E. Seed vigour
- F. Seed health
- G. Seed moisture

8. Seed certification and legislation (Periods : 25)

- A. Seed certification
- B. Field and Seed inspection
- C. Seed legislation and seed law enforcement

PAPER – III (SECOND YEAR)
SEED PRODUCTION AND PROCESSING
PRACTICALS

(160 Periods)

1. Calculation of seed requirement for varieties. (8)
2. Sample registration and sampling procedures. (8)
3. Methods of breaking seed dormancy. (8)
4. Moisture testing of field crops. (8)
5. Taking seed samples and purity analysis. (8)
6. Germination tests in seed of different crop plants. (8)
7. Identification of crop varieties. (8)
8. Detasselling in maize. (8)
9. Visit to seed production plots. (8)
10. Visit to seed testing lab. (8)
11. Visit to NSP, Rajendranagar. (8)
12. Methods to store seed. (8)
13. Visit to seed processing plant. (8)
14. Seed treatment with chemicals. (8)
15. Seed certification procedures. (8)
16. Visit to APSSCA. (8)

8. LIST OF TOOLS AND EQUIPMENT

Sl.No.	Item	Number/ Quantity Required
1	Spade	Fifteen
2	Pickaxe/Kudali	Fifteen
3	Khurpi	Thirty
4	Sickle/Hansiya/Koyta	Fifteen
5	Crow bar	Three
6	Buckets	Six
7	Baskets/Tokra	Fifteen
8	Seed and fertiliser drill (Bullock drawn)	One
9	Wooden Plough	Three
10	Mould board Plough	One
11	Harrow	Two
12	Ridge Former/Leveller	One
13	Cultivator	One
14	Hand Hoe	Three
15	Wheel barrow	One
16	Plank	One
17	Winnowing Stool	One
18	Hand rotary duster	One
19	Food sprayer	One
20	Knapsack sprayer	One
21	Power sprayer	One
22	Seed treating drum	One
23	Insect killing bottle	Five
24	Insect net	Five
25	Seed storage bins	Six
26	Soil augers	Three
27	Sampling tube	Three
28	Soil and water test kits	Two

29	Soil colour chart	One
30	Rain guage	One
31	Dry and wet bulb thermometer	One
32	Hygrometer	One
33	Physical balance	One
34	Weight box	One
35	Mortar and pastle	One
36	Laboratory grinder	Thirty
37	Aluminium moisture box	One
38	Digestion and distillation unit	One
39	Distillation water still	One
40	Sieves set	One
41	Hot plate	One
42	Water bath	One
43	Insect cabin box	Six
44	Thermometer	Six
45	Chemical Balance	One
46	Trays	Six
47	Wash bottle	Fifteen
48	Sample devider	One
49	Gravity separator	One
50	Conductivity bridge	One
51	Conductive bridge	One
52	Hand refracto meter	One
53	Tensiometers	One
54	Neutron Moisture meter	One
55	Digestion and distillation unit	One
56	Flame photometer	One
57	Calorimeter	One
58	Distilled water unit	One
59	Sprinkler irrigation unit	One
60	Drip irrigation unit	One

61	Tractor 35 HP	One
62	Power tiller	One
63	Tractor drawn cultivator, disc harrow, disc plough, M.B.Plough, Ridger tec.	One
64	Moisture meter	One
65	Precision balance (0.01 g precision & 500 grams capacity)	One
66	Double ring infiltrometer	One
67	Secataur	Ten
68	Grafting and budding knife	Ten
69	Water can with rose	Ten
70	Germination trays	Ten
71	Measuring tape	One
72	Tree pruner	Two
73	Refrigerator	One
74	Electrical over	One
75	Charts showing symptoms of nutrients, discorders, pests and diseases	
76	Charts showing different methods of and training	

B. LIST OF GLASSWARE

Sl.No.	Item	Number/ Quantity Required
1	Beakers – 50 ml to 100 ml	As per requirement
2	Petri dishes (100 mm dia)	Fifty
3	Graduate measuring cylinders	As per requirement
4	Conical Flask – 50 ml to 100 ml	As per requirement
5	Pipetters (capacity-5 ml to 50 ml)	As per requirement
6	Glass jars	25 (twenty five)
7	Carboursy 20 liters	One
8	Test tubes	200
9	Funnel	As per requirement

10	Burettes	5
11	Glass rod	2 kg
12	Watch glasses	100
13	Clamps of different types	As per requirement
14	Rubber tubing and glass tubing	As per requirement
15	Round bottom flask 250 ml	3
16	Stands and Try pot	As per requirement
17	Porcelain tile	As per requirement
18	Asbestos sheet	Five

C. LIST OF CHEMICALS

Sl.No.	Item	Number/ Quantity Required
1	Conc.Nitric acid	2 l
2	Conc.Sulphuric acid	2 l
3	Conc.Hydrochloric acid	2 l
4	Boric acid	½ kg
5	Acetic acid	½ kg
6	Oxalic acid	½ kg
7	Sodium hydroxide	2 kg
8	Potassium hydroxide	1 kg
9	Potassium permanganate	1 kg
10	Potassium dichromate	1 kg
11	Devardas alloy	1 kg
12	Activated charcoal	½ kg
13	Calcium chloride	2.5 kg
14	Copper sulphate	1 kg
15	Ferrous ammonium sulphate	0.5 kg
16	Barium chloride	2.5 kg
17	Chloroform	2 kg
18	Indicators of various types like methyl red, methyl orange Phenolphthaleine	5 g each

19	PH. Buffer tablets 4,7 and 0	Ten tablets each
20	Carbon tetra chloride	2 kg
21	Mercuric chloride	0.500 g
22	Magnesium carbonate	0.500 g
23	Silver Nitrate	100 g
24	Potassium thyocynate	500 g
25	Stannous chloride	500 g
26	Universal Indicators	500 g
27	Sodium bicarbonate	1 kg
28	Potassium dihydrogen phosphate	0.5 kg
29	Perchloric acid	500 g
30	Orthophosphoric acid	1 l
31	Sodium hypo chloride	100 g
32	Iodine	1 l
33	Rectified spirit	50 g
34	Diphenyl amine	50 g
35	Ammonium molybdate	100 g
36	Ammonium hydroxide	5 l
37	Ethyl alcohol	2 l
38	Para nitrophenyl	100 g
39	E.D.T.A.Disodium salt	50 g
40	Eriochrome black T indicator	100 g

**D. LIST OF SOME IMPORTANT
HERBICIDES FUNGICIDES AND PESTICIDES**

Sl.No.	Item	Number/ Quantity Required
A.	Herbicides	As per requirement
1	Simazine	As per requirement
2	2-4D	As per requirement
3	Diuron	As per requirement
4	MCPA	As per requirement

5	Butachlor	As per requirement
6	Fluchloralin (Basin)	As per requirement
7	Pesslimethaline	As per requirement
8	Isoproturon	As per requirement
9	Gramoxone (Paraquat)	As per requirement
10	Tribunil (Metha Benzthazuron)	As per requirement
B	Fungicides	
1	Bordeaux mixture	As per requirement
2	Copper oxy chloride	As per requirement
3	Captan, thiram	As per requirement
4	Zineb	As per requirement
5	Dithane-Z78 and Dithane – M 45	As per requirement
6	Wettable sulphur power	As per requirement
7	Streptocycline	As per requirement
8	Tetracycline	As per requirement
C	Pesticides	
1	Methyl bromide	As per requirement
2	Carbon di sulphide	As per requirement
3	E.D.C.T.mixture	As per requirement
4	Aluminium phosphide	As per requirement
5	Melathian	As per requirement
6	Dimethoate 25 EC	As per requirement
7	Phorate granules	As per requirement
8	Endosulfan 35 EC	As per requirement
9	Phosphomidon 100 EC	As per requirement
10	Monocrotophos	As per requirement
11	Carbofuron	As per requirement
12	Thimet granules	As per requirement
13	Quinolphos	As per requirement
14	Parathion 2% dust	As per requirement
15	Zinc phosphide	As per requirement

LIST OF OTHER MATERIAL

Sl.No.	Item	Number/ Quantity Required
1	Nylone	100 metre
2	Metre tapes	10 metre
3	First Aid Box	One
4	Fire extinguisher	One
5	Graph papers	One roll
6	Muslin Cloth	As per requirement
7	Grease/Lubrication oil	As per requirement
8	Stationery	As per requirement
9	Fertilisers, Insecticides, pesticides, fungicides	As per requirement
10	Axe and Hacksaw	One each
11	Fiter shoes	As per requirement
12	Hunter shoes	Five
13	Rubber gloves	Two pairs
14	PH paper stripps	Fifteen

F. LIST OF SOME IMPORTANT FERTILIZERS MANUFACTURED IN INDIA

A. NITROGENOUS

- i. Ammonium sulphate
- ii. Ammonium chloride
- iii. Calcium ammonium nitrate
- iv. Urea

B. PHOSPHATIC

- i. Single super phosphate
- ii. Triple super phosphate
- iii. Rock phosphate

C. POTASSIC

- i. Murate of potash
- ii. Sulphate of potash

D. N.P.FERTILISER

- i. Diammonium phosphate
- ii. Nitrophosphates
- iii. Ammonium phosphate
- iv. Urea ammonium phosphate
- v. Ammonium polyphosphates

E. NPK COMPLEXES (N, P₂O₅, K₂O)

- i. NPK complex (15, 15, 14)
- ii. NPK complex (19, 19, 19)
- iii. NPK complex (17, 17, 17)
- iv. NPK complex (10, 26, 26)
- v. NPK complex (14, 28, 14)
- vi. NPK complex (14, 35, 14)
- vii. NPK complex (12, 32, 16)

G.LIST OF AUDIO-VISUAL AIDS

Sl.No.	Item	Number/ Quantity Required
1	Panel boards	Twelve
2	Charts and posters	Twenty
3	Pamphalets and leaf lets	As per requirement
4	Video cassettes	As per requirement
5	Television and VCP	One
6	Over head projector	One
7	Slide projector	One
8	Camera	One

9	Video camera	One
10	CCD Panel	One

H. LIST OF FIELD FACILITIES

Sl.No.	Item	Number/ Quantity Required
1	Wet land	1 ha
2	Dry Land	1 ha
3	Irrigated Dry Land	1 ha
4	Bullock pair (may be hired on daily wage basis to give practical training to students)	1

I. ADDRESSES FOR PROCUREMENT OF INPUTS

A. SUGGESTED LIST OF SUPPLIERS OF EQUIPMENTS

1. M/s American Spring and Pressing Works Pvt.Ltd., marvae Road, Malad, Mumbai – 400 064 or 24-157 Shakti Nagar New Delhi.
2. M/s Addison Co. Pvt. Ltd., 158, Mount Road, Chennai – 2.
3. M/s Shaw Wallace and Co., 25, Pollock Street, Calcutta – 1
4. M/s Sunbeam Corporation, L-4, Cannought Circus, New Delhi – 110 001.
5. M/s Indo – German Planting Machinery Co. Ltd., 4 – Mahatma Gandhi Road, Bangalore
6. M/s Crop Protection Corporation, 10, Hamam Street, 4th Floor, Mumbai – 400001
7. M/s Aditya Industries, 635-A, Tiruvottiyur High Road, Chennai – 19.
8. M/s Sigma Street Industries (Regd.) A-2, Industrial Estate, Ludhiana – 3.
9. M/s Jardine Handerson Ltd., Agency Dept. 4, Civil Road – Calcutta
10. M/s K.S.I. Instruments, Rajaji Nagar, Bangalore – 560010.

11. M/s Systronic Instruments, Ahemadabad.
12. M/s Toshniwal Industries, Ajmer (Rajasthan)
13. M/s Aimil Instruments, Ahemadabad.
14. M/s K.Lal Instruments, New Delhi.
15. M/s Elico Instruments, New Delhi.

B. SUGGESTED LIST OF SUPPLIERS OF GLASSWARES

1. Brosil Glass works Ltd., New Delhi.
2. Hi-Tech Glass works, Shri Ganganagar (Rajasthan)
3. Corning Glass works.
4. Dholpur Glass House, Dholpur, Rajasthan.
5. Jain Scientific Glass, Ambala Cantt. Punjab.
6. Gupta Scientific Glass, Ambala Cannt., Haryana.

C. SUGGESTED LIST OF SUPPLIERS OF CHEMICALS

Local suppliers of following manufacturer

1. B.D.H.Chemicals
2. Glaxo Chemicals Division
3. Riddle Chemicals
4. Lobo – Chemicals
5. E-Merck Chemical division
6. CDH chemicals
7. SISCO Chemicals

D. SUGGESTED LIST OF SUPPLIERS OF PESTICIDES, FUNGICIDES AND HERCIDES

1. Bayer (India) Limited, Express Towers, Nariman Point, P.O.Box. 1436, Mumbai – 400021 or 1/56, Janpath, New Delhi – 110 001.
2. Bharat Pulverising Mills Pvt.Ltd., Shriniketan 14, Queens Road, Mumbai – 400 020 or 1/185 B, Asif Ali Road, New Delhi – 110 002.
3. Ciba of India Ltd., Royal insurance Bldg., 14-J, Tata Road, P.O.B.No.479, Mumbai-400004.
4. Consolidated Crop Protection Pvt.,Ltd., B.1, Tara Bang Estate Charni Road, Mumbai – 400 004.

5. Cynamid India Ltd., 254-D-2, Dr.Aannie Besant Road, Mumbai – 400010.
6. Esso Standard Eastern Inc., Parliament Road, Mazagaon, P.Box, No.16202, Mumbai – 400010.
7. Hoechst Pharmaceuticals Ltd., Dugal House, Backhay, Post Box No.273, Mumbai-400001 or Horchst House Asaf Ali Road New Delhi – 110 002.
8. Imperial Chemical Industries Ltd., I.C.I.House, 34, Chowringee, Calcutta – 16
9. May and Baker (India) Pvt., Ltd., Connaught Circus, Chaudhary Bldg., New Delhi – 110 001.
10. Mehta Pharmaceuticals (P). Ltd., Chheharta, Amritsar.
11. Mysore Insecticides Company, 31 A, North Beach Road, Post Box No.1835, Chennai-1.
12. National Organic Chemical Industries Ltd., Mafatlal House, Beachpay Reclamation, Mumbai – 400001.
13. Pesticides India, Mewar Oils and General Mills Ltd., Post Box No.20, Udaipur – 313 001.
14. Sandox (India) Ltd., 3, Witter Road, Ballard Estate, Mumbai – 400003 or 4/1 Asaf Ali Road, New Delhi – 110 002.
15. Standard Chemicals and Pharmaceutical Co., Atlas Mills, Mumbai – 400010.
16. Tata Fision Ltd., 21, Ravelin Street, Fort, Mumbai – 400001.
17. Union Carbide Intia Ltd., 1, Middleton Street, Calcutta – 16.
18. Excel Industries Ltd., Jogeshwari, Mumbai – 400060.
19. Hindustan Antibiotics.
20. BASF India Ltd., 501, Barakhamba Road, New Delhi – 110 001.
21. Endofil Chemicals Ltd., Nirlon House, Dr.Annie Besant Road, Mumbai – 400025.
22. M/s Rallis India Ltd., United India life Building, F-Block Connaught Place.
23. New Delhi – 110 001.

F. SUGGESTED LIST OF SUPPLIERS OF SEEDS

- i. National Seed Corporation.
- ii. State Seed Corporation

- iii. Nath Seeds Ltd., adalai Road Aurangabad – 431005
- iv. Mahyco Seeds, Jalana, Maharastra
- v. Tarai Development Corporation, Nainital
- vi. Gangotri Hybrids, Pashim Vihar, New Delhi.
- vii. Chaddha Seeds, Haldwani, Pant Nagar
- viii. Century Seeds, New Delhi.
- ix. Indo-American Seed Co., New Delhi.

G. SUGGESTED LIST OF SUPPLIERS OF FERTILISERS

- 1. Coromandel Fertilisers Ltd.
- 2. EID parry (India), Ennore, T.N. (Pvt.)
- 3. Fertiliser and chemicals travancore Ltd., Alwaye, Kerala (Pub)
- 4. Fertiliser and chemicals travancore Ltd., Ambalamedu, Cochin – Phase I, Kerala (Pub.)
- 5. Fertiliser and chemicals travancore Ltd., Ambalamedu, Cochin – Phase II, Kerala (Pub.)
- 6. Fertiliser Corporation of India Ltd.
- 7. Gujarat State Fertilisers Co.Ltd., Baroda, Gujarat (Pvt.)
- 8. Hari Fertilisers, Varanasi, U.P. (Pvt.)
- 9. Hindustan Fertiliser Corporation Ltd.,
- 10. Indian Farmer Fertiliser Co-operative Ltd.
- 11. National Fertiliser Ltd., Punjab.
- 12. Shriram Fertilisers and Chemicals, Kota.
- 13. Southern Petrochemical Industries Corporation Ltd., Tuticorin, T.N.
- 14. D.C.M. Chemical Works, Delhi.
- 15. Dharamsi Morarji Chemicals Co., Kumhar, M.P./Ambarnath, Maharashtra.
- 16. Hindustan Copper Ltd., Hletri, Rajasthan
- 17. Hindustan Zinc Ltd., Debari, Udaipur, Rajasthan
- 18. Udaipur Chemicals and Fertilisers, Madri, Udaipur, (Rajasthan).
- 19. Shah Wallace and Co., Avedi, T.N.

9. COLLABORATING INSTITUTIONS AND ON THE JOB TRAINING SITES

9 A) LIST OF COLLABORATING INSTITUTES

1. Acharya N.G. Ranga Agricultural University
2. Regional Agricultural Stations (Jagtial / Palem / Guntur / Nandyal / Thirupati / Anakapalli / Chintapalli)
3. Agriculture Research Stations in several districts
4. Indian Council of Agricultural Research Institutes
5. Agriculture Colleges (Hyderabad / Aswaraopet / Bapatla / Thirupati / Mahanandi Naira)
6. Krishi Vigyan Kendras (KVK)
7. National Seed Corporation / A.P. State Seed Corporation / Seed Companies
8. Horticulture Training Institute, Red Hills, Hyderabad
9. Department of Agriculture / Horticulture / Sugars
10. State Farms / Private Farms / Sugar Factories
11. Fertilizer Companies – IFFCO / RCF / KRIBHCO / NFL / GSFC
12. Pesticide Manufacturers
13. DATT Centres
14. Loyola Academy, Secunderabad

9 B) ON – THE – JOB TRAINING SITES

1. State Government Farms
2. A.N.G.R. Agriculture University Research and Seed Production Farms
3. National and State Seed Corporation

4. Seed Industries
5. Meteorological Observatory
6. Krishi Vigyan Kendras
7. Sugar Factories
8. Private Seed Production Farms
9. Seed Processing units/Plants
10. Seed Testing Laboratories
11. Soil Testing Laboratories
12. Soil Conservation Centres
13. Watershed Project Areas
14. Agriculture & Cooperative Societies
15. Agri-Clinics
16. College of Agriculture, Rajendranagar, AP
17. MANAGE, Rajendranagar, AP
18. National Institute of Rural Development, Rajendranagar, AP
19. CRIDA, Hayatnagar, Hyderabad, AP
20. ICRISAT, Patancheru, AP
21. Directorate of Oilseeds Research, Rajendranagar, AP
22. Directorate of Rice Research, Rajendranagar, AP
23. Area of Village Extension worker
24. Irrigation Companies
25. WALAMTARI, Rajendranagar, AP
26. Regional Agricultural Stations (Jagtial / Palem / Guntur / Nandyal / Thirupati / Anakapalli / Chintapalli)
27. Horticulture Training Institute, Red Hills, Hyderabad
28. Loyola Academy, Secunderabad

10. TEACHING STAFF AND THEIR QUALIFICATIONS

A) Lecturer at 10 +2 Level

Essential Qualifications:

- i. B.Sc. (Agriculture) with 1st Class and 3 years of experience in Agriculture and allied Departments / Fertilizer Companies / Seed Industries / Sugar Factories

Preferential Qualifications:

M.Sc. (Agriculture) in Agronomy / Agricultural Economics / Horticulture / Extension Education / Seed Production Technology.

B) Instructor / Demonstrator / Lab Assistant

- i. B.Sc. (Agriculture)
- ii. Intermediate (10 +2) Certificate in Crop Production Vocational Course
- iii. Diploma in Agriculture

11. VERTICAL MOBILITY

a) With Bridge Course

Eligible for admission into :

1. B.Sc.

2. B.Sc.(Ag); B.Sc.(CommercialAgriculture and Business Management); B.V.S.C.; B.Sc.(Horti.) (Through EAMCET)

3. B.Sc. (Home Science)

b) Without Bridge Course

Eligible for admission into

1. B.Sc. (Farm Science & Rural Developments)

2. B.A./B.Com./B.B.M.

12. REFERENCE BOOKS

1. Mavi, H.S. (1985). Introduction to Agrometeorology. Oxford & IBH Publishing Co., New Delhi.
2. Patterson, S. (1958). Introduction to Meteorology. Mc-Graw Hill Book Co., Inc., New York
3. Gupta, O.P. (1984). Scientific weed management. Today and Tomorrow's Printers and Publishers, New Delhi
4. Rao, V.S. (1992). Principles of weed science. Oxford & IBH Publishing Co., New Delhi.
5. Sankaran, S. and Mudaliar, V.T. (1993). Principles of Agronomy. The Bangalore Printing & Publishing Co., Ltd., Bangalore.
6. Yellamanda Reddy, T. and Sankara Reddi, G.H. (1995). Principles of Agronomy. Kalyani Publishers, Ludhaina.
7. Morachan, Y.B. (1986). Crop Production and Management. Oxford & IBH Publishing Co., New Delhi.
8. Murthy, J.V.S. (1994). Watershed management in India. Wiley Eastern Publishers, New Delhi
9. Gupta, U.S. (1975). Physiological Aspects of Dryland Farming. Oxford & IBH Publishing Co., New Delhi.
10. Sankara Reddi, G.H. and Yellamanda Reddy, T. (1996). Efficient use of Irrigation water. Kalyani Publishers, Ludhaina.
11. Gupta, O.P. (2004). Modern Weed Management. Agrobios (India), Jodhpur – 342 002
12. Misra, R.D. and Ahmed, M. (1987). Manual on Irrigation Agronomy. Oxford & IBH Publishing Co., New Delhi.
13. Brady, N.C. (1995). The Nature and Properties of soil. Mac Millan Publishing Company, New York.
14. Purohit, S.S. (2004). Medicinal Plant Cultivation. Agrobios (India), Jodhpur – 342 002

15. Sahai, V.N. (1990). Fundamentals of Soil. Kalyani Publishers, Ludhaina.
16. Tisdale, S.L., Nelson, W.L. and Beaton, J.D. (1993). Soil Fertility and Fertilizers. Mac Millan Publishing Company, New York.
17. Gustafson, A.F. (2003). Hand Book of Fertilizers. Agrobios (India), Jodhpur – 342 002
18. Kanwar, J.S. (ed.). (1976). Soil Fertility – Theory and Practice. ICAR, New Delhi.
19. Hillel, D. (1980). Fundamentals of Soil Physics. Academic Press, New York.
20. Tondon, H.L.S. (1994). Fertilizer Guide. FDCO, New Delhi
21. Jones, S.U. (1987). Fertilizers and Soil Fertility. Prentice Hall of India Private Limited, New Delhi
22. Yawalkar, K.S., Agarwal, J.P. and Bokde, S. (1977). Manures and Fertilizers. Agri-Horticultural Publishing House, Nagpur
23. Gupta, P.K. (2003). Soil, Plant, Water and Fertilizer Analysis. Agrobios (India), Jodhpur – 342 002
24. Seetharaman, S., Biswas, B.C., Maheswari, S. and Yadav, D.S. (1996). Hand Book on Fertilizer Usage. The Fertilizer Association of India, New Delhi.
25. Curran, P.J. (1991). Principles of Remote Sensing. ELBS & Longman, London
26. De, G.C. (1989). Fundamentals of Agronomy. Oxford & IBH Publishing Co., New Delhi.
27. Russel, E.W. (1973). Soil Conditions and Plant Growth. Longmans, 10th Edn.
28. Singh, S.S. (1993). Principles and Practices of Agronomy. Kalyani Publishers, New Delhi.
29. N.C.E.R.T. Publications, Aurobindo Marg, New Delhi – 110 016

- a) Soils and its Properties: Instructional – cum – Practical manual (1985)
 - b) Weeds and Weed Control: Instructional – cum – Practical manual (1985)
 - a) Fertilizers and manures: Instructional – cum – Practical manual (1985)
 - b) Agricultural Meteorology: Instructional – cum – Practical manual (1985)
 - c) Water Management: Instructional – cum – Practical manual (1985)
 - d) Crop Management: Instructional – cum – Practical manual (1985)
 - e) Farm Machinery: Instructional – cum – Practical manual (1985)
30. Mahendra Pal (1986). Proceedings of the National Symposium on Cropping Systems, 3 – 5th April, Indian Society of Agronomy, New Delhi – 110 011
 31. Joshi, S.S. and Kapoor, T.R. (1981). Fundamentals of Farm Business Management. Kalyani Publishers, New Delhi.
 32. Balasubrananiyan, P. and Paliniappan, S.P. (2004). Principles and Practices of Agronomy. Agrobios (India), Jodhpur – 342 002
 33. Singh Chidda. (1983). Modern Techniques of Raising of Field Crops. Oxford & IBH Publishing Co., New Delhi.
 34. Murthy, J.V.S. (1994). Watershed Management in India. Wiley Eastern Publishers, New Delhi.
 35. Somani, L.L., Vittal, K.P.R. and Venkateshwarlu, B. (1992). Dryland Agriculture – State of art of Research in India. Scientific Publishers, Jodhpur.
 36. Sharma, B.L. (1991). Dryland Farming – Perspectives and Prospects. Daya Publishing House, New Delhi.
 37. Mohammad Shadi and Raja, M. (1987). Dryland Agriculture in India. Rawat Publications, Jaipur.

38. Sahu, D.D. (2003). Agrometeorology and Remote Sensing. Agrobios (India), Jodhpur – 342 002
39. Panda, S.C. (2004). Dryland Agriculture. Agrobios (India), Jodhpur – 342 002
40. Sharma, A.K. (2004). A Hand Book of Organic Farming. Agrobios (India), Jodhpur – 342002
41. Vegetable crops in India – Yawalkar K.S. Agri Horticulture Publishing House Allahabad.
42. Fruit physiology and production – Amar Singh, Kitabistan, Allahabad.
43. Principles and procedures of plant protection- Chattopadhaya S.B. Oxford & IBH Publishing Co. New Delhi.
44. Seed Technology – Agrawal R.L. Oxford & IBH Publishing Co. New Delhi.
45. Principles of Seed Technology Agarwal P.K., ICAR New Delhi.
46. Introduction to Horticulture – Kumar N., Rajyalakshmi Publications, Tamil Nadu.
47. Plant propagation – Principles and Practices – Hartman H.T and Kester, Prentice Hall of India Pvt. Ltd., Mumbai.
48. Ornamental Horticulture in India – Randhawe G.S. , Today and Tomorrow's Printers and Publishers, New Delhi.
49. Cultivation and utilization of medicinal and aromatic plants – Atal E.K. & Kapoor CSIR, New Delhi.
50. Hand book of Agriculture – ICAR, New Delhi.
51. Agricultural marketing in India – Acharya S.S. and Agarwal N.L. Oxford & IBH Publishing Co. New Delhi.
52. Fundamentals of Farm Business Management – Johl & Kapoor.
53. Extension Education - Adivireddy

54. Vegetable crops in India - Yawalkar K.S. Agri Horticulture Publishing House Allahabad.
55. Fruit physiology and production - Amar Singh, Kitabistan, Allahabad.
56. Principles and procedures of plant protection- Chattopadhyaya S.B. Oxford & IBH Publishing Co. New Delhi.
57. Seed Technology - Agrawal R.L. Oxford & IBH Publishing Co. New Delhi.
58. Principles of Seed Technology Agarwal P.K., ICAR New Delhi.
59. Introduction to Horticulture - Kumar N., Rajyalakshmi Publications, Tamil Nadu.
60. Plant propagation - Principles and Practices - Hartman H.T and Kester. Prentice Hall of India Pvt. Ltd., Mumbai.
61. Ornamental Horticulture in India - Randhawe G.S. , Today and Tomorrow's Printers and Publishers, New Delhi.
62. Cultivation and utilization of medicinal and aromatic plants - Atal E.K. & Kapoor CSIR. New Delhi.
63. Hand book of Agriculture - ICAR, New Delhi.
64. Agricultural marketing in India - Acharya S.S. and Agarwal N.L. Oxford & IBH Publishing Co. New Delhi.
65. Fundamentals of Farm Business Management - Johl & Kapoor.
66. Extension Education - Adivireddy

SUGGESTED LIST OF PERIODICALS

1. Indian Farming, ICAR Publication, Krishi Bhavan,
New Delhi – 110 011
2. Intensive Agriculture, ICAR Publication, Krishi Bhavan,
New Delhi – 110 011
3. Indian Horticulture, ICAR Publication, Krishi Bhavan,
New Delhi – 110 011
4. Fertilizer News, FAI Publication, New Delhi – 110 016
5. Yojana, Planning Commission, GOI, New Delhi – 110 011
6. Survey of Indian Agriculture, The Hindu, Chennai – 600 002

VOCATIONAL CURRICULUM-2005
(With effect from the Academic Year 2005-2006)

**Curriculum of Intermediate Vocational Course
in**

C R O P
PRODUCTION &
MANAGEMENT



**STATE INSTITUTE OF VOCATIONAL EDUCATION &
BOARD OF INTERMEDIATE EDUCATION A.P.
Nampally, Hyderabad**

FOREWORD

The National Policy on Education (1986) while proposing educational reorganization, placed high priority on the programme of vocationalisation of education. It emphasized that well planned, systematic and rigorously implemented vocational education will create a distinct stream to prepare students for identified occupations encompassing several areas of activity. The primary aim of vocational courses was to cut across several occupational fields and prepare students with employable skills in organized sectors and self employment. Vocationalisation through re-orientation of educational strategies focused on creating a talent pool of skilled youth who are trained in courses relevant to the market and emerging needs of the various sections of the economy.

Inspired by this vision of the National Policy, the Government of Andhra Pradesh introduced Vocational Education at +2 level with an aim to diversify a sizeable segment of students at the senior secondary stage to the world of work. The State Government aimed at reducing the pressures on higher education through empowering youth by harnessing their capabilities. The requirement of skilled manpower industry is being fulfilled by charting a student's career with right options based on aptitude and talent. An right alternative to medical and engineering courses is envisaged in vocationalisation of education in the State.

In view of the changing needs of the students and growing demand for a spectrum of skill competencies in the economy, the Board of Intermediate Education has reviewed the curriculum of Vocational Courses in order to re-orient them based on their viability and practicability. The revised curriculum for Vocational Courses at Intermediate Level will come into effect from the Academic Year 2005-06 1st Year and from Academic Year 2006-07 for 2nd Year students.

I am confident that the revised curriculum will attract more and more students into vocational stream and help them train in need-based, productive courses leading to gainful employment.



SHASHANK GOEL

Secretary, BIE

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