Ph:0863-2220134
2227649

HINDU COLLEGE, GUNTUR – 522 003

(Re-accredited by NAAC as Grade 'A')

Guntur,
15-02-2017

From
The Principal,
Hindu College,
Guntur.

To
Prof. K.R.S. Sambasiva Rao,
Rector,
Acharya Nagarjuna University,
Nagarjuna Nagar.

Respected Sir,

Sub: Submission of III B.Sc. Agriculture syllabus – CBCS pattern – Regarding.

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I am herewith submitting the proposed syllabus for III B.Sc. Agriculture students under CBCS pattern with effect from 2017-18 academic year. I request you to kindly verify it and the syllabus may be approved in B.O.S. meeting at the earliest date.

Enclosures:

III B.Sc. Semester V	-	Paper V Paper VI
III B.Sc. Semester VI	-	Paper VII with 3 elective papers Paper VIII Cluster Electives (A) – 3 papers Cluster Electives (B) – 3 papers

Thanking you, sir.

Yours faithfully,

(Dr. K. Kanaka Durga)
PRINCIPAL
HINDU COLLEGE, GUNTUR

III B.Sc SEMESTER-V Agriculture

Paper V (Compulsory)

FUNDAMENTALS OF HORTICULTURE & PRODUCTION TECHNOLOGY OF FRUIT CROPS

Total hours of teaching 45 hrs @ 3 hrs per week

Unit – I (9 hrs)

FUNDAMENTALS OF HORTICULTURE

1. Introduction
2. Importance of horticulture
3. Scenario of Horticulture - Area, production and EXIM trade in horticulture
4. Horticultural zones of India and classification of horticultural plants

Unit – II (9 hrs)

NURSERIES AND ORCHARDS

1. Nursery - Importance and propagation methods
2. Planning of orchards establishment and layout systems
3. Types of orchards
4. Soil and Climatic conditions for Horticulture Crops
5. Digging and filling of pits

Unit – III (9 hrs)

ORCHARD MANAGEMENT

1. Orchard management, Water requirements and irrigation methods for horticulture crops
2. Weed management in orchards
3. Nutrient management
4. Training and Pruning
5. Planting systems and transplanting of horticultural crops

Unit – IV (9 hrs)

CULTIVATION OF FRUIT CROPS AND VEGETABLES

1. Cultivation of major fruit crops- Mango, Banana, Citrus, Guava, Sapota , Papaya , Annona
2. Minor fruit crops - West Indian cherry/Barbados cherry Jamun, Wood apple, Ber, Aonla, Bael and Litchi.
3. Vegetables- Brinjal, Tomato, Beans, cucurbits, tuber crops and leafy vegetables.

Unit – V (9 hrs)

PROBLEMS OF ORCHARDS

1. Plant growth regulators
2. Problem of unfruitfulness
3. Growth, fruiting habits and methods for inducing fruitfulness in horticultural crops
4. Post harvest problems and basic preservation methods
5. Cropping systems in horticulture

REFERENCES

1. Fruit Growing in India. Heyes W B, 1953. Kitabistan, Allahabad
2. Fundamentals of Horticulture. Edmond J B Senn T L and Andrews F.S , 1964. McGraw Hill Book Co., New York
3. Plant Propagation - Principles and Practices Hartman H T and Kester D E, 1968. Prentice Hall of India Publishing Ltd., Bombay
4. Fruits. Ranjit Singh 1969. National Book Trust New Delhi
5. Fruits - Tropical and Subtropical Bose T K and Mitra S K ,1990. Nayaprakashan, Calcutta
6. Principles of Horticulture Denisen E. L, 1957 MacMillan Publishing Company, New York
7. Introduction to Horticulture. Kumar N, 1990 Rajyalakshmi Publications, Nagarcoil, TamilNadu
8. Plant Propagation Sadhu M.K, 1996 New Age International Publishers - New Delhi.
9. Propagation of Fruit Crops Mukherjee S K and Majumder P K, 1973 ICAR, New Delhi.
10. Text Book on Pomology Vol.II- III Chattopadhya, 1997 N Kalyani Publishers Ludhiana.

III B.Sc SEMESTER-V Agriculture

Paper V (Compulsory)

FUNDAMENTALS OF HORTICULTURE & PRODUCTION TECHNOLOGY OF FRUIT CROPS

Total hours of teaching 30 hrs @ 2 hrs per week

Practical Schedule

1. Identification of Horticultural tools & implements and their use.
2. Different containers, preparation of potting mixture, potting, de-potting and repotting.
3. Propagation through seeds, methods to overcome the seed dormancy -
   a) Mechanical scarification b) Soaking the seeds in water c) Acid scarification
   d) Startification
4. Vegetative propagation by corms, bulbs, rhizomes etc.
5. Propagation methods like for cutting and layering.
6. Vegetative propagation like budding.
7. Vegetative propagation like Grafting.
8. Field preparation, layout and different planting systems
9. Preparation of stock solutions of different growth regulators.
10. Identification and description of important varieties of Mango, Guava and Citrus,
11. Identification and description of important varieties of Grape, Sapota, Banana and Papaya.
12. Visits to fruit research station, live specimens and models
13. Post harvest handling of fruits and vegetables.

Practical Model Paper

1. Identification	20 Marks
2. Project report on farm visit	10 Marks
3. Interview schedule	10 Marks
4. Record & Viva	10 Marks

	Total = 50 Marks

III B.Sc SEMESTER-V Agriculture

Paper VI (Compulsory)

DRYLAND FARMING & WATERSHED MANAGEMENT

Total hours of teaching 45 hrs @ 3 hrs per week

Unit – I (9 hrs)

Definition, concept and characteristics of Dry land farming, dry land versus rainfed farming significance and dimensions of dry land farming in Indian agriculture

Unit – II (9 hrs)

Soil and climatic parameters with special emphasis on rainfall characteristics, constrains limiting crop production in dry land areas, types of drought, characterization of environment for water availability, crop planning for erratic and aberrant weather conditions.

Unit – III (9 hrs)

Stress physiology and resistance to drought, adaptation of crop plants to drought, drought management strategies, preparation of appropriate crop plans for dry land areas, mid contingent plan for aberrant weather conditions.

Unit – IV (9 hrs)

Tillage, tilth, frequency and depth of cultivation, compaction in soil tillage; concept of conservation tillage; tillage in relation to weed control and moisture conservation; techniques and practices of soil moisture conservation (use of mulches, kinds, effectiveness and economics); antitranspirants; soil and crop management techniques, seeding and efficient fertilizer use.

Unit – V (9 hrs)

Concept of watershed resource management, problems, approach and components.

Suggested Readings

Das NR. 2007. Tillage and Crop Production. Scientific Publishers.

Dhopte AM. 2002. Agrotechnology for Dryland Farming. Scientific Publ.

Dhruv Narayan VV 2002. Soil and Water Conservation Research in India. ICAR.

Gupta US. (Ed.). 1995. Production and Improvements of Crops for Drylands. Oxford & IBH.

Katyal JC & Farrington J. 1995. Researdch for Rainfed Farming. CRIDA.

Rao SC & Ryan J. 2007. Challenges and Strategies of Dryland Agriculture. Scientific Publishers.

Singh P & Maliwal PL. 2005. Technologies for Food Security and Sustainable Agriculture.
Agrotech Publishing Company.

Singh RP. 1988. Improved Agronomic Practices for Dryland Cross. CRIDA.

Singh RP. 2005. Sustainable Development of Dryland Agriculture in India. Scientific Publ.

III B.Sc SEMESTER-V Agriculture

Paper VI (Compulsory)

DRYLAND FARMING & WATERSHED MANAGEMENT

Total hours of teaching 30 hrs @ 2 hrs per week

Practical Schedule

1. Allotment of plots and preparation of seed bed
2. Fertilizer application and sowing
3. Rainfall analysis and interpretation
4. Study of dry farming implements -Models, laminations & farm implements
5. Study of agronomic measures of soil and moisture conservation.
6. Study of mulches and anti-transpiration
7. Demonstration of land treatments for moisture conservation
8. Visit to watershed areas- Visit to CRIDA & ICRISAT farms
9. Study of effects of drought on crops
10. Study the efficiency of land treatments for moisture conservation
11. Collection of biometric data on crop and its interpretation
12. Study of erosion problems in field
13. Collection of data on temperature and evaporation
14. Harvesting, post harvesting operations and record of yield

Practical Model Paper

1. Study of dry farming implements (Project)	20 Marks
2. Project report on farm visit	10 Marks
3. Interview schedule	10 Marks
4. Record & Viva	10 Marks

	Total = 50 Marks

III B.Sc SEMESTER-VI Agriculture

Elective-I

Paper VII(A) – PRODUCTION TECHNOLOGY OF VEGETABLE CROPS

Total hours of teaching 45 hrs @ 3 hrs per week

Unit – I (9 hrs)

1. Importance of vegetable growing in India, production, productivity and distribution, nutritive value of vegetables, economic importance and scope of various vegetables in India Export of vegetables
2. Classification of vegetables – types of classification and their bases – Botanical, cultural, thermo classification, classification based on parts used, based on soil acidity and duration
3. Factors affecting vegetable production-soil, climate, water, nutrients.

Unit – II (9 hrs)

1. Basic principles of vegetable production- Vegetable nursery, seed and seedlings production, transplanting, care and management; Irrigation requirements of vegetables – surface and sub surface irrigation, spray irrigation
2. Nutrition, essential nutrients, deficiency symptoms, methods of application
3. Types of vegetable gardens, nutrition garden, market garden, truck garden, vegetable forcing, vegetable garden for special purpose and processing, veg. gardens for seed production, riverbed system, terrace garden etc

Unit – III (9 hrs)

1. Role of growth regulators in vegetable production and methods of application
2. Problems in vegetable production; Plant protection- special precautions in vegetables, methods of control, crop rotation, resistant varieties, seed treatments, etc.
3. General principles of seed production in vegetables- rouging, isolation distance, seed purity, seed standards, – breeder seed, foundation seed, certified seed – packaging and seed storage, moisture and temperature

Unit – IV (9 hrs)

1. Cropping systems and patterns of vegetable based cropping system, vegetables in rice based and coconut based cropping system, intercropping, mixed cropping, relay cropping, multiple cropping, etc.
2. Organic farming in vegetables
3. Importance, origin, varieties, cultivation, seed production, problems and prospects of Tomato

Unit – V (9 hrs)

1. Importance, origin, varieties, cultivation, seed production, problems and prospects of Chilli
2. Importance, origin, varieties, cultivation, seed production, problems and prospects of Brinjal
3. Importance, origin, varieties, cultivation, problems and prospects of cucurbits

Suggested Readings

1. Chadha, K. L. 2003. Handbook of Horticulture, ICAR, New Delhi.
2. Choudhury, B.1983. Vegetables. National Book Trust,New Delhi.
3. Das, P. C.1993. Vegetable crops in India. Kalyani Publishers
4. Gopalakrishnan, T. R. 2007. Vegetable Crops. New India Publishing Agency, New Delhi.
5. Hazra, P. and Som, M. G. 1999. Technology for vegetable Production and Improvement. Naya Prokash, Calcutta
6. Peter, K. V. 1998. Genetics and Breeding of vegetables. ICAR, New Delhi.
7. Peter, K. V. and Hazra, P. 2012. Handbook of vegetables. Studium Press LLC, USA
8. Thamburaj, S. and Singh, N. 2005. Vegetables, tuber crops and spices. ICAR, New Delhi.

III B.Sc SEMESTER-VI Agriculture

Elective-I

Paper VII(A) – PRODUCTION TECHNOLOGY OF VEGETABLE CROPS

Total hours of teaching 30 hrs @ 2 hrs per week

Practical schedule

1. Familiarization of different vegetable crops- through field visits and slide show
2. Preparation of nursery plants, sowing and aftercare; portray seedling production- solanaceous vegetables
3. Layout of nutrition garden and preparation of crop calendar
4. Familiarization of seeds of vegetable crops
1. Visit to the farmer's fields in the vegetable growing areas to study the field problems faced by the farmer and to work out the economics of vegetable cultivation

Practical Model Paper

1. Identification of Vegetables	20 Marks
2 .Project report on farm visit	10 Marks
3. Interview schedule	10 Marks
4. Record & Viva	10 Marks

	Total = 50 Marks

III B.Sc SEMESTER-VI Agriculture

Elective-II

Paper VII(B) – Manures, Fertilizers and Soil fertility management

Total hours of teaching 45 hrs @ 3 hrs per week

Unit – I (9 hrs)

1. Importance and scope of organic farming- - Bulky organic manures/concentrated manures/ liquid manures/green manures and green leaf manures.
2. Chemical fertilizers – classification-Nitrogenous fertilizers – Urea, Ammonium sulfate-manufacturing process, properties and use
3. Nitrogenous fertilizers – Sodium nitrate, ammonium chloride, calcium ammonium nitrate, ammonium nitrate, ammonium sulfate nitrate manufacturing process, properties and use, Suitability of different nitrogenous fertilizers for different soils and crops

Unit – II (9 hrs)

1. Phosphatic fertilizers – classification, manufacturing process, property and use of single super phosphate, triple super phosphate and bone meal
2. Phosphatic fertilizers – basic slag, rock phosphate, dicalcium phosphate manufacture, properties and use. Behavior of phosphatic fertilizers in different soil types and comparative fertilizer value of various phosphatic fertilizers
3. Principles of manufacture of potassic fertilizers, physical and chemical properties in relation to their use in various soils

Unit – III (9 hrs)

1 Straight vs complex fertilizers. Manufacturing process, efficiency, properties and use of the recent complex fertilizers.
2. Unit value and evaluation of fertilizers.
3. Materials supplying secondary nutrients and micro nutrients and chelating compounds.

Unit – IV (9 hrs)

1. Fertilizer control order and specifications of fertilizers Amendments
2. Soil acidity – liming materials and its reaction in acidic soils.
3. Liming materials – methods for evaluating the efficiency and the lime requirement. Saline and alkali soils – amendments for reclamation and soil conditioners

Unit – V (9 hrs)

1. Time and Method of fertilizer Application- Principles involved –methods of applying fertilizers.
2. How much fertilizers to use.
3. Diagnostic techniques for soil and crops Soil Analysis Methods

Suggested Readings

1. Burges, A, and Raw, F. 1967. Soil Biology. Acad.Press, New York

2. Donahu, L. R., Miller, W. R. and Shickuluna, 1977. Soils. Prentice Hall of India Pvt. Ltd., New Delhi

3. Gupta, P.K. (1999) Hand book of Soil, Fertilizer and Manure. Agro Botanica, Bikaner

4. Gupta,A.K. (2007) Methods in Environmental Analysis of Water , Soil and Air. 2nd Edn. Published by Agrobios (India) Jodpur

5. Mengel, K.J. and Kirkby, A. 1978. Principles of Plant Nutrition. International Potash Institute, Switzerland 31

6. Nyle.C. Brady 1995. The Nature and Properties of Soils. 10th Edn. Printice Hall India pvt. Ltd. New Delhi

7. Raymond W Miller and Roy L. Donahue. 1992. Soils and Introduction to Soils and Plant Growth. 6th edn. Printice Hall India pvt. Ltd. New Delhi

8. Robert .M. Devlin and Francis H. Witham 1986. Plant Physiology. 4th Edn. CBS Publishers and Distributors New Delhi.

9. Singh,S.S.2011.Soil Fertility andNutrient Management.3rd Edn. Kalyani Publishers.New Delhi

10. Tisdale,S.L., Nelson,W.L.,Beaton, J.D. and Havlin,J.L. 1995. Soil Fertility and Fertilisers. 5th Edn. Macmillan publishing company, USA.

11. Fundamentals of Soil Science. Published by Indian Society of Soil Science, IARI New Delhi, 2002

III B.Sc SEMESTER-VI Agriculture

Elective-II

Paper VII(B) – Manures, Fertilizers and Soil fertility management

Total hours of teaching 30 hrs @ 2 hrs per week

Practical schedule - Manures, Fertilizers and Soil fertility management

1. Introduction to Analytical Instruments.
2. Principles of pH meter , Conductivity meter, colorimeter and flame photometers (AES & AAS)
3. Preparation of soil samples for analysis
4. Determination of pH and electrical conductivity in soil

Practical Model Paper

1. Experiment		20 Marks
2. Numericals		10 Marks
3. Identification		10 Marks
4. Record & Viva		10 Marks
	Total =	50 Marks

III B.Sc SEMESTER-VI Agriculture

Elective-III

Paper VII(C) - RURAL SOCIOLOGY & EDUCATIONAL PSYCHOLOGY

Total hours of teaching 45 hrs @ 3 hrs per week

Unit – I (9 hrs)

Extension education -Extension – meaning, sociology and rural sociology, scope of rural sociology, Importance of Rural Sociology, Indian rural society, Important characteristics of Indian Rural Society

Unit – II (9 hrs)

Social groups - Characteristics of Social Group , Classification of Group, Culture, Characteristics of Culture , Role of culture in agriculture, Social values and attitudes, Socio-psychological determinants of values

Unit – III (9 hrs)

Social institutions - Definition, social organisations, social organisations**,** Characteristics **,** Definition of Family, Characteristics of family, Social Organisations, Essential Characteristics of organisations

Unit – IV (9 hrs)

Educational psychology - Definition of psychology ,Educational Psychology, Scope of social psychology Personality, Concept of Personality Perception, Characteristics of perception

Unit – V (9 hrs)

Instincts and emotions - Definitions, Instinct, Emotions, Classification of Emotion, motivation, Functions of motivation, Teaching, learning process, learning process, Learning Situation definition Important Points Regarding the Process of Learning.

Suggested Readings:

1. Bhatia, H.R. 1965. A Text Book of Educational Psychology, Asia Publishing House, New Delhi.
2. Chitamber, J.B., 1990. Introductory Rural Sociology: Willey Easter Ltd. New Delhi.
3. Dahama, O.P. & Bhatnagar, O.P.,1985. Education & Communication for Development,Oxford and IBH Publishing Company, New Delhi,
4. Desai, A.R. 1953. Rural Sociology in India, Vora & Co. Publisher Pvt. Ltd., Bombay.
5. Pujari, D. 2002 Educational Psychology in Agriculture, Agrotech Publishing Academy, Udaipur (Raj.) –31300

III B.Sc SEMESTER-VI Agriculture

Elective-III

Paper VII(C)-Practical Syllabus

RURAL SOCIOLOGY & EDUCATIONAL PSYCHOLOGY

Total hours of teaching 30 hrs @ 2 hrs per week

1. Study and survey about rural and social institutions.
2. Identification of farming needs.
3. Study and Visit to KVK.
4. Selection, Planning and Preparation of visual aids - Charts, Posters.
5. Transparencies, Power Point. Preparation of Agricultural Information materials – Leaflet, Folder, Pamphlet, News Stories, Success Stories.

Practical Model Paper

Preparation of charts and folders	30 Marks
Study about social Institutions- report	10 Marks
Viva and Record	10 Marks
Total	= 50 Marks

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-A

Paper VIII A(1) - PRODUCTION ECONOMICS AND FARM MANAGEMENT

Total hours of teaching 45 hrs @ 3 hrs per week

Unit – I (9 hrs)

1. Introduction to Farm Management
2. Farm management decision making process ? Production, operational, strategic, administrative and marketing management decisions.

Unit – II (9 hrs)

1. Basic concepts in farm management. Production, types of resources, choice indicators, costs, revenue, profit, total, average & marginal concepts.
2. Factor – Product relationship – Production function – definition & types – linear, quadratic & Cobb- Douglas functions – Impact of technology.

Unit – III (9 hrs)

1. Law of diminishing returns – 3 regions of production
2. Cost concepts & interrelations – Optimum level of input use and optimum production

Unit – IV (9 hrs)

1. Economies of scale – external and internal economies and diseconomies – Returns to scale – Economies
2. Factor – Factor relationship – Principle of substitution – isoquant, isocline
3. Expansion path, ridgeline and least cost combination of inputs

Unit – V (9 hrs)

1. Product – Product relationship – types. Production possibility curve, iso revenue line and optimum combination of outputs
2. Equi-marginal returns and Opportunity cost – comparative advantage
3. Concepts of Risk and uncertainty – types of uncertainty in agriculture – anagerial decisions to reduce risks in production process

Suggested Readings

1. Dhondyal, S.P.1987. Farm management: An Economic Analysis .Friends Publications, Meerut.

2. Gittinger, J.P.1973. Economic Analysis of Agricultural Projects . The Johns Hopkins University Press, Baltimore.

3. Johl, S.S. and Kapur, T.R. 2000. Fundamentals of Farm Business Management. Kalyani Publishers, New Delhi

4. Kahlon, A.S. and Singh.K.. 1992. Economics of Farm Management in India. Theory and Practice, Allied Publishers.

5. Reddy, S. S., Ram, P.R ., T.V.N. and Dev, J.B. 2004. Agricultural Economics.Oxford& IBH Publishing Co. Private Limited, New Delhi.

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-A

Paper VIII A(1) - PRODUCTION ECONOMICS AND FARM MANAGEMENT

Total hours of teaching 30 hrs @ 2 hrs per week

Practical schedule

1. Preparation of interview schedule -Estimation of cost of crop and livestock enterprises
2. Preparation of farm layout. Determination of cost of fencing of a farm. Computation of depreciation cost of farm assets.
3. Preparation of farm plan and budget
4. Analysis of farm records and accounts farm inventory, balance sheet, profit and loss accounts.
5. Computation of depreciation using different methods
6. Visit to a farm and cost and return analysis

Practical Model Paper

1. Preparation of farm plan and budget	20 Marks
2 .Project report on farm visit	10 Marks
3. Interview schedule	10 Marks
4. Record & Viva	10 Marks

	Total = 50 Marks

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-A

Paper VIII A(2) - Post-harvest Management and value addition of horticultural crops

Total hours of teaching 45 hrs @ 3 hrs per week

Unit – I (9 hrs)

1. State of Indian fruit and vegetable processing industry- Importance of post harvest management of fruits, vegetables and other horticultural produce, problems & prospects
2. Fruits and vegetables their chemical composition
3. Physiology of maturity, ripening and senescence in fruits and vegetables

Unit – II (9 hrs)

1. Post harvest losses - Pre and post harvest factors causing loss and spoilage of fruits and vegetables
2. Post harvest management techniques for fruits and vegetables- Pre-cooling- methods- grading and sorting- other operations- washing-sanitization- heat treatments- waxing- curing etc.
3. Storage system- ambient, low temperature, modified and controlled atmosphere storage systems- storage disorders

Unit – III (9 hrs)

1. Packaging technology - wholesale and retail packaging - packaging materials – advantages and disadvantages- consumer packaging.
2. Government policies, regulations and specifications for fresh and processed products- Marketing systems- Export promotion agencies and their role in export of fresh and processed products.
3. General principles and methods of preservation.

Unit – IV (9 hrs)

1. Principles of preservation by removal of water - pretreatments – blanching- sun drying, dehydration –methods.
2. Principles of preservation by application of heat (Thermal processing) -pasteurization – sterilization- Steps in canning and spoilage of canned products.
3. Principles of preservation by ionizing radiations, Principles of preservation by chemical methods- Role of sugar, brine, acid and other chemical, preservatives, other food additives.

Unit – V (9 hrs)

1. Principles of preservation by fermentation- Alcoholic, acetic and lactic fermentation processes.
2. Recent advances in food preservation techniques.
3. Post harvest technology of Tree spices
4. Post harvest technology of essential oil yielding crops
5. Post harvest technology of cut flowers
6. Industrial waste utilization

Suggested Readings

1. John, P.J. 2008. A hand book on Post Harvest management of Fruits and Vegetables. Daya Publishing House. Delhi.147.
2. Kader, A.A. 2002. Postharvest Technology of Horticultural Crops. UCUCANR Publications. 535p.
3. Mitra, S. K. 1997. Postharvest Physiology and Storage of Tropical Fruits. CAB International, UK.
4. NIIR Board. 2012. Food Packaging Technology Handbook (2nd Rev.Ed). NIIR Project Consultancy Services. 749 p.
5. Panda, H. 2010. Handbook on Spices and Condiments (Cultivation, Processing and Extraction). Asia Pacific Business Press Inc. . 640 P.
6. Rajarathnam, S. and Ramteke, R.S.2011. Advances in preservation and processing technologies of fruits and vegetables.New India Publishing Agency, New Delhi
7. Ranganna, S. 1986. Handbook of Analysis and Quality Control for Fruit and Vegetable Products. Tata Mc. Graw Hill Publishing Company, New Delhi,1112p.
8. Sadasivam, S. and Manickam, A.1996. Biochemical methods. New Age International Pvt.Ltd. Publishers 256p.
9. Saraswathy, S., Preeti, J.L., Balasubramanyan, S., Suresh, J., Revathy, N. and Natarajan, S. 2008. Postharvest management of horticultural crops. AGRIBIOS (India).
10. Sharma, S.K. 2010. Postharvest management and processing of fruits and vegetables- Instant
    Notes. New India Publishing Agency. New Delhi.390. 70
11. Srivastava, R.P. and Sanjeev Kumar.2007. Fruit and vegetable preservation: Principles and Practices. International Book Distributing Company, Lucknow.474.
12. Sudheer, K.P. and Indira ,V. 2007. PostHarvest Technology of Horticultural Crops. New India. Publ. Agency.
13. Verma, L.R. and Joshi, V.K. 2000. Postharvest technology of fruits and vegetables- General concepts and principles. Vol I & II.

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-A

Paper VIII A(2) - Post-harvest Management and value addition of horticultural crops

Total hours of teaching 30 hrs @ 2 hrs per week

Practical schedule

1. Guidelines for establishing fruit and vegetable processing unit- FSSAI standards
2. Preliminary processing of fruits
3. Determination of total soluble solids
4. Preparation of fruit beverages (squash/ syrup/ RTS beverage)
5. Cashew apple processing
6. Preparation of fruit jam
7. Preparation of guava jelly
8. Grape wine preparation
9. Preparation of pickle
10. Tomato processing
11. Visit to processing units of horticultural crops, familiarization with different processed products from spices and plantation crops

Practical Model Paper

1. Preparation of fruit products	20 Marks
2 .Project report on farm visit	10 Marks
3. Interview schedule	10 Marks
4. Record & Viva	10 Marks

	Total = 50 Marks

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-A

Paper VIII A(3) - ANIMAL HUSBANDRY

Total hours of teaching 45 hrs @ 3 hrs per week

Unit – I (9 hrs)

1.Introduction -Role of Livestock in Indian Agriculture- Livestock census
2. Definition of Breed – Classification of indigenous and exotic cattle Breed- characteristics of Sindhi, Kangayam, Kankrej, Jersey, Holstein Friesian, Brown Swiss, Murrah and Surti.

Unit – II (9 hrs)

1. Physical examination of milk and Determination of Specific gravity
2. Determination of Fat percentage, Total solids, Solid Not Fat
3. Legal standards of milk, Determination of adulterants in milk

Unit – III (9 hrs)

1. Common cattle feeds and their classification
2. Care &management of pregnant cow Gestation period in different species
3. Care and management of new born calf, Milk definition, Composition of milk

Unit – IV (9 hrs)

1. Factors affecting milk yield and composition, Clean milk production
2. Preservation of milk – Pasteurization and other methods.
3. Nutrition–definition, Ration Balanced ration Requirement and importance of green fodder

Unit – V (9 hrs)

1. Swine husbandry – common breeds
2. Poultry Definition, Introduction of systems of poultry rearing, Brooding and rearing of chicks
3. Rearing of growers and layers, Broiler rearing, Common diseases symptoms and Vaccination schedule for poultry.

Suggested Readings

1. Banerjee, G.C. 1998. The Text Book of Animal Husbandry. Oxford and IBH Publishing, Calcutta
2. Gopalakrishnan, C.A. and Lal, D.M.M., 1992. Livestock and Poultry Enterprises for Rural Development. Vikas Publishing House Private Limited,Ghaziabad, U.P.,
3. ICAR. 2001. A Hand Book of Animal Husbandry. Indian Poultry Industry Year Book 1998. A25 Priyadarshini Vihar, DELHI.
4. Kadirvel, R. and Balakrishnan, V. 1998. Hand Book of Poultry Nutrition. Madras Veterinary College, TANUVAS, Chennai 7.
5. Maynard, C. and Loosli, S. 1989. Animal Nutrition. Tata Mc Graw Hill Publishing Company Limited, New delhi.
6. Prabakaran, R. 1998. Commercial Chicken Production. Publisher P.Saranya, 5/2, Ramalingam Street, Seven Wells, Chennai1.
7. Sastry, N.S.R., Thomas, C.K. and Singh, R.A. 1982. Farm Animal Management and Poultry Production. Vikas Publishing House Private Limited, Ghaziabad, Uttar Pradesh.
8. Sukumar De. 1980. Outlines of Dairy Technology. Oxford University Press, Delhi.
9. Sharma. R.P., Chatterjee, R.N., Rama Rao, S.V. and Sharma. S.R, 2008. Poultry production in India. Directorate of Information and Publication of Agriculture, Indian Council of Agriculture Research,New Delhi.
10. Watter, H.P. and Robert, H.G. 2001. Livestock Production. Green World Publications, Indira Nagar, Lucknow

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-A

Paper VIII A(3) - ANIMAL HUSBANDRY

Practical schedule

Total hours of teaching 30 hrs @ 2 hrs per week

1. Body parts of cow
2. Identification of animals
3. Instruments used in Animal Husbandry practices 123
4. Ageing of cattle
5. Housing of Cattle
6. Milking of animals
7. Physical examination of milk and Determination of Specific gravity
8. Legal standards of milk, Determination of adulterants in milk
9. Common cattle feeds and their classification
10. Body parts and Handling of birds
11. Classification of Poultry
12. Visit to poultry farm

Practical Model Paper

1. Identification of cattle feeds	20 Marks
2 .Project report on farm visit	10 Marks
3. Identification of instruments	10 Marks
4. Record & Viva	10 Marks

	Total = 50 Marks

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-B

Paper VIII B(1) - GENETICS AND PLANT BREEDING

Total hours of teaching 45 hrs @ 3 hrs per week

Unit – I (9 hrs)

1. History, concept and role of plant breeding, Achievements & future prospects of plant Breeding.
2. Modes of reproduction – Sexual and asexual, Apomixis - classification & Significance
3. Self Incompatibility –types and applications in crop improvement

Unit – II (9 hrs)

1. Male sterility –types and utilization in crop improvement
2. Plant genetic resources – conservation and utilization
3. Centers of origin and diversity, Acclimatisation and domestication

Unit – III (9 hrs)

1. Systems of mating –Random and non random-Genetic basis and methods of breeding suited to SP & CP plants
2. Introduction as a breeding method
3. Components of variability , heritability and genetic advance

Unit – IV (9 hrs)

1. Selection – Mass, Pure line and maternal selections – pure line theory Combination breeding – objectives and types - handling of segregating generations
2. Back cross breeding – advantages and methodology – multiline concept
3. Heterosis breeding – features and theories of Heterosis - estimation of heterosis

Unit – V (9 hrs)

1. Exploitation of hybrid vigour, development of inbred lines and their evaluation – inbreeding depression-Types of hybrids - Single cross, three way and double cross hybrids, synthetics and composites
2. Concepts of population genetics and Hardy Weinberg law
3. Population improvement - different types of recurrent selection schemes

Suggested Readings

1. Acquaah, G. 2007. Principles of Plant Genetics & Breeding. Blackwell Publishing Co., New Delhi.
2. Allard, R.W. 1981. Principles of Plant Breeding. John Wiley & Sons, New York.
3. Chopra, V. L. 2004. Plant Breeding. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
4. Gupta, S. K. 2005. Practical Plant Breeding. Agribios, Jodhpur.
5. Roy, D. 2003. Plant Breeding, Analysis and Exploitation of Variation. Narosa Publishing House Pvt. Ltd., New Delhi.
6. Sharma, J. R. 2001. Principles and Practice of Plant Breeding. Tata McGraw-Hill Publishing Co. Pvt. Ltd., New Delhi.
7. Simmonds, N.W. and Smartt, J. 2014. Principles of Crop Improvement. Wiley India Pvt. Ltd., New Delhi.
8. Singh, B. D. 2014. Plant Breeding- Principles and Methods. Kalyani Publishers, Ludhiana.
9. Singh, P. 2002. Objective Genetics and Plant Breeding . Kalyani Publishers, Ludhiana.
10. Singh, P. 2006. Essentials of Plant Breeding. Kalyani Publishers, Ludhiana.
11. Singh, P. and Narayanam, S. S. 2009. Biometrical Techniques in Plant Breeding (4th Ed.). Kalyani Publishers, Ludhiana.
12. Singh, S. and Pawar, I. S. 2006. Genetic Bases and Methods of Plant Breeding. CBS Publishers, New Delhi.

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-B

Paper VIII B(1) - GENETICS AND PLANT BREEDING

Total hours of teaching 30 hrs @ 2 hrs per week

Practical schedule

1. Plant Breeder's kit, Study of germplasm of various crops
2. Floral biology of self pollinated crops like rice, cowpea etc
3. Floral biology of cross pollinated crops like maize, coconut etc
4. Emasculation & Hybridization techniques in various self and cross pollinated crops
5. Study of male sterility system in crops and consequences of inbreeding
6. Field layout of experiments, Data collection

Practical Model Paper

1. Field layout of experiments, Data collection	20 Marks
2. Emasculation	20 Marks
3. Record & Viva	10 Marks

Total =	50 Marks

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-B

Paper VIII B(2) - Organic Farming and Sustainable Agriculture

Total hours of teaching 45 hrs @ 3 hrs per week

Unit – I (9 hrs)

Concept of organic farming

1. Introduction: Farming, organic farming, concept and development of organic farming.
2. Principles of organic farming, Types of organic farming, Biodynamic farming
3. Benefits of organic farming Need for organic farming, Conventional farming v/s organic farming
4. Scope of organic farming; Andhra Pradesh, national and international status
5. Agencies and institutions related to organic agriculture
6. Requirements for organic farming, Farm components for an organic farm

Unit – II (9 hrs)

Organic plant nutrient management

1. Organic farming systems, Soil tillage, Land preparation and mulching
2. Choice of varieties
3. Propagation-seed, planting materials and seed treatments, Water management
4. Green manuring, Composting- principles, stages, types and factors, Composting methods, Vermicomposting
5. Bulky organic manures, Concentrated organic manures, Organic preparations, Organic amendments and sludges, biogas
6. Bio-fertilizers- types, methods of application, advantages and disadvantages, Standards for organic inputs- fertilizers

Unit – III (9 hrs)

1. Plant protection- cultural, mechanical, botanical pesticides,control agents
2. Weed management
3. Standards for organic inputs- plant protection

Unit – IV (9 hrs)

Organic crop production practices

1. Organic crop production methods- rice, coconut
2. Organic crop production methods- vegetables- okra, amaranthus, cucurbits
3. Livestock component in organic farming

Unit – V (9 hrs)

Organic Certification

1. Farm economy: Basic concept of economics- Demand, supply, Economic Viability of a farm.
2. Basic production principles, Reducing expenses, ways to increase returns, Cost of production system. Benefit/ cost ratio, Marketing, Imports and exports
3. Policies and incentives of organic production.
4. Farm inspection and certification
5. Conversion to organic farming, Process
6. Income generation activities: Apiculture, Mushroom production, Terrace farming.

Suggested Readings

1. Dahama AK. 2005. Organic Farming for Sustainable Agriculture. 2nd Ed. Agrobios.
2. Gehlot G. 2005. Organic Farming; Standards, Accreditation Certification and Inspection. Agrobios.
3. Palaniappan SP & Annadorai K. 2003. Organic Farming, Theory and Practice. Scientific Publ.
4. Pradeepkumar T, Suma B, Jyothibhaskar & Satheesan KN. 2008. Management of Horticultural Crops. New India Publ. Agency.
5. Shivashankar K. 1997. Food Security in Harmony with Nature. 3rd IFOAMASIA, Scientific Conf.. 1- 4 December, 1997, UAS, Bangalore.

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-B

Paper VIII B(2) - Organic Farming and Sustainable Agriculture

Total hours of teaching 30 hrs @ 2 hrs per week

Practical schedule

1. Study of different organic materials
2. Preparation of enriched Farm Yard Manure
3. Study of composting methods
4. Preparation of vermin- compost
5. Study of recycling of farm waste
6. Study of green manuring
7. Visit to urban waste recycling unit
8. Study of bio fertilizer

Practical Model Paper

1. Visit to urban waste recycling unit	20 Marks
2. Study of different organic materials (Project)	20 Marks
3. Record & Viva	10 Marks

Total =	50 Marks

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-B

Paper VIII B(3) - SOCIAL AND FARM FORESTRY

Total hours of teaching 45 hrs @ 3 hrs per week

Unit – I (9 hrs)

1. Role of forests – productive role – food, fuel, clothing, shelter, timber and non- timber forest produce and protective role – climate amelioration, soil and water conservation, habitat for wildlife, purification of atmosphere.
2. Status of Indian forests – Comparison with other countries, National forest Policy, 1988
3. Agroforestry – definition – different terminologies – components – distinction between agroforestry and social forestry. Benefits and constraints of agroforestry

Unit – II (9 hrs)

1. Classification of agroforestry systems on structural, functional, socio- economic and ecological basis
2. Agrisilvicultural systems – improved fallow species in shifting cultivation, taungya system, multi species tree garden, alley cropping, multi purpose trees and shrubs on farmlands, crop combinations with plantation crops, fuel wood plantations
3. Shelter belts, wind breaks, soil conservation hedges

Unit – III (9 hrs)

1. Silvipastural system – protein bank, live fence of fodder and hedges and trees and shrubs on pasture
2. Agrisilvipastural systems – homestead, woody hedgerows for browse, mulch, green manure, soil conservation – other systems
3. Planning in agroforestry – Diagnosis and Design

Unit – IV (9 hrs)

1. Agroforestry systems for seven agro climatic zones in Andhra Pradesh
2. Role of trees in soil fertility – Economics of agroforestry
3. Community forestry – evolution of social forestry concepts – Social forestry in Andhra Pradesh, Interface forestry – JFM, TAP

Unit – V (9 hrs)

1. Wasteland development – definition – extent and classification. Suitable trees for problem soils – planting technique for wastelands. Trees in soil and water conservation. Afforestation for sand dune stabilization, mine burden, coastal and hilly areas
2. Silvicultural practices for Teak, Eucalyptus and Tamarind
3. Silvicultural practices for Ailanthus, Neem, Pungam and Prosopis

Suggested Readings

1. Shepherd, G. & J. Stewart. 1988. Poor people's forestry. Appropriate Technology 15(1):1-4.
2. Winterbottom, R. & P.T. Hazelwood. 1987. Agroforestry and sustainable development: making the connection. AMBIO 16(2/3):100-110.
3. Moench,M. and J. Bandyopadhyay. 1986. People--forest interaction: a neglected parameter in Himalayan forest management. Mountain Research and Development 6(1):3-16.
4. Bainbridge, D.A. 1985. The rise of agriculture: a new perspective. AMBIO 14(3):148-151.
5. Gómez-Pompa, A. & D.A. Bainbridge. 1991. Tropical forestry as if people mattered. In: A.E. Lugo & C. Lowe. (eds.). A Half Century of Tropical Forest Research. Springer-Verlag.
6. Bainbridge, D.A. 1987. Agroforestry and the need for institutional reform. Cookstove News 7(3):9-20.
7. Labelle, R. 1987. Agroforestry: General Concepts, Early Work and Current Initiatives --A Review of the Literature. International Council for Research in Agroforestry. Nairobi, Kenya.
8. Chowdry, K. 1984. Agroforestry, the rural poor and institutional structures. pp. 11-19. In: J. K. Jackson (ed.). Social, Economic and Institutional Aspects of Agroforestry. United Nations University, Tokyo, Japan

III B.Sc SEMESTER-VI Agriculture

Cluster Elective-B

Paper VIII B(3) - SOCIAL AND FARM FORESTRY

Total hours of teaching 30 hrs @ 2 hrs per week

Practical schedule

1. Study of Status of Indian forests – Comparison with other countries
2. Planting of Fruit trees in the college campus and road side area near the college.
3. Study of Agrisilvicultural systems (Project)
4. Preparation of charts regarding afforestation

Practical Model Paper

1. Preparation of charts	20 Marks
2. Survey of Trees in the campus	20 Marks
3. Record and Viva	10 Marks

	Total = 50 Marks

ACHARYA NAGARJUNA UNIVERSITY

B.SC. AGRICULTURE.

V- Semester

Paper VI (Compulsory)

DRYLAND FARMING & WATERSHED MANAGEMENT

Time:3Hrs Max.Marks:75

SECTION-A

Answer any **Five** questions. Each question carries 5 marks. **5 x 5= 25M**

1. Rain-fed farming
2. Soil parameters with reference to rainfall characteristics
3. Environment and water availability
4. Adaptations to drought condition
5. Suitable crop plants for dry land areas
6. Seeding and efficient fertilizer use
7. Conservation tillage
8. Watershed management approaches

SECTION-B

Answer **ALL** questions. Each question carries 10 marks. **5 x 10= 50M**

9 (a). Define dry land farming and add a note on its characteristic features.

(OR)

(b). Write the comparative account on dry land and rain-fed farming in Indian agriculture.

10 (a). Discuss various types of drought and constraints limiting crop production in dry land areas.

(OR)

(b). Give an account on crop planning for erratic and aberrant weather conditions in dry land areas.

11 (a). Discuss various drought management strategies and add a note on mid contingent plan for aberrant weather conditions.

(OR)

(b). Write an essay on stress physiology and resistance to drought.

12(a). Write an essay on cultivation of Mango and Aonla

(OR)

b). Write an account on cultivation of any two tropical tuber crops.

13(a). Write an essay on plant growth regulators.

(OR)

(b). Discuss postharvest problems and basic preservation methods for horticultural crops.

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ACHARYA NAGARJUNA UNIVERSITY

B.SC. AGRICULTURE V- Semester

Paper V (Compulsory)

FUNDAMENTALS OF HORTICULTURE & PRODUCTION TECHNOLOGY OF FRUIT CROPS

Time:3Hrs Max.Marks:75

SECTION-A

Answer any **Five** questions. Each question carries 5 marks. **5 x 5= 25M.**

1 .Importance of horticulture
2. Digging and filling of pits
3. Types of orchards
4. Weed management
5. Litchi cultivation
6. Fruiting habits in horticultural crops
7. Unfruitfulness
8. Cropping systems in horticulture

SECTION-B

Answer **ALL** questions. Each question carries 10 marks. **5 x10= 50M.**

9 (a). Write an essay on horticultural zones in India and add a note on classification of horticultural plants.

(OR)

(b). Discuss the present status of horticulture in India with special reference to production and EXIM trade.

10 (a). Write an essay on planning of orchards establishment and layout systems.

(OR)

(b). Discuss the soil and climatic conditions in India for horticultural crops.

11(a). Give a brief account on pruning and training of horticultural plants.

(OR)

(b). Write the critical note on nutrient management in horticultural crops.

12(a). Write an essay on cultivation of Mango and Aonla

(OR)

b). Write an account on cultivation of any two tropical tuber crops.

13(a). Write an essay on plant growth regulators.

(OR)

(b). Discuss postharvest problems and basic preservation methods for horticultural crops.

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