

Syllabus
B. Sc. (Ag) Hons. Part-III, Semester-II
Agriculture University, Jodhpur

Courses & Credits

Course No.	Course Title	Credits
AGRON-4321	Practical crop production II (Rabi crops)	1(0+1)
PBG-4321	Principles of Seed Technology	3(2+1)
EXTED-4321	Extension Methodologies for Transfer of Agricultural Technology	2(1+1)
LPM-4321	Livestock Production and Management	3(2+1)
ENVS-4321	Environmental Science*	3(2+1)
AGRON-4322	Farming Systems, Sustainable Agriculture and Organic farming	3(2+1)
HORT-4321	Post harvest management and value addition of fruits and vegetables	3(2+1)
PPATH-4321	Disease of Horticultural crops and their management	2(1+1)
AECON-4321	Fundamentals of Agri. Business Management	2(1+1)
	Total	22(13+9)

*Shall be shared between Biochemistry, Entomology and Soil Science



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AGRON- 4321

Practical Crop Production –II (Rabi)

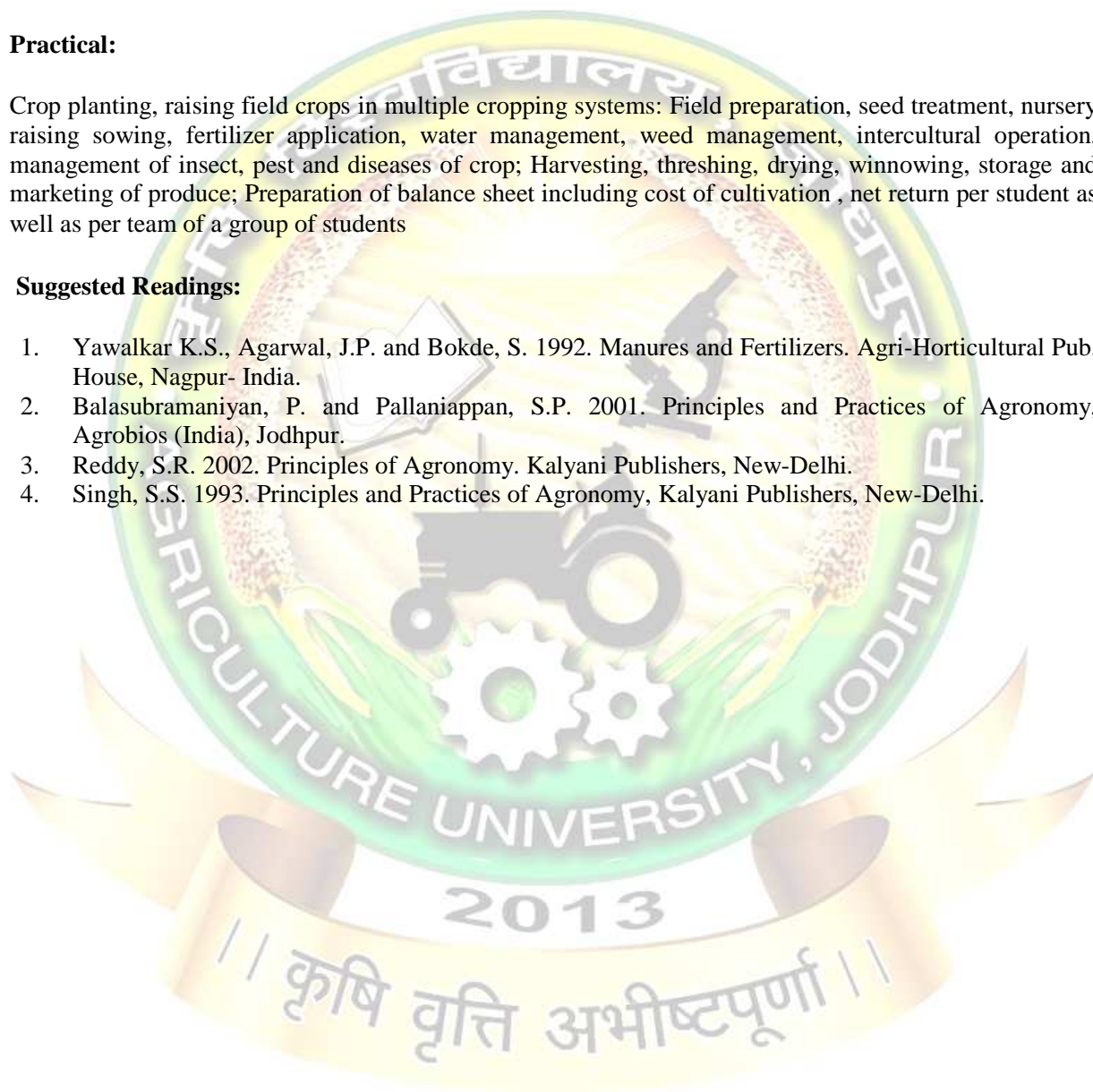
1(0+1)

Practical:

Crop planting, raising field crops in multiple cropping systems: Field preparation, seed treatment, nursery raising sowing, fertilizer application, water management, weed management, intercultural operation, management of insect, pest and diseases of crop; Harvesting, threshing, drying, winnowing, storage and marketing of produce; Preparation of balance sheet including cost of cultivation , net return per student as well as per team of a group of students

Suggested Readings:

1. Yawalkar K.S., Agarwal, J.P. and Bokde, S. 1992. Manures and Fertilizers. Agri-Horticultural Pub. House, Nagpur- India.
2. Balasubramanian, P. and Pallaniappan, S.P. 2001. Principles and Practices of Agronomy, Agrobios (India), Jodhpur.
3. Reddy, S.R. 2002. Principles of Agronomy. Kalyani Publishers, New-Delhi.
4. Singh, S.S. 1993. Principles and Practices of Agronomy, Kalyani Publishers, New-Delhi.



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AGRON—4322 Farming Systems, Sustainable Agriculture and Organic Farming

3(2+1)

Theory:

Sustainable agriculture: definition, current concept ; Factors affecting ecological balance and ameliorative measures; Land degradation and conservation of natural resources; Low external input agriculture (LEIA) & high external input agricultural (HEIA); Irrigation problems; Waste lands and their development; Differences between conventional and sustainable agricultural systems; Organic farming: definition, principles , components and relevance in present context; Organic production requirements; Biological intensive nutrient management-organic manures, vermicomposting, green manuring, recycling of organic residues, biofertilizers; Soil amendments; Integrated diseases and pest management – use of biocontrol agents, biopesticides, pheromones, trap crops, bird perches; Organic produce: quality considerations, certification, and accreditation; Farming systems: definition, principles and components, Intergrated farming system (I F S) models for wetland, irrigated dryland and dryland situations.

Practical:

Preparation of cropping scheme for irrigated situations; Preparation of cropping scheme for dryland situations; Study of existing farming systems in nearby villages; Preparation of integrated farming system model for wetlands; Preparation of integrated farming system model for drylands; Preparation of enriched Farm Yard Manure; Preparation of Vermicompost; Study of profitable utilization of agricultural wastes; Visit to poultry and dairy units to study resource allocation, utilization and economics; Visit to an organic farm to study various components and utilization; Manurial requirement through vermicompost, FYM and poultry manure based on major nutrients; Estimation of organic carbon in organic manures; Technique for treating legume seed with *Rhizobium* and use of *Azotobactor* , *Azospirillum* and PSB in field crops ; Sustainable yield index and sustainable value index ; Productivity index of some important cropping sequences ; Raising of crops organically.

Suggested Readings:

1. Panda, S.C. 2004. Cropping Systems and Farming Systems, Agrobios (India), Jodhpur.
2. Sharma, Arun K. 2002. A Handbook of Organic Farming, Agrobios (India) Ltd., Jodhpur.
3. Balasubramanian, P. and Palaniappan, S.P. 2004. Principles and Practices of Agronomy, Agrobios (India) ,Jodhpur.
4. Shukla, Rajeev K. 2004. Sustainable Agriculture, Surbhee Publications, Jaipur.
5. Palaniappan, SP. 1985. Cropping Systgems in the Tro;ics : Principles and Management, Wiley Easter Ltd. And TNAU, Ciombatore.
6. Reddy, S.R. 2004. Principles of Agronomy, Kalyani Publishers, Ludhiana.
7. Palaniappan, S.P. and Sivraman, K. 1996. Cropping system in Tropics, International Pvt. New-Delhi.
8. Dahama, A.K. 1999. Organic Farming, Agro Botanica, Bikaner.
9. Sharma, Arun K. 2002. A Handbook of Organic Farming, Agrobios (India) , Jodhpur.
10. Palaniappan, S.P. and Anandurai, K. 1999. Organic Farming- Theory and Practice, Scientific Pub. Jodhpur.
11. Thapa, U and Tripathy, P. 2006. Organic farming In India: Problems and Prospects, Agrotech, Publishning Academy, Udaipur.
12. Gautam , R.C. and Singh, Punjab 1997. Tikau Kheti , Bhartia Krishi Anusandhan Parishad, New-Delhi.
13. Sharma, Arun , K. 2005 . Gevik Kheti- Sindant , Taknik and Upyogita. Agrobios, Jodhpur.

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PBG- 4321

Principles of Seed Technology

3(2+1)

Theory:

Importance of improved seed in agriculture. Seed technology – definition, objective, relationship with other sciences. Seed quality - definition, characters of good quality seed and classes of seed. Seed policy, Seed demand forecasting and planning for certified, foundation and breeder seed production. Deterioration of crop varieties, factors affecting deterioration and their control; Maintenance of genetic purity during seed production. Steps involved in development of seed programme and seed multiplication. Production of nucleus & breeder seed, Maintenance and multiplication of pre-release and newly released varieties in self-and cross-pollinated crops. Seed Production - foundation and certified seed production of maize, bajra, sorghum (hybrids, synthetics and composites), rice, cotton, tomato and hybrids; chillies and cucurbits (varieties and hybrids): Seed production of wheat, barley, gram and rapeseed mustard. Seed certification, phases of certification, procedure for seed certification and field inspection, field counts. Seed Act 1966 and Seed Act enforcement, Central Seed Committee, Central Seed Certification Board, State Seed Certification Agency. Central and State Seed Testing Laboratories; Duties and powers of seed inspectors, offences and penalties. Seed control order : Seed Control Order 1983. Intellectual Property Rights, Patenting, WTO, Plant Breeders Rights and Farmer's Right. Seed Drying - Forced air seed drying, principle, properties of air and their effect on seed drying, moisture equilibrium between seed and air. Seed processing - planning and establishment of seed processing plant; air screen machine and its working principle, different upgrading equipment and their use. Principles of seed treatment Seed storage; stages of seed storage, factors affecting seed longevity during storage and conditions required for good storage, general principles of seed storage. Seed marketing - marketing structure, marketing organization.

Practical:

Seed sampling principles and procedures; Physical Purity analysis of Field and Horticultural crops; Moisture test Germination analysis and viability test of Field and Horticultural crops; Vigour tests of Field and Horticultural crops; KOH and NaOH test for varietal identification; Visit of GOT fields at University farms. Visit to Seed production plots of University Farms. Visit to Seed processing plant; Seed testing laboratories; Varietal identification in seed production plots; Planting ratios, Minimum seed certification standards of important crops in the vicinity.

Suggested Readings:

1. Agarwal, R.L. 1991. Seed Technology, Oxford & IBH Publishing Co. Delhi.
2. Agarwal, P.K. 1999. Seed Technology, ICAR, New Delhi.
3. Subir Sen and Nabinanda Ghosh. 1999. Seed Science and Technology. Kalyani Publishers.
4. Dhiredra Khare and Mohan S. Bhale. 2000. Seed Technology. Scientific Publishers (India), Jodhpur.
5. Maloo, S.R., Intodia, S.K. and Pratap Singh. 2008. Beej Pradyogiki. Agrotech Publishing Academy.
6. A.K. Joshi and B.D. Singh. Seed Technology. 2005. Kalyani Publishers. New Delhi.

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EXTED-4321 Extension Methodologies For Transfer of Agricultural Technology 2(1+1)

Theory:

Communication - Meaning, Definition, Models, Elements and their Characteristics, Barriers in Communication. Extension Programme Planning - Meaning, Definition of Planning, Programme, Project, Principles and Steps in Programme Planning Evaluation - Meaning, concept and types. Extension Teaching methods - Meaning, Definition and Classification. Individual contact methods – Farm and Home visit, Telephone call, E-mail. Group contact methods – Group discussion, Method and Result demonstrations; Small group discussion techniques – Lecture, Panel, Workshop, Syndicate group, Brain Storming, Seminar, Conference and Buzz group. Mass contact Methods- Campaign, Exhibition, Kisan Mela, Radio & Television -Meaning, Importance, steps, Merits & Demerits. Factors influencing in selection of Extension Teaching methods. Innovative Information sources – Internet, Cyber Cafes, Video and Tele conferences, Kisan call centers. Diffusion-Meaning, Definition and Elements. Adoption Process-Meaning, Stages, Innovation decision process, Adopter categories and their characteristics, Factors influencing adoption process.

Practical:

Organization of Group discussion and Method demonstration. Planning and Writing of scripts for Radio and Television. Preparation of selected audio-visual aids- Charts, Posters, Over Head Projector(OHP) Transparencies, Power Point Slides. Leaflet, Folder, Pamphlet, News Stories and Success Stories. Handling of Public Address Equipment (PAE) System, Still Camera, Video Camera and Liquid Crystal Display (LCD) Projector.

Suggested Readings:

1. Das Gupta, S. 1989. Diffusion of agricultural Innovation in Indian Villages, Wiley Eastern Ltd., New Delhi.
2. Kumar, K.J. 2000. Mass Communication in India, Jaico Publishing House, 121 Mahatama Gandhi Road, Mumbai.
3. Mathur, K.B. 1994. Communication for Development & Social change, Allied Publisher Ltd., New Delhi.
4. Rogers, E.M. and Shoemaker, F.F. 1971. Communication of Innovations – A Cross cultural Approach, The Free Press, New York.
5. Sandhu, A.S.1993. Text book on Agricultural Communication : Process & Method, Oxford & IBH Publishing Co, Pvt. Ltd. New Delhi.
6. Reddy, A.A. 1993. Extension Education, Shri Laxmi Press, Bapatala.

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LPM-4321

Livestock Production and Management

3(2+1)

Theory:

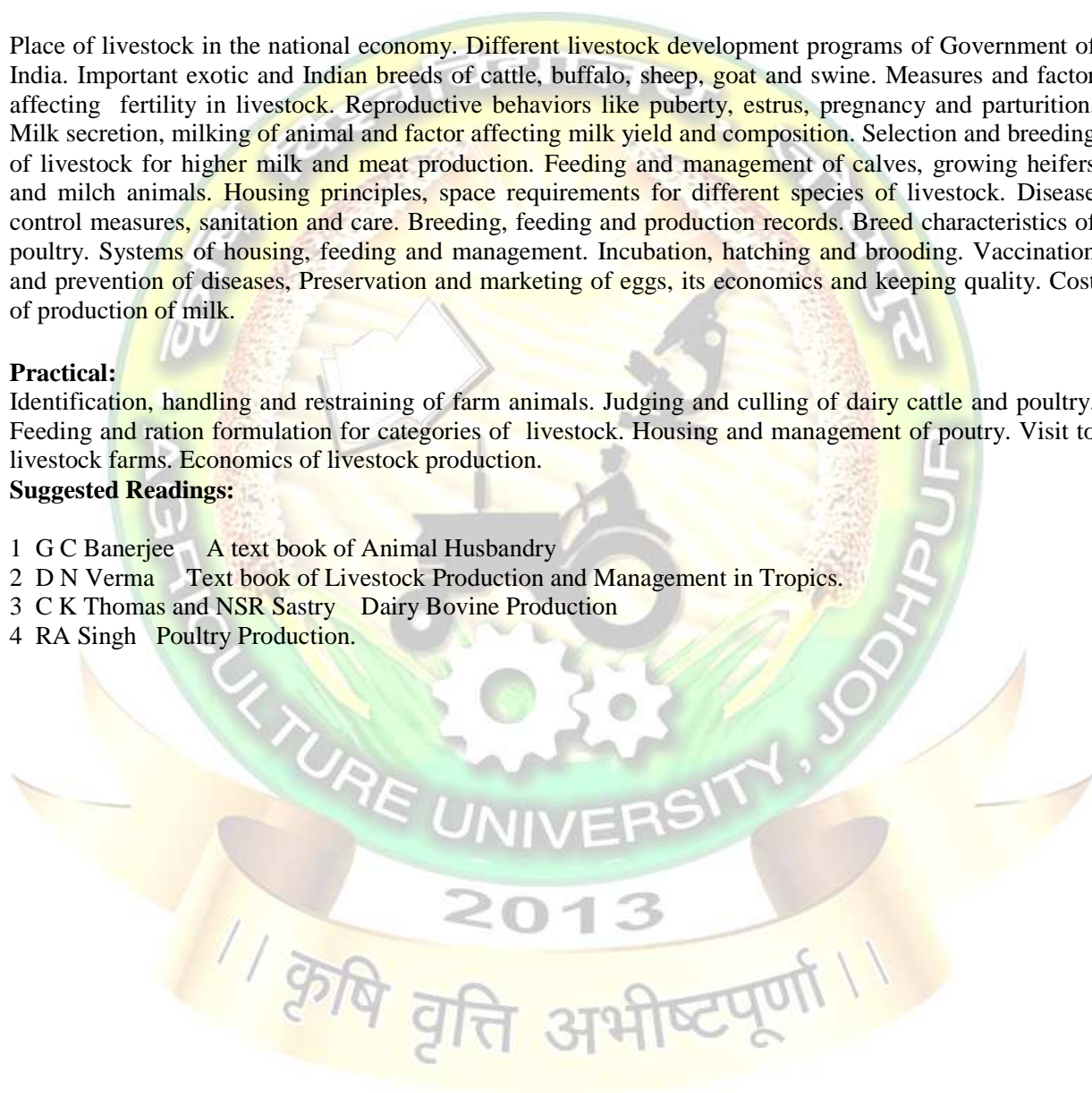
Place of livestock in the national economy. Different livestock development programs of Government of India. Important exotic and Indian breeds of cattle, buffalo, sheep, goat and swine. Measures and factor affecting fertility in livestock. Reproductive behaviors like puberty, estrus, pregnancy and parturition. Milk secretion, milking of animal and factor affecting milk yield and composition. Selection and breeding of livestock for higher milk and meat production. Feeding and management of calves, growing heifers and milch animals. Housing principles, space requirements for different species of livestock. Disease control measures, sanitation and care. Breeding, feeding and production records. Breed characteristics of poultry. Systems of housing, feeding and management. Incubation, hatching and brooding. Vaccination and prevention of diseases, Preservation and marketing of eggs, its economics and keeping quality. Cost of production of milk.

Practical:

Identification, handling and restraining of farm animals. Judging and culling of dairy cattle and poultry. Feeding and ration formulation for categories of livestock. Housing and management of poultry. Visit to livestock farms. Economics of livestock production.

Suggested Readings:

- 1 G C Banerjee A text book of Animal Husbandry
- 2 D N Verma Text book of Livestock Production and Management in Tropics.
- 3 C K Thomas and NSR Sastry Dairy Bovine Production
- 4 RA Singh Poultry Production.



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ENVS- 4321

Environmental Science

3(2+1)

Theory:

Scope and importance of environmental studies and biological chemistry. Renewable resources : Forest, Water, Food, energy and land - various environmental cycles viz. carbon, nitrogen and water etc. Energy flow in the ecosystem : concept of photosynthesis and respiration. Woman and child welfare – food, balance diet, vitamins and minerals etc. HIV/AIDS – viruses and nucleic acids, modification and propagation. Role of information technology on environment and human health – nutrition/malnutrition in communities. Concept of biological processing of industrial wastes. *

Ecology : Definition and scope. Ecosystems: Definition, types, concept, structure, functions, components and food pyramids. Producers, consumers and decomposers of an ecosystem. Bio-diversity: Definition, classification, threats to biodiversity and its conservation. The Environment Protection Act, The Air Act, The water Act, The Wildlife Protection Act and Forest Conservation Act.**

Environmental pollution: Causes, effects and control of air, water, soil, thermal, noise and marine pollution. Causes, effects and management of soil nuclear hazards and industrial wastes.***

Practical:

Estimation of chlorophyll content of fresh water/sea water ecosystem. Study of transpiration and water balance in plants. Estimation of ascorbic acid (Vitamin C). Community survey for nutritional health status. Estimation of proline as stress indicator in plants. *

Estimation of pesticide contamination in Agro-Ecosystem. Determination of sound level by using sound level meter. Estimation of respirable and non respirable dust in the air by using portable dust sampler. Estimation of species abundance of plants. Visit to ecosystems and study of biodiversity. **

Collection, processing and storage of effluent samples; Determination of Bio-Chemical oxygen demand (BOD) in effluent sample; Determination of chemical oxygen demand (COD) in effluent sample; Estimation of dissolved oxygen in effluent samples; Determination of total dissolved solids (TDS) in effluent samples; Estimation of nitrate contamination in ground water. Analysis of temporary and total hardness of water sample by titration. Determination of heavy metals in sewage and sludge. ***

***Bio chemistry ** Entomology *** Soil science**

Suggested Readings:

1. Bamanayha B.R., Verma, L.N. and Verma A (2005). Fundamentals of Environmental Sciences, Yash Publishing House, Bikaner
2. Dhaliwal G.S., Sangha G.S. and Ralhan P.K. (2000) Fundamentals of Environmental Sciences, Kalyani Publishers, New Delhi
3. Odum E.P. and Barrett G.W.(2007) Fundamentals of Ecology, Brooks/Cole, Akash Press, New Delhi
4. Agrawal, K.C.(1999) Environmental Biology, Agro Botanica, Bikaner
5. Kumar, H.D.(1997) Modern concepts of Ecology, Vikash Publishing House Pvt. Ltd. New Delhi
6. Dhaliwal G.S., and D.S.Kley (2006) Principles of Agricultural Ecology. Himalyan Publishing house, Bombay
7. Brij Gopal, and N.Bhardwaj (2004) Elements of Ecology. Vikash Publishing House, Pvt. Ltd., New Delhi.
8. Fawler, F.B.(1961). Radioactive Fall out, Soils, Plants, Food, Man (Ed.) Elsevier Science, Netherland
9. Kudesta, V.P.(1990). Pollution Everywhere, Pragatgi Prakashan, Meerut
10. Nemeron, R.L.1976. Industrial Water Pollution. Addison Wesley
11. Page, R.A.I., Miller, H. and Keeney, D.R., (1992) Methods of Soil Analysis Part-2 (Ed.) American Soc. Agronomy Madison, Wisconsin, USA
12. Mishra, P.C.(2001). Soil pollution and Soil Organism, Ashish Publishing House, 8/81, Punjab Bagh, New Delhi – 110026.
13. Pathak, H.and Kumar, S.,(2003). Soil and Green House Effect, CBS Publishers and Distributors, 4596/1-A, 11, Dayaganj, New Delhi – 10002.

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HORT- 4321 Post Harvest Management and Value Addition of Fruits and Vegetables
3(2+1)

Theory:

Importance of post harvest technology in horticultural crops. Maturity indices, harvesting and post-harvest handling of fruits and vegetables. Classification of fruit crops on the basis of ripening and ripening process. Factors affecting ripening of fruits and vegetables. Pre-harvest factors affecting quality on post-harvest shelf-life of fruits and vegetables. Factors responsible for deterioration of harvested fruits and vegetables. Chemicals used for hastening and delaying ripening of fruits and vegetables. Primary processing of fruits and vegetables. Methods of storage – pre-cooling, pre-storage treatments, low temperature storage, controlled atmospheric storage, hypobaric storage, irradiation and low cost storage structures. Various methods of packing, packaging materials and transport. . Importance and scope of fruit and vegetable preservation in India. Principles of preservation by heat, low temperature, chemicals and fermentation. Unit layout – selection of site and precautions for hygienic conditions of the unit. Preservation through canning, bottling, freezing, dehydration, drying, ultraviolet and ionizing radiations. Preparation of jams, jellies, marmalades, candies, crystallized and glazed fruits, preserves, chutneys, pickles, ketchup, sauce, puree, syrups, juices, squashes and cordials Spoilage of canned products, biochemical, enzymatic and microbial spoilage. Laws prohibiting processed fruit and vegetables food adulteration in India.

Practical:

Practice in judging the maturity of various fruits and vegetables. Construction of zero energy cool chambers for on farm storage. Determination of physiological loss in weight (PLW), total soluble solids (TSS), total sugars, acidity and ascorbic acid content in fruits and vegetables. Effect of ethylene on ripening of banana, sapota and mango. Identification of equipment and machinery used in preservation of fruits and vegetables. Preservation by drying and dehydration. Preparation of jam, jelly and marmalades. Preparation of squash, cordials and syrups. Preparation of chutneys, pickles, sauces and ketchup. Visit to processing units, market yards, cold storage units and packing industries.

Suggested Readings:

1. Srivastava, R. P. and Kumar, S. (2007). Fruits and Vegetables Preservation. Principle and Practices. International Book Distributing Comp., Lucknow
2. Lal, G., Siddapa, G.S. and Tandon, G.L. (1967). Fruit and vegetable Preservation in India. ICAR, New Delhi
3. Nair, S.S. And Sharma, H.C. (2006). Phal Tarkari Parikshan Praydhogiki. Rajasthan Hindhi Granth Academy, Jaipur

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P.PATH. 4321

Diseases of Horticultural Crops and Their Management

2(1+1)

Theory:

Economic importance, symptoms, etiology, disease cycle and management of diseases of **citrus** (canker, dieback); **mango** (malformation and black tip); **banana** (panama wilt and sigatoka); **grapevine** (downy mildew and anthracnose); **pomegranate** (bacterial blight); **papaya** (foot rot and ring spot); **guava** (wilt and Zn deficiency); **apple** (scab); **ber** (powdery mildew); **potato** (late blight and black heart); **tomato** (early blight and leaf curl); **chilli** (anthracnose); **brinjal** (Phomopsis blight and little leaf disease); **bhindi** (yellow vein mosaic); **pea** (powdery mildew); **cabbage** (black rot); **cucurbits** (downy mildew); **onion** (purple blotch); **ginger** (rhizome rot) and **rose** (powdery mildew).

Practical:

Study of symptoms, etiology, host-parasite relationship and control measures of diseases of citrus, mango, grapevine, pomegranate, papaya, guava, ber, potato, tomato, chilli, brinjal, bhindi, pea, onion. Field visits at orchards and vegetable fields during the semester.

Note: Student should submit at least 25 pressed well mounted disease specimens.

Suggested Readings:

- 1 Gupta, S.K. and Thind, T.S. 2006. Disease problems in vegetable production. Scientific Publishers, Jodhpur.
- 2 Mehrotra, R.S. and Aggarwal, A. 2007. Plant Pathology(2nd.ed.) Tata McGraw-Hill Publishing Co Ltd., New Delhi.
- 3 Pathak, V.N. 1980. Diseases of fruit crops. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
- 4 Godara, S.L., Kapoor, B.B.S. and Rathore B.S. 2010. Disease Management of Spice Crops. Madhu Publications. Bikaner (Raj.).
- 4 Rangaswamy, G. and Mahadevan, A. 2001. Diseases of crop plants in India. Prentice Hall of India Pvt Ltd., New Delhi.
- 5 Singh, R.S. 2006. Diseases of fruit crops. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
- 6 Singh, R.S. 1994. Diseases of vegetable crops. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
- 7 Singh, R.S. 2007. Plant Diseases. (8th.ed) Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.

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AGECON-4321 Fundamentals of Farm Business Management (Including Project Development, Appraisal and Monitoring) 2(1+1)

Theory

Agribusiness: Meaning, Definition, Structure of Agribusiness, (Input, Farm, Product Sectors). Importance of Agribusiness in the Indian Economy, Agricultural Policy. Agribusiness Management. Distinctive features, Importance of Good Management. Definitions of Management. Management Functions, Planning. Meaning, Definition, Types of Plans (Purpose or Mission, Goals or Objectives, Strategies, Policies, Procedures, rules, programmes, Budget) characteristics of sound plan, Steps in planning, Organisation. Staffing, Directing, Motivation, Ordering, Leading, Supervision, Communication, control. Capital Management. Financial Management of Agribusiness: Importance of Financial Statements, Balance sheet, Profit and Loss Statement, Analysis of Financial statements. Agro-based Industries: Importance and Need, Classification of Industries, Types of Agro-based Industries. Institutional arrangement, Procedure to set up agro-based industries, Constraints in establishing agro-based industries. Marketing Management: Meaning, Definitions. Marketing Mix. 4Ps of Marketing. Mix, Market segmentation, Methods of Market. Product life cycle. Pricing policy, Meaning, pricing method. Prices at various stages of Marketing. Project, definitions, project cycle. Identification, Formulation. Appraisal, Implementation. Monitoring and evaluation, Appraisal and Evaluation techniques, NPV, BCR, IRR, N/C ratio, sensitivity analysis. characteristics of agricultural projects: preparation of project reports for various activities in agriculture and allied sectors: Dairying, poultry, fisheries. agro-industries etc.

Practical:

Study of input markets: seed, fertilizers, pesticides. Study of output markets: grains, fruits, vegetables, flowers. Study of product markets: retail trade commodity trading, value added products. Study of financing institutions cooperatives commercial banks, RRBs. Agribusiness Finance Limited, NABARD: Preparations of projects. Feasibility reports; Project appraisal techniques: Case study of agro-based industries.

Suggested Readings:

1. C B Mamoria and Joshi. Principles and practice of Marketing in India
 2. S Subba Reddy and P Raghu Ram. Agricultural finance and Management.
 3. Kohls and Uhl. Marketing Agricultural Products.
 4. Kotler. Marketing Management.
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