

**Program:** B.Sc. (Hons.) Agriculture

**Semester:** Sixth

**Course:** Rainfed Agriculture and Watershed Management

**Course Code:** 13A.359

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1	0	2	2

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**Course Objective:**

- To learn about soil and water conservation techniques
- To manage crops in rainfed areas
- To demonstrate soil moisture conservation and water harvesting structures

**Unit I:**

Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershed in India; Problems and prospects of rainfed agriculture in India.

**Unit II:**

Soil and climatic conditions prevalent in rainfed areas; Soil and water conservation techniques, Drought: types, effect of water deficit on physio-morphological characteristics of the plants, Crop adaptation and mitigation to drought;

**Unit III:**

Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices, Management of crops in rainfed areas, Contingent crop planning for aberrant weather conditions

**Unit IV:**

Concept, objective, principles and components of watershed management, factors affecting watershed management.

**Practical:**

1. Studies on climate classification
2. Studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons.
3. Studies on cropping pattern of different rainfed areas in the country and demarcation of rainfed area on map of India.
4. Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops.
5. Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation.
6. Studies on cultural practices for mitigating moisture stress.
7. Characterization and delineation of model watershed.
8. Field demonstration on soil & moisture conservation measures.
9. Field demonstration on construction of water harvesting structures.
10. Visit to rainfed research station/watershed.

**Suggested Reading:**

1. S.R.Reddy, 1999. *Principles of Agronomy*. Kalyani Publishers, New Delhi.
2. T.Yellamanda Reddy and G.H.Sankara Reddi, 2010. *Principles of Agronomy*. Kalyani Publishers, New Delhi.
3. Reddy, S. R. and Prabhakar Reddy, G. 2015. *Dryland Agriculture*. Kalyani Publishers.
4. Arnon,I. 1972. *Crop Production in Dry Regions (Vol.I)*, Leonard Hill Pub. Co, London.
5. Dhruva Narayana, V.V., Sastry, G.S. and Patnaik, V.S. 1999. *Watershed Management in India*. ICAR, New Delhi.
6. Jeevananda Reddy,S.2002. *Dryland Agriculture in India: An agro-climatological and agro-meteorological perspective*. B S publications.

**Program:** B.Sc. (Hons.) Agriculture

**Semester:** Sixth

**Course:** Principles of Food Science and Nutrition

**Course Code:** 13A.360

L	T	P	C
2	0	0	2

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### Course Objective:

1. To familiarize with basic concepts of food science, processing, preservation
2. To understand concepts nutrition and nutritional disorders
3. To provide knowledge regarding menu planning and new trends in food science

### Unit I:

Concepts of Food Science (definitions, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems etc.); Food composition and chemistry (water, carbohydrates, proteins, fats, vitamins, minerals, flavours, colours, miscellaneous bioactives, important reactions)

### Unit II:

Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production of fermented foods)

### Unit III:

Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.)

### Unit IV:

Food and nutrition, Malnutrition (over and under nutrition), nutritional disorders; Energy metabolism (carbohydrate, fat, proteins); Balanced/ modified diets, Menu planning, New trends in food science and nutrition.

### Suggested Reading:

1. P.H.Pandey. *Principles & Practices of Post Harvest Technology*
2. D.V. Reedy. *Applied Nutrition*
3. Sumati R. Mudambi, Shalini M. Rao and M.V. Rajagopal. 2006. *Food Science, 2nd Ed. New Age International (P) Limited, New Delhi.*
4. Martin Eastwood. 2003. *Principles of Human Nutrition. Blackwell Science Ltd., Oxford.*
5. Norman N. Potter. 1998. *Food Science, 5th Ed. Springer Science+ Business Media, New York.*
6. Michael J. Pelczar Jr., E.C.S. Chan and Noel R. Krieg. 1998. *Microbiology, 5th Ed. Tata McGraw-Hill Education, New Delhi.*
7. William C. Frazier and Dennis C. Westhoff. 1987. *Food Microbiology, 4th Ed. Tata McGraw-Hill Education, New Delhi.*
8. L.E. Casida Jr. 1968. *Industrial Microbiology. New Age International Publishers, New Delhi.*
9. P. Fellows. 2000. *Food Processing Technology: Principles and Practice, 2nd Ed. CRC Press, Boca Raton, FL, USA.*
10. Marcus Karel and Darvl B. Lund. 2003. *Physical Principles of Food Preservation, 2nd Ed. Marcel Dekker, Inc., NY, USA.*

11. *Gerald Wiseman. 2002. Nutrition and Health. Taylor & Francis, London.*

**Program:** B.Sc. (Hons.) Agriculture

**Semester:** Sixth

**Course:** Diseases of Field & Horticultural Crops & their Management-II

**Course Code:** 13A.361

L	T	P	C
2	0	2	3

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### Course Objective:

- To understand the Symptoms, etiology, disease cycle and management of various field and horticultural crops
- To make student identify the disease and frame a viable management plan.

### Unit I:

Symptoms, etiology, disease cycle and management of following diseases:

Field Crops: Wheat: rusts, loose smut, karnal bunt, powdery mildew, *alternaria* blight, and ear cockle;

Sugarcane: red rot, smut, wilt, grassy shoot, ratoon stunting and Pokkah Boeng; Sunflower: Sclerotinia stem rot and *Alternaria* blight; Mustard: *Alternaria* blight, white rust, downy mildew and *Sclerotinia* stem rot; Gram: wilt, grey mould and *Ascochyta* blight; Lentil: rust and wilt; Cotton: anthracnose, vascular wilt, and black arm; Pea: downy mildew, powdery mildew and rust.

### Unit II:

Horticultural Crops: Mango: anthracnose, malformation, bacterial blight and powdery mildew; Citrus: canker and gummosis; Grape vine: downy mildew, Powdery mildew and anthracnose; Apple: scab, powdery mildew, fire blight and crown gall; Peach: leaf curl. Strawberry: leaf spot

### Unit III:

Potato: early and late blight, black scurf, leaf roll, and mosaic. Cucurbits: downy mildew, powdery mildew, wilt.

### Unit IV:

Onion and garlic: purple blotch, and *Stemphylium* blight; Chillies: anthracnose and fruit rot, wilt and leaf curl; Turmeric: leaf spot Coriander: stem gall Marigold: *Botrytis* blight; Rose: dieback, powdery mildew and black leaf spot

### Practical:

1. Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory.
2. Field visit for the diagnosis of field problems.
3. Collection and preservation of plant diseased specimens for herbarium.

### Suggested Reading:

1. Rangaswami, G & Mahadevan, K.2001. Diseases of crop plants in India, Prentice Hall of India Pvt.Ltd, New Delhi.
2. Singh, R.S.2005. Plant Diseases. Oxford & IBH Publications, New Delhi
3. Pathak, V.N.2001. Diseases of Fruit crops. Oxford & IBH Publications, New Delhi

4. Singh, R.S. 1999. *Diseases of Vegetable crops*. Oxford & IBH Publications, New Delhi
5. Chaube, H.S and V.S. Pundhir, 2012. *Crop Diseases & Their Management*. PHI Pvt.Ltd, New Delhi

**Program:** B.Sc. (Hons.) Agriculture

**Semester:** Sixth

**Course:** Post-harvest Management and Value Addition of Fruits and Vegetables

**Course Code:** 13A.362

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1	0	2	2

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### Course Objective:

- To raise awareness related to the major future prospects of agro-food processing industry
- To provide knowledge about the value addition of fruits/vegetables through different methods
- To impart practical skills related to preparation of value added products of fruits and vegetables

### Unit I:

Importance of post-harvest processing of fruits and vegetables, extent and possible causes of post harvest losses

### Unit II:

Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Harvesting and field handling.

### Unit III:

Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages.

### Unit IV:

Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. Canning -- Concepts and Standards, packaging of products.

### Practical:

1. Applications of different types of packaging, containers for shelf life extension.
2. Effect of temperature on shelf life and quality of produce.
3. Demonstration of chilling and freezing injury in vegetables and fruits.
4. Extraction and preservation of pulps and juices.
5. Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products.
6. Quality evaluation of products -- physico-chemical and sensory.
7. Visit to processing unit/ industry

### Suggested Reading:

1. P.H.Pandey. *Principles & Practices of Post Harvest Technology*
2. Amar Singh. *Fruit Physiology and Production*

3. Rathore, N.S., Mathur, G.K., Chasta, S.S. 2012. *Post-harvest Management and Processing of Fruits and Vegetables*. ICAR, New Delhi.
4. Srivastava, R.P. and Sanjeev Kumar. 2002. *Fruit and Vegetable Preservation: Principles and Practices*. International Book Distribution Company, Lucknow.
5. Giridharilal, G.S., Siddappa and Tondon, G.L. 2007. *Preservation of Fruits and Vegetables*. ICAR, New Delhi.
6. Mitra, S.K. 2005. *Post Harvest Physiology and Storage of Tropical and Subtropical Fruits*. CABI Publishers, Kolkatta.



**Program:** B.Sc. (Hons.) Agriculture  
**Semester:** Sixth  
**Course:** Management of Beneficial Insects  
**Course Code:** 13A.363

L	T	P	C
1	0	2	2

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### Course Objective:

- To learn the tangible and non-tangible benefits of insects and the significance of insects in rural economies.
- To design, implement, and manage an apiary or sericulture, and lac culture units as enterprises.
- Advise on proper production, harvesting and post-harvest handling techniques to ensure high quality hive and sericulture products.
- To learn the mass multiplication techniques of major bio-agents

### Unit I:

Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants.

### Unit II:

Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons. Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection.

### Unit III:

Species of lac insect, morphology, biology, host plant, lac production – seed lac, button lac, shellac, lac-products. Identification of major parasitoids and predators commonly being used in biological control.

### Unit IV:

Insect orders bearing predators and parasitoids used in pest control and their mass multiplication techniques. Important species of pollinator, weed killers and scavengers with their importance.

### Practical:

1. Honey bee species, castes of bees.
2. Beekeeping appliances and seasonal management
3. bee enemies and disease.
4. Bee pasturage, bee foraging and communication.
5. Types of silkworm, voltinism and biology of silkworm.
6. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves.  
Species of lac insect, host plant identification.
7. Identification of other important pollinators, weed killers and scavengers.

8. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies.
9. Identification and techniques for mass multiplication of natural enemies.

***Suggested Reading:***

1. Aruga H. 1994. *Principles of Sericulture*. Oxford & IBH, New Delhi.
2. B.Vasanta Raj. *Elements of Economic Entomology*
3. Atwal AS. 2006. *The World of the Honey Bee*. Kalyani Publ., New Delhi.
4. Ganga G. 2003. *Comprehensive Sericulture. Vol. II. Silkworm Rearing and Silk Reeling*. Oxford & IBH, New Delhi.
5. Partiban S & David BV. 2007. *Management of Household Pests and Public Health Pests*. Namratha Publ., Chennai.
6. Singh S. 1975. *Beekeeping in India*. ICAR, New Delhi.

**Program:** B.Sc. (Hons.) Agriculture  
**Semester:** Sixth  
**Course:** Crop Improvement-II (Rabi crops)  
**Course Code:** 13A.364

L	T	P	C
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**Course Objective:**

- To understand the origin, distribution and different breeding methods to be adopted for the development of varieties / hybrids in various rabi crops
- To study about the plant genetic resources, centers of diversity and breeding for resistance to biotic and abiotic stresses
- To learn about the influence of Genotype x Environment interaction on yield / performance
- To acquaint with floral biology, emasculation and hybridization techniques, maintenance breeding of different rabi crops
- To handle germplasm and segregating populations by different breeding methods
- To make layout of field experiments and apply field techniques for seed production and hybrid seeds production in rabi crops
- To estimate heterosis, inbreeding depression and heritability

**Unit I:**

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fodder crops and cash crops; vegetable and horticultural crops;

**Unit II:**

Plant genetic resources, its utilization and conservation; study of genetics of qualitative and quantitative characters;

**Unit III:**

Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional);

**Unit IV:**

Hybrid seed production technology of rabi crops. Ideotype concept and climate resilient crop varieties for future.

**Practical:**

Floral biology, emasculation and hybridization techniques in different crop species namely

1. Wheat, Oat, Barley,
2. Chickpea, Lentil, Field pea, Rajma, Horse gram,
3. Rapeseed, Mustard, Sunflower, Safflower,
4. Potato, Berseem. Sugarcane, Tomato, Chilli, Onion;
5. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods;
6. Study of field techniques for seed production and hybrid seeds production in Rabi crops;
7. Estimation of heterosis, inbreeding depression and heritability;

8. Layout of field experiments;
9. Study of quality characters, study of donor parents for different characters;
10. Visit to seed production plots;
11. Visit to AICRP plots of different field crops

**Suggested Reading:**

1. Allard, R.W. 1960. *Principles of Plant Breeding*. John Wiley & Sons, New York.
2. Phundan Singh. 2006. *Essential of Plant Breeding*. Kalyani Publishers, Ludhiana. 54
3. Poehlman, J.M. and Borthakur, D. 1995. *Breeding of Asian Field Crops*. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
4. Sharma, J.R. 1994. *Principles and Practice of Plant Breeding*. Tata McGraw-Hill Publishing Co. Ltd., New Delhi.
5. Kalloo, G. 1994. *Vegetable Breeding*. Panima Educational Book Agency, New Delhi.
6. Kumar, N. 2006. *Breeding of Horticultural Crops - Principles and Practices*. New India Publishing Agency, New Delhi.
7. George Acquaah..2012. *Principles of Plant Genetics and Breeding*. Blackwell Publishing Ltd., USA.

**Program:** B.Sc. (Hons.) Agriculture  
**Semester:** Sixth  
**Course:** Principles of Organic Farming  
**Course Code:** 13A.365

L	T	P	C
1	0	2	2

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**Course Objective:**

- To learn the concepts of organic farming, preparation of various non-chemical nutrient supplements
- To get acquainted with mass multiplication techniques of various bio-agents
- To gain knowledge of certification process and standards of organic farming

**Unit I:**

Organic farming, principles and its scope in India. Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture;

**Unit II:**

Organic ecosystem and their concepts; Organic nutrient resources and its fortification;

**Unit III:**

Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production;

**Unit IV:**

Operational structure of NPOP; Certification process and standards of organic farming; Processing, leveling, economic considerations and viability, marketing and export potential of organic products.

**Practical:**

1. Visit of organic farms to study the various components and their utilization;
2. Preparation and quality analysis of
  - a. enrich compost
  - b. vermicompost
  - c. bio-fertilizers/bio-inoculants
3. Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management;
4. Cost of organic production system;
5. Post harvest management; Quality aspect, grading, packaging and handling

**Suggested Reading:**

1. Arun K. Sharma. 2002. *A Hand book of organic farming*. Agrobios, India. 627p.
2. Palaniappan, S.P and Annadurai, K.1999. *Organic farming-Theory and Practice*. Scientific publishers, Jodhpur,India. 257p.
3. Mukund Joshi and Prabhakarasetty, T.K. 2006. *Sustainability through organic farming*. Kalyani publishers, New Delhi. 349p.

4. Balasubramanian, R., Balakishnan, K and Siva Subramanian, K. 2013. *Principles and practices of organic farming*. Satish Serial Publishing House. 453p 39
5. Tarafdar, J.C., Tripathi, K.P and Mahesh Kumar, 2009. *Organic agriculture*. Scientific Publishers, India. 369p.
6. Tiwari, V.N., Gupta, D.K., Maloo, S.R and Somani, L.L. 2010. *Natural, organic, biological, ecological and biodynamic farming*. Agrotech Publishing Academy, Udaipur. 420p.
7. Dushyent Gehlot. 2005. *Organic farming- standards, accreditation, certification and inspection*. Agrobios, India. 357p

**Program:** B.Sc. (Hons.) Agriculture

**Semester:** Sixth

**Course:** Farm Management, Production & Resource Economics

**Course Code:** 13A.366

L	T	P	C
1	0	2	2

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### **Course Objective:**

- To enable students to understand the principles required for the allocation of inputs at the level of individual farms
- To provide students with the principles required for organizing and operating the farm business in order to generate maximum possible income on a continuous basis

### **Unit I:**

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms. Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and product-product relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage.

### **Unit II:**

Meaning and concept of cost, types of costs and their interrelationship, importance of cost in managing farm business and estimation of gross farm income, net farm income, family labour income and farm business income.

### **Unit III:**

Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises. Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts. Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming, appraisal of farm resources, selection of crops and livestock's enterprises.

### **Unit IV:**

Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies, Crop/livestock/machinery insurance – weather based crop insurance, features, determinants of compensation. Concepts of resource economics, differences between NRE and agricultural economics, unique properties of natural resources. Positive and negative externalities in agriculture, Inefficiency and welfare loss, solutions, Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.

### **Practical:**

1. Preparation of farm layout.
2. Determination of cost of fencing of a farm.
3. Computation of depreciation cost of farm assets.
4. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources.
5. Determination of most profitable level of inputs use in a farm production process.

6. Determination of least cost combination of inputs.
7. Selection of most profitable enterprise combination.
8. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises.
9. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts.
10. Collection and analysis of data on various resources in India

**Suggested Reading:**

1. V.T. Raju, D.V.S Rao. *Economics of Farm Production and Management*
2. Bishop, C.E. and W. D. Tousaint. 1958. *Introduction to Agricultural Economic Analysis*. John Wiley and Sons, London.
3. Heady, Earl O. 1964. *Economics of Agricultural Production and Resource Use*. Prentice Hall of India, Private Limited, New Delhi
4. S.S. Johl, J.R. Kapur. 2006. *Fundamentals of Farm Business Management*.
5. Kahlon, A.S. and Karam Singh. 1965. *Principles of Farm Business Management*. Kalyani Publishers, New Delhi.
6. Raju, V.T. and D.V.S. Rao. 2006. *Economics of Farm Production and Management*. Oxford & IBH Publishing Co. Pvt. Limited, New Delhi



**Program:** B.Sc. (Hons.) Agriculture

**Semester:** Sixth

**Course:** Protected Cultivation and Secondary Agriculture

**Course Code:** 13A.367

L	T	P	C
1	0	2	2

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**Course Objective:**

- To familiarize with the design of greenhouse, cost estimation and economic analysis
- To create awareness on production of horticultural crops under protected structure
- To develop skill to erect protected structure according to the requirement.

**Unit I:**

Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes.

**Unit II:**

Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house drying. Cost estimation and economic analysis.

**Unit III:**

Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation.

**Unit IV:**

Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

**Practical:**

1. Study of different type of green houses based on shape.
2. Determine the rate of air exchange in an active summer winter cooling system.
3. Determination of drying rate of agricultural products inside green house.
4. Study of green house equipments.
5. Visit to various Post Harvest Laboratories.
6. Determination of Moisture content of various grains by oven drying & infrared moisture methods.
7. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials).
8. Determination of Moisture content of various grains by moisture meter.
9. Field visit to seed processing plant

**Suggested Reading:**

1. Prasad Kumar. Green House Management for Horticulture Crops

2. *Radha Manohar, K and Igathinathane. C. Greenhouse Technology and Management, 2nd Edition, BS Publications.*
3. *Tiwari, G.N. Greenhouse Technology for Controlled Environment. Narosa Publishing house Pvt.Ltd.*
4. *Singh Brahma and Balraj Singh., 2014. Advances in Protected Cultivation, New India Publishing Company.*
5. *Sahay, K.M. and Singh, K.K. 1994. Unit operations of Agricultural Processing. Vikas Publishing house Pvt. Ltd. New Delhi.*
6. *Chakraverty, A. Post Harvest Technology of cereals, pulses and oilseeds. Oxford & IBH publishing Co. Ltd., New Delhi.*
7. *Ojha, T.P and Michael, A.M. Principles of Agricultural Engineering, Vol. I, Jain Brothers, Karol Bag, New Delhi.*

**Program:** B.Sc. (Hons.) Agriculture

**Semester:** Sixth

**Course:** Practical Crop Production –II (Rabi crops) (Lab.)

**Course Code:** 13A.368

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**Course Objective:**

1. Crop planning
2. Raising field crops in multiple cropping systems:
3. Field preparation,
4. Seed treatment,
5. Nursery raising,
6. Sowing,
7. Nutrient, water and weed management
8. Management of insect-pests diseases of crops,
9. Harvesting, threshing, drying winnowing,
10. Storage and marketing of produce.

(The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies.)

11. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

**Electives Sem VI****Program:** B.Sc. (Hons.) Agriculture**Semester:** Sixth**Course:** Landscaping**Course Code:** 13A.371

L	T	P	C
2	0	2	3

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**Course Objective:**

- To learn selection, propagation, planting schemes, canopy management of different plants
- To understand landscaping of different urban and rural areas

**Unit I:**

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes.

**Unit II:**

Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting, Annuals: selection, propagation, planting scheme. Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management.

**Unit III:**

Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions.

**Unit IV:**

Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

**Practical:**

1. Identification of trees, shrubs, annuals, pot plants
2. Propagation of trees, shrubs and annuals
3. Care and maintenance of plants
4. Potting and repotting
5. Identification of tools and implements used in landscape design
6. Training and pruning of plants for special effects
7. Lawn establishment and maintenance
8. Layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house
9. Use of computer software
10. Visit to important gardens/ parks/ institutes

**Program:** B.Sc. (Hons.) Agriculture  
**Semester:** Sixth  
**Course:** Micro-propagation Technologies  
**Course Code:** 13A.371

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**Course Objective:**

- To understand different techniques of plant tissue culture.
- To impart knowledge of different steps of micro-propagation

**Unit I:**

Introduction, History, Advantages and limitations;

**Unit II:**

Types of cultures (seed, embryo, organ, callus, cell),

**Unit III:**

Stages of micropropagation, Axillary bud proliferation (Shoot tip and meristem culture, bud culture), Organogenesis (callus and direct organ formation),

**Unit IV:**

Somatic embryogenesis, cell suspension cultures, Production of secondary metabolites, Somaclonal variation, Cryopreservation

**Practical:**

1. Identification and use of equipments in tissue culture Laboratory
2. Nutrition media composition
3. sterilization techniques for media, containers and small instruments
4. sterilization techniques for explants
5. Preparation of stocks and working solution
6. Preparation of working medium
7. Culturing of explants: Seeds, shoot tip and single node
8. Callus induction
9. Induction of somatic embryos regeneration of whole plants from different explants
10. Hardening procedures.

**Program:** B.Sc. (Hons.) Agriculture

**Semester:** Sixth

**Course:** Hi-tech Horticulture

**Course Code:** 13A.371

L	T	P	C
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**Course Objective:**

- To impart knowledge of mechanization, micro propagation and protected cultivation of horticultural crops
- To develop understanding of application of precision farming in horticultural crops

**Unit I:**

Introduction & importance; Nursery management and mechanization; micro propagation of horticultural crops; Modern field preparation and planting methods,

**Unit II:**

Protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation systems and its components; EC, pH based fertilizer scheduling, canopy management, high density orcharding,

**Unit III:**

Components of precision farming: Remote sensing, Geographical Information System (GIS), Differential Geo-positioning System (DGPS), Variable Rate applicator (VRA),

**Unit IV:**

Application of precision farming in horticultural crops (fruits, vegetables and ornamental crops); mechanized harvesting of produce.

**Practical:**

1. Types of polyhouses and shade net houses
2. Intercultural operations
3. Tools and equipments: Identification and application
4. Micro propagation
5. Nursery-protrays
6. Micro-irrigation
7. EC, pH based fertilizer scheduling
8. Canopy management
9. Visit to hi-tech orchard/nursery.