SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

B.Sc. (Ag.) (3rd) Year

(6th) Semester w.e.f.-2016-2017

Subject Code	Subject Name		Credits
AG- 601	Rain fed Agriculture & Watershed Management		2(1+1)
AG -602	Protected Cultivation and Secondary Agriculture		2(1+1)
AG -603	Diseases of Field and Horticultural Crops and their Management-II		3(2+1)
AG -604	Management of Beneficial Insects		2(1+1)
AG -605	Crop Improvement-II *(Rabi crops)*		2(1+1)
AG -606	Principles of Organic Farming		2(1+1)
AG -607	Farm Management, Production & Resource Economics		2(1+1)
AG -608	Principles of Food Science and Nutrition		2(2+0)
AG -609	PHM & Value Addition Of Fruit & Vegetable.		2(1+1)
AG -610	Practical Crop Production –II (*Rabi* crops)		2(0+2)
AG-611(A) **AG-611(B)** **AG-611(C)**	Elective Course	Weed management Hi-tech Horticulture Landscaping	3(2+1)
Total			**24**

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 601 **Credit 2(1+1)**

w.e.f. 2016-2017

Rainfed Agriculture and Watershed Management

UNIT-1. Rain fed agriculture: Introduction, types, History of rain fed agriculture & watershed in India; Problems and prospects of rain fed agriculture in India

UNIT-2. Soil and climatic conditions prevalent in rain fed areas; Drought: types, Mechanism of crop adaptation under moisture deficit condition.

UNIT-3. Water harvesting: importance, its techniques, efficient utilization of water through soil and crop management practices, Management of crops in rain fed areas.

UNIT-4. Contingent crop planning for aberrant weather conditions, Concept, objective, principles and components of watershed management.

UNIT-5. Factors affecting watershed management.

Practical

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

References

1. Rainfed Agriculture and Watershed Management- S.R. Reddy & G.P. Reddy
2. Crop Production at a Glance- Sah Akilesh.
3. Post Harvest Technology of Cereals, Pulses and Oilseeds – Dr. A. Chakraverty, Oxford & IBH Publishing Co. Pvt. Ltd.

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 602 **Credit 2(1+1)**

w.e.f. 2016-2017

Protected Cultivation and Secondary Agriculture

UNIT-1. Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses,

UNIT-2. Design criteria of green house for cooling and heating purposes. Green house equipment's, materials of construction for traditional and low cost green houses.

UNIT-3. 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-4. 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-5. 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 greenhouses 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 greenhouse equipment's. Visit to various Post Harvest Laboratories.
5. Determination of Moisture content of various grains by oven drying & infrared moisture methods.
6. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials).
7. Determination of Moisture content of various grains by moisture meter.
8. Field visit to seed processing plant.

References

1. Green house management for – S. Prasad/U. Kumar, Agrobio (India) Horticultural Crops
2. Unit operations of Agricultural – K.M. Sahay and K.K. Singh, Vikas Processing Publishing House, Pvt. Ltd.
3. Post Harvest Technology of Cereals, Pulses and Oilseeds – Dr. A. Chakraverty, Oxford & IBH Publishing Co. Pvt. Ltd.

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 603 **Credit 3(2+1)**

w.e.f. 2016-2017

Diseases of Field & Horticultural Crops & their Management-II

UNIT-1. Symptoms, etiology, disease cycle and management of following diseases: Field Crops: Wheat: rusts, loose smut, karnal bunt, powdery mildew, alternaria blight, and ear Cockle.

UNIT-2. 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;

UNIT-3. Gram: wilt, grey mould and Ascochyta blight; Lentil: rust and wilt;Cotton: anthracnose, vascular wilt, and black arm;Pea: downy mildew, powdery mildew and rustHorticultural Crops: Mango:anthracnose, malformation, bacterial blight and powdery mildew;

UNIT-4. 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 Potato: early and late blight, black scurf, leaf roll, and mosaic

UNIT-5. Cucurbits: downy mildew, powdery mildew, wilt;Onion and garlic purple blotch, and Stemphylium blight;Chillies: anthracnose and fruit rot, wilt and leaf curl;Turmeric: leaf spot Coriander: stem gallMarigold: 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.

Note: Students should submit 50 pressed and well-mounted specimens.

References

1. Diseases of Field & Horticultural Crops & their Management-II- Dr. Mukherjee Dr.Jha Santanu, Dr. Ray Surjeet.
2. Diseases of Crops & their Management-Manoj Kumar Kalita

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 604 **Credit 2(1+1)**

w.e.f. 2016-2017

Management of Beneficial insects

UNIT-1. Importance of beneficial Insects, Beekeeping, pollinating plant and their cycle, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease.

UNIT-2. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. 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.

UNIT-3. Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection.

UNIT-4. 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-5. 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, bee enemies and disease.
3. Bee pasturage, bee foraging and communication.
4. Types of silkworm, voltinism and biology of silkworm.
5. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves.
6. 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.

References

1. Beneficial Insects- David V Alford
2. Selected Beneficial and Harmful Insects of Indian Subcontinent-Thomas K Sabu

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 605 **Credit 2(1+1)**

w.e.f. 2016-2017

Crop Improvement – II (*Rabi*)

UNIT-1. Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fodder crops and cash crops; vegetable and horticultural crops;

UNIT-2. Plant genetic resources, its utilization and conservation; Floral biology, study of genetics of qualitative and quantitative characters; Important concepts of breeding self pollinated, cross pollinated and vegetatively propagated crops;

UNIT-3. 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-4. Seed production technology in self-pollinated, cross pollinated and vegetatively propagated crops.

UNIT-5. Hybrid seed production technology of rabi crops. Ideotype concept and climate resilient crop varieties for future.

Practical

1. Emasculation and hybridization techniques in different crop species namely Wheat, Oat, Barley, Chickpea, Lentil, Field pea,
2. Rapeseed Mustard, Sunflower, Potato, Berseem. Sugarcane, Cowpea;
3. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods;
4. Study of field techniques for seed production and hybrid seeds production in *Rabi* crops; Estimation of heterosis, inbreeding depression and heritability;
5. Layout of field experiments; Study of quality characters, study of donor parents for different Characters; Visit to seed production plots;
6. Visit to AICRP plots of different field crops.

References

1. Principles of Plant Breeding – B.D. Singh.
2. Principles of Plant Breeding – Kundan Singh
3. Principles and Plant Breeding Methods of field crop in India– Soumendra Chakraborty & Tapash Dasgupta

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 606 **Credit 2(1+1)**

w.e.f. 2016-2017

Principles of Organic Farming

UNIT-1. Organic farming, principles and its scope in India; Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture;

UNIT-2. Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming;

UNIT-3. Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production;

UNIT-4. Operational structure of NPOP; Certification process and standards of organic farming; Processing, leveling, economic considerations and viability,

UNIT-5. Marketing and export potential of organic products.

Practical

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

References

1. Organic Food Production in India - Bhattacharya, P. 2003, Agribios- Status, Strategy and Scope - (India), Jodhpur
2. Organic Farming-Theory and - Palanniappan, S.P. and Anandurai, Practices K 1999, Scientific Publisher,Jodhpur
3. Organic Farming - Lumpkin, N. 1990, Farming Press Books, IPSWITCH, U.K.
4. Hand Book of Organic Farming - Sharma, A.K. 2001,

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 607 **Credit 2(1+1)**

w.e.f. 2016-2017

Farm Management, Production and Resource Economics

UNIT-1. 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:

UNIT-2. 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-3. 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 labor income and farm business income. 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.

UNIT-4. 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. 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.

UNIT-5. 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. Selection of most profitable enterprise combination.
6. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises.

References

1. Elements of Farm Management – I.J. Singh and V.K. Puri
2. Economics of Farm Management – A.S. Kahlon and Karam Singh
3. Farm Business Management – S.S. Johl and T.R. Kapoor
4. Farm Management – S.P. Dondyal

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 608 **Credit 2(2+0)**

w.e.f. 2016-2017

Principles of Food Science and Nutrition

UNIT-1. Concepts of Food Science- definitions, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems etc.

UNIT-2. Food composition and chemistry (water, carbohydrates, proteins, fats, vitamins, minerals, flavours, colours, miscellaneous bioactives, important reactions);

UNIT-3. Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production of fermented foods);

UNIT-4. Principles and methods of food processing and preservation- use of heat, low temperature, chemicals, radiation, drying etc.

UNIT-5. 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.

References

1. Textbook of Food Science and Technology- V. Khader
2. Bio chemistry – J.L. Jain
3. Bio chemistry(Hindi) – T.D Pandey

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 609 **Credit 2(1+1)**

W.e.f.-2016-2017

Post-harvest Management and Value Addition of Fruits and Vegetables

UNIT-1. Importance of fruits and vegetables,

UNIT-2. Extent and possible causes of post harvest losses; Pre-harvest factors affecting post harvest quality, maturity, ripening and changes occurring during ripening;

UNIT-3. Respiration and factors affecting respiration rate; Role of ethylene; Post harvest disease and disorders; Heat, chilling and freezing injury; Harvesting and field handling;

UNIT-4. Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy –

UNIT-5. Concepts and Standards; Fermented and non-fermented beverages. 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. Visit to processing unit/ industry.

References

1. Post-Harvest Management of Horticultural Crops - S.N. Pandey
2. A Text Book of Farming System and Sustainable Agriculture-Aniket Kalhapure, Madhukar dhonde & Balasaheb Shete.
3. Post Harvest Technology of Horticultural Crops – K.P. Sudheer
4. Post Harvest Management of Horticultural Crops – M.A. Mir
5. Marketing of Processed, Fruits and Vegetables – M. Choudhory.
6. Principles and Practices of Post Harvest Technology – P.H. Panday
7. Post Harvest Technology of Fruits and Vegetables – L.R. Verma and V.K. Joshi

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 610 **Credit 2(0+2)**

W.e.f.-2016-2017

Practical Crop Production-II *(Rabi Crops)*

Practical

1. Crop planning, raising field crops in multiple cropping systems: Field preparation, seed Treatment, nursery raising, sowing, nutrient, water.

2. Weed management and management of insect-pests diseases of crops.

3. Harvesting, threshing, drying winnowing, storage and marketing of produce.

4. The emphasis will be given to seed production, mechanization, resource conservation.

5. Integrated nutrient, insect-pest and disease management technologies.

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

References

1. Scientific crop production (1&2) – C. Thakur
2. Handbook of Agriculture (IV edition 2006)– ICAR Publication
3. Field Crops – Y.M. Iyyer
4. High Yielding Varieties of Crops – Mahabal Ram
5. Principal of Cereal Crop Production – Mahendra Pall, Deka & R.K. Rai

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

Elective Course

SUBJECT CODE-AG 611(A) **Credit 3(2+1)**

W.e.f.-2016-2017

Weed management

UNIT-1. Introduction to weeds, characteristics of weeds their harmful and beneficial effects on ecosystem.

UNIT-2. Classification, reproduction and dissemination of weeds. Herbicide classification, concept of adjuvant, surfactant, herbicide formulation and their use.

UNIT-3. Introduction to mode of action of herbicide and selectivity.allelopathy and its application for weed management.

UNIT-4. Bio-herbicide and their application in agriculture. Concept of herbicide mixture and utility in agriculture. Herbicide compatibility with agro-chemical and their application.

UNIT-5. Integration of herbicide with non chemical methods of weeds management. herbicide resistance and its management.

Practical

1. Techniques of weed preservation.
2. Weed identification and their losses study.
3. Biology of important weeds study of herbicide formulation and mixture of herbicide.
4. Herbicide and agro-chemicals study.
5. Shift of weed flora study in long term experiments.
6. Study of methods of herbicide application. Spraying equipments.
7. Calculation of herbicide doses and weed control efficiency and weed index.

References

1. Principal of Weed Science – V.S. Rao (1994), Oxford & IBH Publication, New Delhi.
2. Weed Management – Walia, U.S. (2003), Kalyani Publication, New Delhi
3. Weed Management-Principles and – Gupta, O.P. (2000), Agrobios practices Publication, India
4. All about Weed Control – Subramaniam, S., Ali, A.M. and Kumar, R.J. (1977), Kalyani Publication, New Delhi
5. Weed Science : Basics and Applications – T.K. Das (2008), Jain Brothers Publication

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

Elective Course

SUBJECT CODE-AG 611(B) **Credit 3(2+1)**

W.e.f.-2016-2017

Hi-tech Horticulture

UNIT-1. Introduction & importance; Nursery management and mechanization; micro propagation of horticultural crops; Modern field preparation and planting.

UNIT-2. Protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation systems and its components; use.

UNIT-3. EC, pH based fertilizer scheduling, canopy management, high density orcharding,.

UNIT-4. Methods Components of precision farming: Remote sensing, Geographical Information System (GIS),Differential Geo-positioning System (DGPS), Variable Rate applicator (VRA),

UNIT-5. 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, tools and equipments. identification and application,
3. Micro propagation, Nursery-protrays, micro-irrigation.
4. EC, pH based fertilizer scheduling, canopy management, visit to hi-tech orchard/nursery.

References

1. Instant Horticulture- S.N Gupta
2. Hitech horticulture- Davendra kumar singh

.

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

Elective Course

SUBJECT CODE-AG 611(C) **Credit 3(2+1)**

W.e.f.-2016-2017

Landscaping

UNIT-1. 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-2. Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture.

UNIT-3. 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. Bio-aesthetic planning: definition, need, planning,

UNIT-4. 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-5. Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

Practical

1. Identification of trees, shrubs, annuals, pot plants; Propagation of trees, shrubs and annuals, care and maintenance of plants, potting and repotting, identification of tools and implements used in landscape design,
2. Training and pruning of plants for special effects, lawn establishment and maintenance, layout of formal gardens, informal gardens, special type of gardens (sunken garden,
3. Terrace garden, rock garden) and designing of conservatory and lathe house. Use of computer software, visit to important gardens/ parks/ institutes..

References

1. Instant Horticulture- S.N Gupta
2. Hand Book of Horticulture- U.S. Bose
3. Glaustas Horticulture- P. Mathukumar