

**SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES,  
SEHORE**

**B.Sc. (Ag.) (3<sup>rd</sup>) Year**

**(5<sup>th</sup>) Semester 2016-2017      w.e.f.-2016-17**

<b>Subject Code</b>	<b>Subject Name</b>	<b>Credits</b>
<b>AG- 501</b>	Principles of Integrated Pest and Disease Management	3(2+1)
<b>AG -502</b>	Manures, Fertilizers and Soil Fertility Management	3(2+1)
<b>AG -503</b>	Pests of Crops and Stored Grains and their Management	3(2+1)
<b>AG -504</b>	Diseases of Field & Horticultural Crops & their Management-I	3(2+1)
<b>AG -505</b>	Crop Improvement – I ( <i>Kharif Crops</i> )	2(1+1)
<b>AG -506</b>	Geo-informatics and Nano-technology for Precision Farming	2(1+1)
<b>AG -507</b>	Practical Crop Production-I ( <i>Kharif Crops</i> )	2(0+2)
<b>AG -508</b>	Intellectual Property Rights	1(1+0)
<b>AG-509(A)</b>	Elective Course	Agri-business Management
<b>AG-509(B)</b>		Food Safety and Standards
<b>AG-509(C)</b>		Agricultural Journalism
<b>Total</b>		<b>22</b>

# SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

Subject-Code AG-501

Credit 3(2+1)  
W.e.f.-2016-2017

## Principles of Integrated Pest and Disease Management

**UNIT-1.**Categories of insect pests and diseases, IPM: Introduction, history, importance, concepts, principles and tools of IPM.

**UNIT-2.**Economic importance of insect pests, diseases and pest risk analysis. Methods of detection and diagnosis of insect pest and diseases. Calculation and dynamics of economic injury level and importance of Economic threshold level.

**UNIT-3.**Methods of control: Host plant resistance, cultural, mechanical, physical, legislative biological and chemical control. Ecological management of crop environment.

**UNIT-4.**Introduction to conventional pesticides for the insect pests and disease mgt. Survey surveillance and forecasting of Insect pest and diseases. Development and validation of IPM module.

**UNIT-5.**Implementation and impact of IPM (IPM module for Insect pest and disease. Safety issues in pesticide uses. Political, social and legal implication of IPM. Case histories of important IPM programmes.

### Practical

- 1.Methods of diagnosis and detection of various insect pests, and plant diseases,
- 2.Methods of insect pests and plant disease measurement,
- 3.Assessment of crop yield losses, calculations based on economics of IPM,
- 4.Identification of bio-control agents, different predators and natural enemies.
- 5.Mass multiplication of *Trichoderma*, *Pseudomonas*, *Trichogramma*, NPV etc.
6. Identification and nature of damage of important insect pests and diseases and their management.
- 7.Crop (agro-ecosystem) dynamics of a selected insect pest and diseases.
- 8.Plan & assess preventive strategies (IPM module) and decision making.
- 9.Crop monitoring attacked by insect, pest and diseases . Awareness campaign at farmers fields.

### References

1. Imms General text book of Entomology – Richards, O.W. and Davies, E.C.
2. Text Book of Entomology – Pruthi, H.S.
3. Agricultural Entomology for Indian – Khanna, S.S. Students
4. General and Applied Entomology – Nayar, K.K., Ananthkrishnan, T.N. and David,
5. The Insect Structure and function – Chapman, R.F.
6. Text book of Entomology – Mathur and Upadhyaya
7. The science of Entomology – Romoser, W.S. (1981) II & III edition Macmillan Publishing Company, New York

**SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES,  
SEHORE**

**Subject-Code AG-502**

**Credit 3(2+1)  
W.e.f.-2016-2017**

**Manures, Fertilizers and Soil Fertility Management**

**UNIT-1.**Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring.

**UNIT-2.**Integrated nutrient management. Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary & micronutrient fertilizers,

**UNIT-3.**Complex fertilizers, Nano-fertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order. History of soil fertility and plant nutrition. criteria of essentiality. role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants,

**UNIT-4.**Factors affecting nutrient availability to plants. Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil.

**UNIT-5.**Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

**Practical**

- 1.Introduction of analytical instruments and their principles,
- 2.Alibration and applications, Colorimetry and flame photometry.
- 3.Estimation of available N in soils.
- 4.Estimation of available P in soils.
- 5.Estimation of available K. Estimation of available S in soils.
- 6.Estimation of available Ca and Mg in soils.
- 7.Estimation of available Zn in soils. Estimation of N in plants. Estimation of P in plants.
- 8.Estimation of K in plants. Estimation of S in plants.

**References**

1. The Nature Properties of Soil – Brady, N.C. & Weil R.R.
2. Fundamentals of Soil Science
3. Soil Fertility and Fertilizers – Nelson Tisdale
4. Methods of Soil Fertilization – A.J. Pieters
5. Organic Farming – N.S. Subbarao

**Subject-Code AG-503**

**Credit 3(2+1)  
W.e.f.-2016-2017**

**Pests of Crops and Stored Grains and their Management**

**UNIT-1.**General account on nature and type of damage by different arthropods pests.

**UNIT-2.**Scientific name, order, family, host range, distribution, biology and bionomics, nature of damage, and management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various field crop, vegetable crop,

**UNIT-3.** fruit crop, plantation crops, ornamental crops, narcotics, spices and condiments. Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain.

**UNIT-4.** Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management.

**UNIT-5.**Storage structure and methods of grain storage and fundamental principles of grain store management.

**Practical**

1. Identification of different types of damage.
2. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops (b) Vegetable Crops (c) Fruit Crops (d) Plantation, Gardens, Narcotics, Spices & condiments.
3. Identification of insect pests and Mites associated with stored grain.
4. Determination of insect infestation by different methods.
5. Assessment of losses due to insects.
6. Calculations on the doses of insecticides application technique.
7. Fumigation of grain store / godown. Identification of rodents and rodent control operations in godowns.

**References**

1. Storage Pest Management – Sharma, S. and Choudhary, A.
2. Management of Insect Pests of – Gupta, H.C.L. Horticultural Crops
3. Text book of Entomology – Pruthi, H.S.
4. Cotton pests and Bio control agents – Sathe, T.V.
5. Economic and Applied Entomology – Ashok Kumar and Prem Mohan Nigam
6. A Test book of Applied Entomology – K.P. Shrivastava (Vol. II)

**Subject-Code AG-504**

**Credit 3(2+1)  
W.e.f.-2016-2017**

**Diseases of Field & Horticultural Crops & their Management-I**

**UNIT-1.** Symptoms, etiology, disease cycle and management of major diseases of following Crops.

**UNIT-2.** Field Crops: Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro; Maize: stalk rots, downy mildew, leaf spots; Sorghum: smuts, grain mold and anthracnose.

**UNIT-3.** Bajra :downy mildew and ergot; Groundnut: early and late leaf spots, wilt Soybean: Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic; Pigeonpea: Phytophthora blight, wilt and sterility mosaic; Finger millet: Blast and leaf spot; black & green gram: anthracnose, Cercospora leaf spot and anthracnose, web blight and yellow mosaic; Castor.

**UNIT-4.** Phytophthora blight; Tobacco: black shank, black root rot and mosaic. Horticultural Crops: Guava: wilt and anthracnose; Banana: Panama wilt, bacterial wilt, Sigatoka and bunchy top; Papaya: foot rot, leaf curl and mosaic, Pomegranate: bacterial blight; Cruciferous vegetables:

**UNIT-5.** Alternaria leaf spot and black rot; Brinjal: Phomopsis blight and fruit rot and Sclerotinia blight; Tomato: damping off, wilt, early and late blight, buck eye rot and leaf curl and mosaic; Okra: Yellow Vein Mosaic; Beans: anthracnose and bacterial blight; Ginger: soft rot; Colocasia: Phytophthora blight; Coconut: wilt and bud rot; Tea: blister blight; Coffee rust.

**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 Vegetable crops - R.S. Singh
2. Diseases of Plantation crops – Kulkarni and their management
3. Diseases of Fruits and Plantation - Jahagirdar, Shamora crops and their management, A modern perspective
4. Diseases of Plantation Crops - V.K. Gupta
5. Diseases of Vegetable Crops - J.C. Walker
6. Diseases of Fruit Crops - V.K. Gupta

**Subject-Code AG-505**

**Credit 2(1+1)  
W.e.f.-2016-2017**

**Crop Improvement – I (*Kharif Crops*)**

**UNIT-1.**Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fibers; fodders and cash crops.

**UNIT-2.**vegetable and horticultural crops; Plant genetic resources, its utilization and conservation Floral biology, study of genetics of qualitative and quantitative characters.

**UNIT-3.**Important concepts of breeding self pollinated, cross pollinated and vegetative propagated crops; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield.

**UNIT-4.** adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Seed production technology in self pollinated, cross pollinated and vegetatively propagated crops.

**UNIT-5.**Hybrid seed production technology in Maize, Rice, Sorghum, Pearl millet and Pigeonpea, etc. Ideotype concept and climate resilient crop varieties for future.

**Practical**

1. Emasculation and hybridization techniques in different crop species; viz., Rice, Maize, Sorghum, Pearl Millet, Ragi, Pigeonpea, Urdbean, Mungbean, Soybean, Groundnut, Sesame , Caster, Cotton, Cowpea, Pearl millet and Tobacco.
2. Maintenance breeding of different kharif crops.
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 Kharif Crops.
5. Estimation of heterosis, inbreeding depression and heritability; Layout of field Experiments.
6. Study of quality characters, donor parents for different characters;
7. Visit to seed production plots; Visit to AICRP plots of different field crops.

**References**

1. Omics Technologies and Crop Improvement- Nouredine Benkeblia
2. Molecular Approaches in Plant Abiotic Stress- rajashri Kumar gour and Pradeep sharma
3. Translational Genomics for Crop Breeding: Biotic Stress- Rajeev Varsney, Roberto Tuberosa
4. Marker Assisted Plant Breeding- B D Singh and A K Singh
5. Plant Breeding principles & Methods - B D Singh

**Subject Code AG-506**

**Credit 2(1+1)  
W.e.f.-2016-2017**

**Geo-informatics and Nano-technology for Precision Farming**

**UNIT-1.** Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture; Geo-informatics- definition, concepts, tool and techniques, their use in Precision Agriculture.

**UNIT-2** Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; Spatial data and their management in GIS; Geodesy and its basic principles.

**UNIT-3.** Remote sensing concepts and application in agriculture; Image processing and interpretation; Global positioning system (GPS), components and its functions; System Simulation- Concepts and principles.

**UNIT-4.** Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; STCR approach for precision agriculture; Nanotechnology, definition, concepts and techniques, brief introduction about Nano scale effects.

**UNIT-5.** Nano-particles, Nano-pesticides, Nano-fertilizers, Nano-sensors, Use of nanotechnology in tillage, seed, water, fertilizer, plant protection for scaling-up farm productivity.

**Practical**

1. Introduction to GIS software, spatial data creation and editing.
2. Introduction to image processing software.
3. Visual and digital interpretation of remote sensing images.
4. Generation of spectral profiles of different objects. Supervised and unsupervised
5. Classification and acreage estimation.
6. Multispectral remote sensing for soil mapping.
7. Creation of thematic layers of soil fertility based on GIS.
8. Creation of productivity and management zones.
9. Fertilizers recommendations based of VRT and STCR techniques.
10. Crop stress (biotic/abiotic) monitoring using geospatial technology.

**References**

1. Geo-informatics and Nano-technology for Precision Farming by- S R Reddy.
2. Precision Farming – Premjit Sharma
3. Precision Farming a New Approach- Ram, Tulsa & Lohan, Shiv Kumar & Singh, Ranveer & Singh, Purshotam
4. Adoption of Precision Farming Technologies- Sangeetha Vidwan A.S. Panchapakesa Iyer
5. Foundations of Information Technology- Sangeeta Panchal and Alka Sabharwal

**Subject-Code AG-507**

**Credit 2(0+2)  
W.e.f.-2016-2017**

**Practical Crop Production-I (*Kharif Crops*)**

**Practical**

1. Crop planning, raising field crops in multiple cropping systems.
2. Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed Management.
3. Management of insect-pests diseases of crops.
4. Harvesting, threshing, drying winnowing, storage and marketing of produce.
5. The emphasis will be given to seed production, mechanization, resource conservation and Integrated nutrient.
6. Insect-pest and disease management technologies.
7. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

**References**

1. Kharif crop Production (Hindi), by - Arya R.L. 2019
2. Production technology of kharif crops- Suresh Singh Tomar and Yagya Dev Mishra
3. Science of crop Production Part-1 (Kharif Crop) – Dr. G .S. Tomar, Dr S. K. Tounk, Dr. J. L. Chaudhary
4. Textbook of Field Crop- Mukund Joshi
5. Principles of Crop Production – SR Reddy, C Nagamani
6. Textbook of Field Crop Production (Commercial Crops)- Rajendra Prashad

**SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES,  
SEHORE**

**Subject-Code AG-508**

**Credit 1(1+0)  
W.e.f.-2016-2017**

**Intellectual Property Rights**

**UNIT-1.**Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs and WIPO, Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc.

**UNIT-2.**Types of Intellectual Property and legislations covering IPR in India:-Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets.

**UNIT-3.**Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database.

**UNIT-4.**Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India, Plant breeders rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights.

**UNIT-5.**Traditional knowledge-meaning and rights of TK holders. Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing.

**References**

1. Intellectual Property Rights by Yadav R.K. Dr. Shweta.
2. An introduction to intellectual property rights- Venkataraman M
- 3 Law Relating to Intellectual Property Rights- M. K. Bhandari
4. Intellectual Property Rights-II- Kriti Sharma

# **SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE**

## **Elective Course**

**Subject-Code AG-509 (A)**

**Credit 3(2+1)  
W.e.f.-2016-2017**

## **Agri-business Management**

**UNIT-1.** Transformation of agriculture in to agribusiness, various stakeholders and components of agribusiness systems. Constraints in establishing agro-based industries. Agri-value chain: Understanding primary and support activities and their linkages. Business environment: PEST & SWOT analysis. Management functions: Roles & activities, Transformation of agriculture into agribusiness, various stakeholders and components of agribusiness systems.

**UNIT-2.** Importance of agribusiness in the Indian economy and New Agricultural Policy. Distinctive features of Agribusiness Management: Importance and needs of agro-based industries, Classification of industries and types of agro based industries.

**UNIT-3.** Institutional arrangement, procedures to set up agro based industries. Constraints Organization culture. Planning, meaning, definition, types of plans. Purpose or mission, goals or objectives, Strategies, polices procedures, rules, programs and budget.

**UNIT-4.**Components of a business plan, Steps in planning and implementation. Organization staffing, directing and motivation. Ordering, leading, supervision, communications, control. Capital Management and Financial management of Agribusiness. Financial statements and their importance.

**UNIT-5.** Marketing Management: Segmentation, targeting & positioning. Marketing mix and marketing strategies. Consumer behaviour analysis, Product Life Cycle (PLC). Sales & Distribution Management. Pricing policy, various pricing methods. Project Management definition, project cycle, identification, formulation, appraisal, implementation, monitoring and evaluation. Project Appraisal and evaluation technique

## **Practical**

1. Study of agri-input markets: Seed, fertilizers, pesticides. Study of output markets: grains, fruits, vegetables, flowers.
2. Study of product markets, retails trade commodity trading, and value added products.
3. Study of financing institutions- Cooperative, Commercial banks, RRBs, Agribusiness Finance Limited, NABARD.
4. Preparations of projects and Feasibility reports for agribusiness entrepreneur.
5. Appraisal/evaluation techniques of identifying viable project- Non-discounting techniques.
6. Case study of agro-based industries. Trend and growth rate of prices of agricultural Commodities.Net present worth technique for selection of viable project. Internal rate of return.

**SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES,  
SEHORE**

**References**

1. Agribusiness Management – W. David Downey and Steven P. Erickson
2. Introduction of Agril. Business – Davis, J. and Gold Berg Management
3. Project Management and Control – Rao
4. Project Management – S. Choudhary, Hill Publication Company, New Delhi
5. Project Management – Nagaraja
6. Agri. Business Management – Broadway, Himalaya Publication House, New Delhi
7. Project Planning, Analysis, Selection, – Chandra Implementation and Review

# **SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE**

**Subject Code AG-509 (B)**

**Credit 3(2+1)  
W.e.f.-2016-2017**

## **Food Safety and Standards**

**UNIT-1.**Food Safety – Definition, Importance, Scope and Factors affecting Food Safety. Hazards and Risks, Types of hazards - Biological, Chemical, Physical hazards. Management of hazards - Need. Control of parameters.

**UNIT-2.**Temperature control. Food storage. Product design. Hygiene and Sanitation in Food Service Establishments- Introduction. Sources of contamination and their control. Waste Disposal. Pest and Rodent Control. Personnel Hygiene. Food Safety Measures.

**UNIT-3.**Food Safety Management Tools- Basic concepts. PRPs, GHPs, GMPs, SSOPs etc. HACCP. ISO series. TQM - concept and need for quality, components of TQM, Kaizen. Risk Analysis. Accreditation and Auditing, Water Analysis, Surface Sanitation and Personal Hygiene.

**UNIT-4.**Food laws and Standards Indian Food Regulatory Regime, FSSA. Global Scenario CAC. Other laws and standards related to food. Recent concerns- New and Emerging Pathogens. Packaging, Product labeling and Nutritional labeling.

**UNIT-5.**Genetically modified foods\ transgenics. Organic foods. Newer approaches to food safety. Recent Outbreaks. Indian and International Standards for food products.

### **Practical**

1. Water quality analysis physico-chemical and microbiological.
2. Preparation of different types of media.
3. Microbiological Examination of different food samples.
4. Assessment of surface sanitation by swab/rinse method.
5. Assessment of personal hygiene. Biochemical tests for identification of bacteria.
6. Scheme for the detection of food borne pathogens.
7. Preparation of plans for Implementation of FSMS - HACCP, ISO: 22000.

### **References**

1. Food Safety and Standards Act, 2006- Lawman's
2. International Standards for Food Safety- Naomi Rees and David Watson
3. Food Science and Nutrition- Sunterra Roday
4. Food Safety Culture: Creating a Behavior-Based Food Safety Management System- Frank Yiannas

# **SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE**

**Subject Code AG-509(C)**

**Credit 3(2+1)  
W.e.f.-2016-2017**

## **Agricultural Journalism**

**UNIT-1.** Agricultural Journalism: The nature and scope of agricultural journalism characteristics and training of the agricultural journalist, how agricultural journalism is similar to and different from other types of journalism.

**UNIT-2.** Newspapers and magazines as communication media: Characteristics; kinds and functions of newspapers and magazines, characteristics of newspaper and magazine readers. Form and content of newspapers and magazines.

**UNIT-3.** Style and language of newspapers and magazines, parts of newspapers and magazines. The agricultural story: Types of agricultural stories, subject matter of the agricultural story, structure of the agricultural story.

**UNIT-4.** Gathering agricultural information: Sources of agricultural information, interviews, coverage of events, abstracting from research and scientific materials, wire services, other agricultural news sources.

**UNIT-5.** Writing the story: Organizing the material, treatment of the story, writing the news lead and the body, readability measures. Illustrating agricultural stories: Use of photographs, use of artwork (graphs, charts, maps, etc.), writing the captions. Editorial mechanics: Copy reading, headline and title writing.

### **Practical**

1. Practice in interviewing. Covering agricultural events.
2. Abstracting stories from research and scientific materials and from wire services.
3. Writing different types of agricultural stories.
4. Selecting pictures and artwork for the agricultural story.
5. Practice in editing, copy reading, headline and title writing, proofreading, layouting. Testing copy with a readability formula.
6. Visit to a publishing office.

### **References**

1. Agricultural Extension and Farm Journalism- A K Singh
2. Needed, a Profession of Agricultural Journalism 1-Robert William Trullinger
3. Agricultural Communications: Changes and Challenges-Kristina Boone