SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

B.Sc. (Ag.) (IST) Year

2nd Semester **w.e.f-2016-2017**

Subject Code	Subject Name	Credits
AG- 201	Fundamentals of Genetics	3(2+1)
AG -202	Agricultural Microbiology	2(1+1)
AG -203	Soil and Water Conservation Engineering	2(1+1)
AG -204	Fundamentals of Crop Physiology	2(1+1)
AG -205	Fundamentals of Agricultural Economics	2(2+0)
AG -206	Fundamentals of Plant pathology	3(2+1)
AG -207	Fundamentals of Entomology	4(3+1)
AG -208	Fundamentals of Agricultural Extension Education	3(2+1)
AG -209	Communication Skills and Personality Development	2(1+1)
	Total	**24**

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 201 **Credit 3(2+1)**

Fundamentals of Genetics **w.e.f. - 2016-2017**

UNIT-1 Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity, Cell division – mitosis, meiosis, Probability and Chi-square. Dominance relationships, gene interaction.

UNIT-2 Multiple alleles, pleiotropism and pseudoalleles, Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanisms, chromosome mapping.

UNIT-3 Structural changes in chromosome, Mutation, classification, Methods of inducing mutation & CIB technique, mutagenic agents and induction of mutation.

UNIT-4 Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Epistatic interactions with examples. Cytoplasmic inheritance.

UNIT-5 Genetic disorders, Nature, structure & replication of genetic material. Protein synthesis, Transcription and translational mechanism of genetic material, Gene concept: Gene structure, function and regulation, Lac and Trp operons.

Practical

1. Study of microscope. Study of cell structure.
2. Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross, Experiments on epistatic interactions including test cross and back cross, Practice on mitotic and meiotic cell division,
3. Experiments on probability and Chi-square test.
4. Determination of linkage and cross over analysis (through two point test cross and three point test cross data).
5. Study on sex linked inheritance in Drosophila. Study of models on DNA and RNA structure.

References

1. Fundamentals of Genetics – B.D. Singh, Kalyani Publisher
2. Elements of Genetics – Phundan Singh, Kalyani Publisher
3. Genetics – M.W. Strickberger
4. Principles of Genetics – Snoids & Simonds (4th edition) John Willy Publication, New York
5. Manual of Practical genetics – Singh, Chouhan and Katiyar, Kalyani Publisher
6. Cytogenetical practices – Choubey and Bhardwaj, Kalyani Publisher
7. Genetic – R.K. Gupta

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 202 **Credit 2(1+1)**

Agricultural Microbiology **w.e.f. - 2016-2017**

UNIT-1 Introduction. Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, chemoautotrophy, photo autotrophy, growth.

UNIT-2 Bacterial genetics: Genetic recombination- transformation, conjugation and transduction, plasmids, transposon.

UNIT-3 Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and sulphur cycles.

UNIT-4 Biological nitrogen fixation- symbiotic, associative and aysmbiotic. Azolla, blue green algae and mycorrhiza. Rhizosphere and phyllosphere.

UNIT-5 Microbes in human welfare: silage production, biofertilizers, biopesticides, biofuel production and biodegradation of agro-waste.

Practical

1. Introduction to microbiology laboratory and its equipments; Microscope- parts, principles of microscopy, resolving power and numerical aperture.
2. Methods of sterilization. Nutritional media and their preparations. Enumeration of microbial population in soil- bacteria, fungi, actinomycetes.
3. Methods of isolation and purification of microbial cultures.
4. Isolation of *Rhizobium* from legume root nodule. Isolation of *Azotobacter* from soil. Isolation of *Azospirillum* from roots.
5. Staining and microscopic examination of microbes.

References

1. Agricultural Microbiology – Rangaswami and Bhagyaraj
2. Soil Microbiology – N.S. Subbarao
3. Agricultural Microbiology – N. Mukherjee and T. Ghosh
4. Biofertilizers – L.L. Somani, S.C. Bhandari, S.N. Saxena
5. Introduction to Soil Microbiology – M. Alexender
6. An Introduction to Microbiology – P. Tauro, K.K. Kapoor and K.S. Yadav

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 203 Credit 2(1+1)

Introductory Soil and Water Conservation Engineering w.e.f. - 2016-2017

UNIT-1 Introduction to Soil and Water Conservation, causes of soil erosion. Definition and agents of soil erosion,

UNIT-2 Water erosion: Forms of water erosion. Gully classification and control measures.

UNIT-3 Soil loss estimation by universal Loss Soil Equation. Soil loss measurement techniques.

UNIT-4 Principles of erosion control: Introduction to contouring, strip cropping. Contour bund. Graded bund and bench terracing. Grassed water ways and their design. Water harvesting and its techniques.

UNIT-5 Wind erosion: mechanics of wind erosion, types of soil movement. Principles of wind erosion control and its control measures.

Practical

1. General status of soil conservation in India.
2. Calculation of erosion index.
3. Estimation of soil loss.
4. Measurement of soil loss.
5. Preparation of contour maps.
6. Design of grassed water ways. Design of contour bunds. Design of graded bunds. Design of bench terracing system.
7. Problem on wind erosion.

References

1. Principles of Agricultural Engineering Vol. II – Dr. A.M. Michael and Dr. T.P. Ojha
2. Irrigation – Theory and Practice – Dr. A.M. Michael
3. Surveying and Leveling – B.C. Punamia

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 204 **Credit 2(1+1)**

Fundamentals of Crop Physiology **w.e.f. - 2016-2017**

UNIT-1 Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview; Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology;

UNIT-2 Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms; Photosynthesis: Light and Dark reactions, C3, C4 and CAM plants.

UNIT-3 Respiration: Glycolysis, TCA cycle and electron transport chain; Fat Metabolism: Fatty acid synthesis and Breakdown.

UNIT-4 Plant growth regulators: Physiological roles and agricultural uses, Physiological aspects of growth and development of major crops.

UNIT-5 Growth analysis, Role of Physiological growth parameters in crop productivity.

Practical

1. Study of plant cells, structure and distribution of stomata.
2. Imbibitions, osmosis, plasmolysis.
3. Measurement of root pressure, rate of transpiration.
4. Separation of photosynthetic pigments through paper chromatography.
5. Rate of transpiration, photosynthesis, respiration.
6. Tissue test for mineral nutrients, estimation of relative water content.
7. Measurement of photosynthetic CO_2 assimilation by Infra Red Gas Analyser (IRGA).

References

1. Plant Physiology - R.M. Devlin and F.S. Witham (1986)
2. Text Book of Plant Physiology - C.P. Malik and A.K. Shrivastava
3. Crop Physiology - U.S. Gupta
4. Plant Physiology - Frank, B. Salisbury & Cleon W. Ross (1995)
5. Test Book of Plant Physiology - S. Mukherjee and A.K. Ghosh
6. Practical Plant Physiology - O.P. Sharma
7. Plant Physiology - C.P. Malik
8. Plant Physiology - S.C. Dutta
9. Plant Physiology - H.S. Shrivastava
10. An introduction to crop physiology - Milthorpe, F.L. and Moorley, J.

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 205 **Credit 2(2+0)**

Fundamentals of Agricultural Economics **w.e.f. - 2016-2017**

UNIT-1 Economics: Meaning, scope and subject matter, definitions, activities, approaches to economic analysis; micro and macroeconomics, positive and normative analysis. Nature of economic theory; rationality assumption, concept of equilibrium, economic laws as
generalization of human behavior. Basic concepts: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare. Agricultural economics: meaning, definition, characteristics of agriculture, importance and its role in economic development. Agricultural planning and development in the country.

UNIT-2 *Demand:* meaning, law of demand, demand schedule and demand curve, determinants, utility theory; law of diminishing marginal utility, equi-marginal utility principle. Consumer's equilibrium and derivation of demand curve, concept of consumer surplus. Elasticity of demand: concept and measurement of price elasticity, income elasticity and cross elasticity. Production: process, creation of utility, factors of production, input output relationship.

UNIT-3 *Laws of returns*: Law of variable proportions and law of returns to scale. *Cost:* Cost concepts, short run and long run cost curves. Supply: Stock v/s supply, law of supply, supply schedule, supply curve, determinants of supply, elasticity of supply. Market structure: meaning and types of market, basic features of perfectly competitive and imperfect markets. Price determination under perfect competition; short run and long run equilibrium of firm and industry, shut down and break even points. Distribution theory: meaning, factor market and pricing of factors of production. Concepts of rent, wage, interest and profit.

UNIT-4 *National income:* Meaning and importance, circular flow, concepts of national income accounting and approaches to measurement, difficulties in measurement. Population: Importance, Malthusian and Optimum population theories, natural and socio-economic determinants, current policies and programmes on population control. Money: Barter system of exchange and its problems, evolution, meaning and functions of money, classification of money, money supply, general price index, inflation and deflation. Banking: Role in modern economy, types of banks, functions of commercial and central bank, credit creation policy. Agricultural and public finance: meaning, micro v/s macro finance, need for agricultural finance, public revenue and public expenditure.

UNIT-5 *Tax:* meaning, direct and indirect taxes, agricultural taxation, VAT. *Economic systems:* Concepts of economy and its functions, important features of capitalistic, socialistic and mixed economies, elements of economic planning.

References

1. Elements of Economic Theory – K.K. Dewett and J.P. Verma
2. Indian Economy – S.K. Mishra and V.K. Puri, Himalayan Publication Pvt. Ltd., New Delhi
3. Fundamentals of Agricultural Economics – K.N. Sandhu & Amarjeet Singh, Himalayan Publication Pvt.Ltd., New Delhi.
4. Agricultural Economics – S. Subba Reddy and P. Raghuram, Oxford and IBH Publication Co. Pvt. Ltd., New Delhi 5. An Introduction to Agricultural Economics – Bilgrami

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 206 **Credit: 3(2+1)**

Fundamentals of Plant Pathology

w.e.f. - 2016-2017

UNIT-1 Introduction: Importance of plant diseases, scope and objectives of Plant Pathology. History of Plant Pathology with special reference to Indian work. Terms and concepts in Plant Pathology.

UNIT-2 Pathogenesis.Cause and classification of plant diseases. Important plant pathogenic organisms, different groups**:** fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them. Diseases and symptoms due to abiotic causes.

UNIT-3 Fungi: general characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction (asexual and sexual). Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to divisions,sub-divisions, orders and classes.

UNIT-4 Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction. Viruses: nature, architecture, multiplication and transmission.Study of phanerogamic plant parasites. Nematodes: General morphology and reproduction, classification, symptoms and nature of damage caused by plant nematodes (Heterodera, Meloidogyne, *Anguina* etc.)

UNIT-5 Role of enzymes, toxins and growth regulators in disease development, Defence mechanism in plants, Epidemiology: Factors affecting disease development. Principles and methods of plant disease management.Nature, chemical combination, classification, mode of action and formulations of fungicides and antibiotics.

Practical

1. Acquaintance with various laboratory equipments and microscopy.
2. Preparation of media, isolation and Koch's postulates.
3. General study of different structures of fungi. Study of symptoms of various plant diseases.
4. Study of representative fungal genera. Staining and identification of plant pathogenic bacteria. Transmission of plant viruses.
5. Study of phanerogamic plant parasites.
6. Study of morphological features and identification of plant parasitic nematodes. Extraction of nematodes from soil and plant material.
7. Study of fungicides and their formulations. Methods of pesticide application and their safe use. Calculation of fungicide sprays concentrations**.**

References

1. Introduction to Principles of Plant Pathology - R.S. Singh
2. Plant Pathology - E.N. Agrios
3. Plant Pathology - R.S. Mehrotra
4. A text book of modern Plant Pathology - Bilgramie and Dubey
5. Essentials of Plant Pathology - V.N Pathak

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 207 **Credit 4(3+1)**

Fundamentals of Entomology **w.e.f. - 2016-2017**

UNIT-1 History of Entomology in India. Factors for insect's abundance. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus. Structure of male and female genital organ. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive system, in insects. Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptor.

UNIT-2 Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors– temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents. Effect of biotic factors – food competition, natural and environmental resistance. Concepts of Balance of life in nature, biotic potential and environmental resistance and causes for outbreak of pests in agro-ecosystem.

UNIT-3 Pest surveillance and pest forecasting. Categories of pests. Host plant resistance, Cultural, Mechanical, Physical. Legislative. Biological (parasites, predators & transgenic plant pathogens such as bacteria, fungi and viruses) methods of control. Chemical control-importance, hazards and limitations. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Recent methods of pest control, repellents, antifeedants, hormones, attractants, gamma radiation and genetic control. Practices, scope and limitations of IPM. Insecticides Act 1968-Important provisions. Application techniques of spray fluids. Phytotoxicity of insecticides. Symptoms of poisoning, first aid and antidotes.

UNIT-4 Beneficial insects: parasites and predators used in pest control and their mass multiplication techniques. Important groups of microorganisms, bacteria, viruses and fungi used in pest control and their mass multiplication techniques. Important species of pollinators, weed killers and scavengers, their importance.

UNIT-5 Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta upto Orders, basic groups of present day insects with special emphasis to orders and families of Agricultural importance like Orthoptera: Acrididae, Tettigonidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera:

Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthridinidae, Apidae. Trichogrammatidae, lchneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae,Muscidae, Tephritidae.

Practical

1. Methods of collection and preservation of insects including immature stages.
2. External features of Grasshopper/Blister beetle.
3. Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus.
4. Types of insect larvae and pupae.
5. Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper).
6. Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance.

References

1. कृषि कीट विज्ञान – Sharma, J.P.

2. कृषि कीट विज्ञान – Mathur and Upadhyaya

3. An introduction to Entomology (1997) – Shrivastava, P.D. and Singh, R.P., Concept Publishing Company, New Delhi 110059

4. Text Book of Entomology – Pruthi, H.S.

5. Agricultural Entomology for Indian – Khanna, S.S. Students

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 208 Credit 3(2+1)

Fundamentals of Agricultural Extension Education w.e.f. - 2016-2017

UNIT-1 Education: Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education; Extension Programme planning- Meaning, Process, Principles and Steps in Programme Development. Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era (Etawah Pilot Project, Nilokheri Experiment, etc.);

UNIT-2 Various extension/ agriculture development programmes launched by ICAR/ Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND,NATP, NAIP, etc.). New trends in agriculture extension: privatization extension, cyber extension/ e-extension, market-led extension, farmer-led extension, expert systems, etc.

UNIT-3 Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Dev.-meaning, definition, concept & principles, Physiology of C.D. Rural Leadership: concept and definition, types of leaders in rural context;

UNIT-4 Extension administration: meaning and concept, principles and functions. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: concept and models, capacity building of extension personnel;

UNIT-5 Extension teaching methods: meaning, classification, individual, group and mass contact methods, media mix strategies; communication: meaning and definition; models and barriers to communication. Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories.

Practical

1. To get acquainted with university extension system.

2. Group discussion- exercise; handling and use of audio visual equipment's and digital camera and LCD projector;

3. Preparation and use of AV aids,

4. Preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories;

5. Presentation skills exercise; micro teaching exercise;

6. A visit to village to understand the problems being encountered by the villagers/ farmers;

7. To study organization and functioning of DRDA and other development departments at district level;

8. Visit to NGO and learning from their experience in rural development;

9. Understanding PRA techniques and their application in village development planning; exposure to mass media:

10. Visit to community radio and television studio for understanding the process of programme production; script writing, writing for print and electronic media, developing script for radio and television.

References

1. Extension Education in Community – Directorate of Extension, Development Ministry of Agriculture, Govt. of India
2. Education and Communication for Development – Dhama, O.P. and Bhatnagar, O.P., Oxford and IBH Publicity Co. New Delhi
3. An Introductory of Agricultural Extension – Mosher, A.T.
4. Extension Communication and Management - Ray G.L., Naya Prakashan 206 Bidhan Sarani, Calcutta-6
5. Rural Development, Principles, Policies and Management – Singh, Katar, Sage Publications, New Delhi
6. Dimensions of Agriculture Extension – Singh, A.K. and K. Roy Burman, Aman Publication, Merut
7. Text Book of Extension Education – Singh, Ranjeet, Oxford & IBH
8. Extension Education – Reddy, A.V.V., Laxmi Press, Baptala (AP)
9. An Introductory to Extension Education – Supe, S.V., Oxford & IBC Published Co. New Delhi

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SUBJECT CODE-AG 209 **Credit 2(1+1)**

Communication Skills and Personality Development
w.e.f. - 2016-2017

UNIT-1. Communication Skills: Structural and functional grammar; meaning and process of communication, verbal and nonverbal communication;

UNIT-2. listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures.

UNIT-3. Reading and comprehension of general and technical articles, precise writing,

UNIT-4. Summarizing, abstracting; individual and group presentations, imprompt presentation,

UNIT-5. Public speaking; Group discussion. Organizing seminars and conferences.

Practical

1. Listening and note taking, writing skills, oral presentation skills;
2. field diary and lab record; indexing,
3. Footnote and bibliographic procedures.
4. Reading and comprehension of general and technical articles,
5. Precise writing, summarizing, abstracting;
6. Individual and group presentations.

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