

RAI TECHNOLOGY UNIVERSITY
SCHOOL OF AGRICULTURAL SCIENCES
AND FORESTRY (SASF)
SEMESTER-I

Courses for the First Semester 2014-15

1. AGR 101- Introductory Agriculture, Principles of Agronomy and Soil Management (2+1)
2. BCM.101- Plant Biochemistry (1+1)
3. AET.101- Insect Morphology and Systematics (2+1)
4. AMB.101-Agricultural Microbiology (1+1)
5. FSN.101 Principles of Food Science And Nutrition (1+0)
6. FES.101 Introduction to Forestry (1+1)
7. SAC.101 Fundamentals of Soil Science (2+1)
8. CSM.101 Introduction to Computers and Application (1+1)
9. ENG.101 Comprehension and Communicative English (1+1)
- 10.NSS.101 National Service Scheme (0+1)

AGR.101 Introductory Agriculture, Principles of Agronomy and Soil Management 2+1

Theory: Art, Science and Business of crop production, Basic elements of crop production; Factors affecting crop production; History of Agricultural Development; Ancient Indian Agriculture, Chronological stages of development of agriculture, Agricultural research and education with special reference to India and Karnataka. Contribution of agriculture and horticultural crops to national economy. Importance and scope of agriculture, horticulture, sericulture, animal husbandry and forestry as farming enterprises and relation to industry. Women in agriculture – Multifaceted roles and tasks, work stress factors. Soil factors, weather factors, ecology, crop distribution, adaptation and crop production centers. Factors affecting plant growth, dry and irrigated agriculture, farming system approach and value addition in agriculture. Agro-climatic zones of India and Karnataka; Methods of crop production; Tillage – meaning, concepts and types of tillage, Crops stand

establishment, Planting geometry and its effect on growth and yield. Classification of crops, selection of seed material, Importance of soil in crop production. Concepts of soil fertility and productivity and their improvement. Effects of tillage on soil physical properties and root growth. Requirement of ideal seedbed. Green manuring, manure and fertilizer management for different cropping systems. Advantages and limitation, Agronomic management for different soils. Agronomic management of problematic soils.

Practical: Area, production, productivity of important crops in World, India and Karnataka; Identification and classification of field crops; Factors affecting crop production; Seeded preparation for field crops; study of tillage implements; Methods and practice of ploughing; Practice of puddling; Study of seeding equipments and introduction of remote sensing; Different methods of sowing; Study of manures, fertilizers and green manure crops / seed (including calculations); Study of inter-cultivation implements and practice; Study and practice of special implements; Preparation of FYM and compost; Methods of fertilizer application; Participation in ongoing field operations.

BCM.101 Plant Biochemistry 1+1

Theory: Biochemistry – Introduction and importance. Plant cell – Structure & organellar functions. Biomolecules – Structure, properties & reactions: amino acids, peptides and proteins, lipids, carbohydrates, nucleotides and nucleic acids. Enzymes – Factors affecting the activity, classification, immobilisation and other industrial applications. Metabolism- Basic concepts, glycolysis, citric acid cycle, pentose phosphate pathway, β -oxidation of fatty acid, electron transport and oxidative phosphorylation. General reactions of amino acid degradation. Metabolic regulation. Secondary metabolites-terpenoids, alkaloids, phenolics.

Practical: Protein denaturation – Heat, pH, precipitation of proteins with heavy metals, Estimation of crude protein, Estimation of protein by Lowry method; Enzyme assay; Extraction of nucleic acids; Extraction of oil from oilseeds; Estimation of crude fat; Estimation of iodine number and saponification value of an oil; Quantitative determination of sugars; Paper chromatography for the separation of sugars; Determination of phenols, chlorophyll, phosphorus and ascorbic acid.

AET.101 Insect Morphology and Systematics 2+1

Theory: Entomology- Definition/meaning and its scope. History of Entomology in India. Factors for insects abundance. Characters of the class Insecta, structure of typical insect. Structure and functions of body wall and its appendages, moulting process, body segmentation, structure of head, mouth parts, types of mouth parts, modifications of insect antennae. Structure of thorax, types of legs, wing venation, modifications and wing coupling apparatus. Structure of abdomen and its appendages, structure of ovipositor, structure of male and female genitalia. Sensory organs, Metamorphosis and diapause in insects. Types of larvae and pupae. An elementary knowledge of internal systems and their functions- digestive, circulatory, excretory, respiratory, nervous, secretory (endocrine) and reproductive systems in insects. Types of reproduction in insects. Systematics: Definition of Taxonomy, systematics, classification and its importance, Brief history of classification, Nomenclature definition, objectives, Guidelines for the Binomial nomenclature as indicated by ICZN. Definitions of Biotypes, species, sub species, genus, family, order, tribe, hierarchy, Taxonomic categories; Type concept in nomenclature, general classification of Insects up to orders. Characteristics and general habits of economically important insect orders and families.

Practical: Study of phylum Arthropoda, study of insects with special reference to cockroach, study of immature stages of insects, modifications of insect appendages, types of insect mouth parts, dissection of digestive, circulatory including salivary glands, nervous and reproductive systems in insects, collecting and curating insects, and General classification of insects and study of wingless Primitive insects (Collembola and Thysanura). Study of insect orders – Odonata, Blattodea, Mantodea, Isoptera, Orthoptera, Phthoptera, Hemiptera (sub order Heteroptera and Homoptera), Thysanoptera, Coleoptera, Diptera, Siphonoptera, Lepidoptera and Hymenoptera.

AMB.101 Agricultural Microbiology 1+1

Theory: History of Microbiology: Spontaneous generation theory, Germ theory of disease, Protection against infections, Working principles of microscopy, Metabolism in bacteria: ATP generation, chemoautotrophy, photo autotrophy, respiration, fermentation. Bacteriophages: structure and properties of Bacterial viruses – Lytic and Lysogenic cycles: viroids, prions. Bacterial genetics; Gene expression; Genetic recombination: transformation, conjugation and transduction, genetic engineering, Plasmids, episomes, genetically modified Organisms.

Introduction to mycology, Soil Microbiology: Microbial group in soil microbial transformations of carbon, nitrogen, phosphorus and sulphur, Biological nitrogen fixation. Microflora of Rhizosphere and Phyllosphere microflora, microbes in composting.

Practical: General instructions – Familiarization with instruments, materials, glassware etc. in a microbiology laboratory. Practice of Aseptic methods – Evaluation of aseptic technique with Nutrient broth tubes- Evaluation of aseptic technique with a Nutrient agar plate. Methods of Sterilization and Preparation of media – Preparation of nutrient broth, agar plates, slants and nutrient agar stablinsg – Sterilization of glassware by Dry hating – Sterilization of nutrient broth by Filtration. Plating methods for Isolation and Purification of bacteria – Isolation of bacteria by Streak plate method – Isolation of aerobic spore forming bacteria by Enrichment using Streak plate method – Checking of purity of a bacterial culture by Streak plating method. Identification of bacteria by staining methods and Biochemical tests – Morphological examination of bacteria by Simple and Differential staining – Different biochemical tests for identification of bacterial culture. Enumeration of bacteria – Enumeration of bacteria by Stain slide method – Enumeration of bacteria by Most Probable Number method – Enumeration of bacteria by Pour plate method and Spread plate method. Experiments in soil Microbiology – Study of rhizosphere and phyllosphere microflora – Isolation of Nitrogen fixing bacteria fromsoil-Isolation of Phosphate Solubilizing Microorganisms. Isolation and characterization of microorganisms in composts. itrogen transformation.

FSN.101 Principles of Food Science and Nutrition 1+0

Theory: Relationship between agriculture, food and nutrition, food habits and nutrition situation. Terminologies used in human nutrition, food and health. Food and its functions and functional classification. Basic food groups and their nutritional values. Water, protien and fat-classification, functions, sources, deficiencies and RDA. Carbohydrates - classification, functions, sources and RDA. Energy - classification, functions, sources, RDA and measurements. Vitamins and minerals- classification, functions, sources, deficiencies and RDA. Water-compartments of body water, water balance and functions. Importance of balanced diet and its formulation using RDA. Calculation of nutritive value of balanced diet. Importance of weaning foods. Methods in dietary and nutritional surveys. Assessment of nutritional status. Ongoing National and International nutrition food and nutrition programmes, and National nutrition policies.

Processing and preservation methods of foods. Food storage methods. Food safety issues and quality assurance systems. Methods of sensory evolution of foods. Methods in nutrition education.

FES.101 Introduction to Forestry 1+1

Theory: Definition of Forest and Forestry, importance, history, forestry education and research in India, Various branches in forestry. National Forest Policy of 1894, 1952, 1988; Indian Forest Act 1927; Karnataka Tree Preservation Act. Forest Conservation Act 1980. The Environment (Protection) Act 1986; Indian Wildlife Preservation Act 1972, Forest wealth in India. Deforestation. Various causes and implications, desertification, afforestation, deforestation. Indian Wildlife and management, national parks and sanctuaries, endangered species, Forest ecosystem, succession climax vegetation type of natural forest and their distribution. Limiting factors. Social Forestry and its branches, Extension Forestry, Urban Forestry. Recreation forestry, Agroforestry, Windbreaks and shelterbelts joint forest management.

Practical: Identification of important trees, seeds and seedlings. Study of Nursery-Techniques Trench and mound Plantation, pit plantation Study of different types of plantation, visit to Agro-forestry plots. Measurement of volume of standing trees, study of wood specimens and non-timber forest products. Visit to a near by national Park and Forest.

SAC. 101 Fundamentals of Soil Science 2 + 1

Theory: Soil-Pedological and edaphological concepts. Soil Science-scope and branches of soil science. Earth spheres and composition of earth crust. Minerals classification, formation and properties of silicate and non silicate minerals, Rocks-classification, formation and properties of igneous, sedimentary and metamorphic rocks. Weathering-types, factors of weathering, products of weathering; Soil formation- soil forming factors and soil forming processes. Soil profile-master horizons, subordinate horizons. Soil physical properties-Soil texture-classification of soil separates, properties of soil separates, Particle size analysis – Stokes law assumptions and limitations, textural classes. Soil structure-classification, soil aggregates, evaluation of soil structure, significance. Pore space types, factors affecting porosity, manipulation. Bulk density and particle density – relationships, factors, significance and manipulation. Soil colour-factors, attributes and significance. Soil consistency-forms, factors, limits and significance. Soil crusting-

factors and significance. Soil temperature-thermal properties of soils, flow of heat, soil temperature regimes, influence of soil temperature on plant growth. Soil air-composition, gaseous exchange, influence of soil air on plant growth. Soil water classification, potentials, Soil moisture constants, movement of soil water, infiltration, percolation, hydraulic conductivity. Soil survey- types and methods. Soil classification- systems of classification. Soil taxonomy- advantages, structure, formative elements, diagnostic horizons, keys to soil orders. Soils of Karnataka and India.

Practical: Study of general properties of minerals; Study of minerals – silicate and non-silicate minerals; Study of rocks-igneous, sedimentary and metamorphic rocks; Study of a soil profile; Collection and processing of soil for analysis; Study of soil texture- feel method, mechanical analysis; Determination of bulk density, particle density and soil porosity; Determination of soil colour; Study of soil structure and aggregate analysis; Determination of soil moisture, Determination of soil moisture constants – field capacity; water holding capacity; Study of infiltration rate of soil; Study of soil temperature.

CSC.101 Introduction to Computers and Application 1+1

Theory: Introduction to Computers, Types of computers, Characters of Computers, Organization of Computers, Operating system: DOS, UNIX and Windows, DOS Internal and External Commands, UNIX basic Commands, Windows functional commands. Computer Networks: Introduction to pure topologies and Hybrid topologies, Intranet and Internet communication systems, WORD: Word processing, EXCEL: Electronic spreadsheet use, the built-in function with examples. Principle of programming: algorithm, flowchart, program, C-programming language – constants, variables, data types, operators and expressions, input, output operations, decision making and branching, arrays. Concept of Database, advantages and uses of database, creating database and simple queries using ACCESS. Concept of power point presentation.

Practical: Study of computer components; booting, shutdown of computer, practice internal DOS commands and editor commands. Practice assignments on C-programming language: operators and expressions, input, output operations, decision-making, branching and arrays. Practice WINDOWS: operating systems. Desktop commands and explore, creating folders and COPY, DELETE functions. Practice of WORDS: Creating, Editing, Saving, Creating TABLE, Split, Merge, alignments, formatting functions export to EXCEL. EXCEL: import table from WORD or create a table, function bar, using inbuilt functions, analysis of data.

ACCESS: Creating Database, FORMS, QUERIES, REPORTS, use simple queries to analyse the data. POWERPOINT: Creating Slides on Power Point, transforming and add the animation to effective presentation.

ENG. 101 Comprehension and Communicative English 1+1

Theory: Reading comprehension- Scientific and general passages. Vocabulary development; Prefix and Suffix; Synonyms and antonyms; words often confused. Homonyms and Homophones. Writing Skills- Mechanics of letter writing – business, official and personal letter. Preparation of curriculum vitae and job application; essay writing. Interview techniques: Purpose, Settings, Physical makeup and manners, Poise, Functional Grammar; Agreement of subject and verb.

Practical: Listening Comprehension; Listening to short talks, lectures, speeches (scientific, commercial and general in nature). Spoken English: Importance of stress and intonation, sounds and phonetic symbols, vowels, consonants and diphthongs. Essentials of good conversation, oral exercises in conversation practice. Telephonic conversation, rate of speech, clarity of voice, speaking and listening politeness, telephone etiquette. Reading Skills: skimming, scanning, rapid reading. Presentation Skills: Features of oral presentation; body language, voice modulation, audience analysis, preparation of visual aids, Evaluation of presentation, practice of presentation using power point and LCD projector. Conducting mock interview-testing initiative, team spirit, leadership, motivation, group discussion, debates on current issues.

NSS.101 National Service Scheme 0+1

Practical: NSS -Orientation of students in national problems, study of philosophy of NSS, fundamental rights, directive principles of state policy, socioeconomic structure of Indian society, population problems, brief of five year plan. Functional literacy, non-formal education of rural youth, eradication of social evils, awareness programmes, consumer awareness, highlights of consumer act. Environment enrichment and conservation, health, family welfare and nutrition.