

Distribution of Courses and Credits for B.Sc. (Hons.) Agriculture

1st Semester

Sl. No.	Course No.	Title of Course	Credit(s)
1	AG 101	Agriculture Heritage*	1(1+0)*
2	AGR 102	Fundamentals of Agronomy I	2(1+1)
3	ACSS 103	Fundamentals of Soil Science I	2(1+1)
4	AEN 104	Fundamentals of Agricultural Entomology I	3(2+1)
5	PPA 105	Fundamentals of Plant Pathology I	2(1+1)
6	ABC 106	Fundamentals of Plant Biochemistry	3(2+1)
7	HORT 107	Fundamentals of Horticulture	2(1+1)
8	SWAG 108	Introduction to Forestry	2(1+1)
9	AEX 109	Rural Sociology and Educational Psychology	2(2+0)
10	ENG 110	Comprehension and Communication Skills in English	2(1+1)
11	AST 111	Elementary Mathematics*	1(1+0)*
12	NSS 112	NSS / NCC / Physical Education and Yoga Practices	1(0+1)**
		Total	20+2*+1**

*R (Remedial Course), **NC (Non-Gradual Course)

AGR 102 Fundamentals of Agronomy I

2 (1+1)

Theory

Agronomy and its scope; Seeds and sowing; Crop density and geometry; Crop nutrition, manures and fertilizers, nutrient use efficiency; Growth and development of crops, factors affecting growth and development; Plant ideotypes; Crop rotation and its principles; Adaptation and distribution of crops; Agro-climatic zones of India and West Bengal; Weeds- importance, classification, crop weed competition, concepts of weed management-principles and methods; Herbicides- classification, selectivity and resistance, allelopathy.

Practical

Identification of crops, seeds, fertilizers and tillage implements; Study of agro-climatic zones of India; Methods of fertilizers application; Study on yield contributing characters and yield estimation; Seed germination and viability test; Numerical exercises on fertilizer requirement and plant population; Identification of weeds in crop fields and study on weed seed bank; Cultural, mechanical and biological methods of eco-safe weed management; Calibration of sprayer, types of herbicides and application methods; Numerical exercise on herbicide and weed control efficiency

Theory

Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification; climate and soil for horticultural crops; Plant propagation-methods and propagating structures; Seed dormancy, Seed germination, principles of orchard establishment; Principles and methods of training and pruning, juvenility and flower bud differentiation; unfruitfulness; pollination, pollinizers and pollinators; fertilization and parthenocarpy; medicinal and aromatic plants; importance of plant bio-regulators in horticulture. Irrigation – methods, Fertilizer application in horticultural crops.

Practical

Identification of garden tools. Identification of horticultural crops. Preparation of seed bed/nursery bed. Practice of sexual and asexual methods of propagation including micro-propagation. Layout and planting of orchard. Training and pruning of fruit trees. Preparation of potting mixture. Fertilizer application in different crops. Visits to commercial nurseries/orchard.

Theory

Important plant pathogenic organisms (1), different groups: fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them (4).

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 (7).

Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction (2).

Viruses: nature, architecture, multiplication and transmission, Study of phanerogamic plant parasites. (2).

Practical

Acquaintance with various laboratory equipments and microscopy. Preparation of media, isolation and Koch's postulates. General study of different structures of fungi. Study of symptoms of various plant diseases. Study of representative fungal genera. Staining and identification of plant pathogenic bacteria. Transmission of plant viruses. Study of phanerogamic plant parasites. Study of fungicides and their formulations. Methods of pesticide application and their safe use. Calculation of fungicide sprays concentrations.

AG 101 Agricultural Heritage

(Remedial Course)

1 (1+0)

Theory

Introduction of Indian agricultural heritage; Ancient agricultural practices, Relevance of heritage to present day agriculture; Past and present status of agriculture and farmers in society; Journey of Indian agriculture and its development from past to modern era; Plant production and protection through indigenous traditional knowledge; Crop voyage in India and world; Agriculture scope; Importance of agriculture and agricultural resources available in India; Crop significance and classifications; National agriculture setup in India; Current scenario of Indian agriculture; Indian agricultural concerns and future prospects.

Theory

Elementary Set Theory

Basic ideas of Sets, set operations, laws of Algebra of sets, number of elements in a set, Venn diagram, Cartesian product of sets.

Determinants and Matrices

Definitions and ideas, Types of Matrices, Matrix operations, Transpose, Symmetric and Skew symmetric matrices with properties. Determinants, Properties of Determinants (without proof), minors and cofactors, Product, Adjugate and reciprocal of determinants, Differentiation and Integration of determinants, Cramer's Rule, Adjoint and Inverse of matrices, Orthogonal Matrix, Rank and Equivalence, Solution of system of Equations by Matrix method and rank method.

Differential Calculus

Ideas of Functions(Different kinds of functions with examples) , Limits and Continuity (No problems) Differentiation: Derivative of polynomial and trigonometric functions, composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms.

Integral Calculus

Indefinite integrals, Method of substitution, Standard forms, Rules of integration, Integration by parts, Partial fraction method. Definite integral as limit of a sum and its geometrical interpretation, Fundamental theorem of integral calculus. Elementary properties of definite integrals. Evaluation of definite integrals,

Infinite Series

Sequences, Convergence of sequences, infinite series of constant terms, Tests of convergence, Comparison test, D'Alembert's ratio test, Cauchy's root test.

Theory

War Minus Shooting- The sporting Spirit. A Dilemma- A layman looks at science Raymond B. Fosdick. You and Your English – Spoken English and broken English G.B. Shaw. Reading Comprehension, Vocabulary- Antonym, Synonym, Homophones, Homonyms, often confused words. Exercises to Help the students in the enrichment of vocabulary based on TOEFL and other competitive examinations. Functional grammar: Articles, Prepositions, Verb, Subject verb Agreement, Transformation, Synthesis, Direct and Indirect Narration. Written Skills: Paragraph writing, Precise writing, Report writing and Proposal writing. The Style: Importance of professional writing. Preparation of Curriculum Vitae and Job applications. Synopsis Writing. Interviews: kinds, Importance and process.

Practical

Listening Comprehension: Listening to short talks lectures, speeches (scientific, commercial and general in nature). Oral Communication: Phonetics, stress and intonation, Conversation practice. Conversation: rate of speech, clarity of voice, speaking and Listening, politeness & Reading skills: reading dialogues, rapid reading, intensive reading, improving reading skills. Mock Interviews: testing initiative, team spirit, leadership, intellectual ability. Group Discussions.

Sociology and Rural Sociology: Definition, scope and its significance in agricultural extension.

Social Ecology: Concept, components and Natural unplanned ecological entities

Rural Society: definition, characteristics, rural-urban differences, factors for closing rural urban gap

Social group: Definition, characteristics of group, classification of group, stages of group formation

Social stratification: Definition, function of stratification, types or forms of stratification, caste system, class system

Cultural concept: Concept of Culture, custom, folkways, mores, taboos, rituals, tradition, norms and values

Social Institution: definition, characteristics, functions, important Institutions – the family, religion, economic, Govt., education

Social change and Development: Definition, characteristics of social change, theories of social change, factors of social change, resistance to social change, social change and rural development

Educational Psychology: Meaning and its importance in Agril Extension

Behaviour: Concept, Cognitive, Affective and Psychomotor Domain

Personality: Definition, elements of Personality, factors influencing growth and development of Personality. Concept of Introvert, Extrovert and Ambivert

Learning: definition, types of learning, learning curve, Theories of learning (stimulus-response)

Motivation: Definition and concept, Theories of motivation (McClelland and Maslaw)

Intelligence: Definition, types of Intelligence, I.Q: Concept and classification, importance of Intelligence in Extension.

Theory

Soil as a natural body, Pedological and edaphological concepts of soil; Soil genesis: soil forming rocks and minerals; weathering, processes and factors of soil formation; Soil Profile, components of soil; Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity; Elementary knowledge of soil taxonomy classification and soils of India; Soil water retention, movement and availability; soil air, composition, gaseous exchange, problem and plant growth; source, amount and flow of heat in soil; soil temperature and plant growth; Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability; soil colloids - inorganic and organic; silicate clays: constitution and properties; sources of charge ion exchange, cation exchange capacity, base saturation.

Practical

Study of soil profile in field. Study of soil sampling tools, collection of representative soil sample, its processing and storage. Study of soil forming rocks and minerals. Determination of soil density, moisture content and porosity. Determination of soil texture by feel and Bouyoucos Methods. Studies of capillary rise phenomenon of water in soil column and water movement in soil. Determination of soil pH and electrical conductivity. Determination of cation exchange capacity of soil. Study of soil map. Determination of soil colour. Demonstration of heat transfer in soil. Estimation of organic matter content of soil.

Theory

Importance of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate: Importance and classification. Structures of Monosaccharides, Reducing and oxidizing properties of Monosaccharides, Mutarotation; Structure of Disaccharides and Polysaccharides. Lipid: Importance and classification; Structures and properties of fatty acids; storage lipids and membrane lipids. Proteins: Importance of proteins and classification; Structures, titration and zwitterions nature of amino acids; Structural organization of proteins. Enzymes: General properties; Classification; Mechanism of action; Michaelis & Menten and Line Weaver Burk equation & plots; Introduction to allosteric enzymes. Nucleic acids: Importance and classification; Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure. Metabolism of carbohydrates: Glycolysis, TCA cycle, Glyoxylate cycle, Electron transport chain. Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids.

Practical

Preparation of solution, pH & buffers, Qualitative tests of carbohydrates and amino acids. Quantitative estimation of glucose/ proteins. Titration methods for estimation of amino acids/lipids, Effect of pH, temperature and substrate concentration on enzyme action, Paper chromatography/ TLC demonstration for separation of amino acids/ Monosaccharides.

Theory

Introduction – definitions of basic terms related to forestry; Objectives of silviculture, forest classification, salient features of Indian Forest Policies; Forest regeneration, natural regeneration– natural regeneration from seed and vegetative parts, coppicing, pollarding, root suckers, artificial regeneration – objectives, choice between natural and artificial regeneration, essential preliminary considerations; Crown classification; Tending operations – weeding, cleaning, thinning–mechanical, ordinary, crown and advance thinning; Forest mensuration– objectives, diameter measurement, instruments used in diameter measurement; Non instrumental methods of height measurement–shadow and single pole method; Instrumental methods of height measurement; Geometric and trigonometric principles, instruments used in height measurement; Tree stem form, form factor, form quotient, measurement of volume of felled and standing trees, age determination of trees; Agroforestry–definitions, importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country, shifting cultivation, taungya, alley cropping, wind breaks and shelter belts, home gardens; Cultivation practices of two important fast growing tree species of the region.

Practical

Identification of tree species; Diameter measurements using calipers and tape; Diameter measurements of forked, buttressed, fluted and leaning trees; Height measurement of standing trees by shadow method, single pole method and hypsometer; Volume measurement of logs using various formulae; Nursery lay out, seed sowing, vegetative propagation techniques; Forest plantations and their management; Visit to nearby forest-based industries.

History of Entomology in India. 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, sense organs. 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.

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, Papilionidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthredinidae, Apidae. Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae.

Practical

Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Blister beetle; Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper); Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance. Insecticides and their formulations. Pesticide appliances and their maintenance. Sampling techniques for estimation of insect population and damage.

Introduction and basic components of NSS

Orientation: history, objectives, principles, symbol, badge; regular programmes under NSS, organizational structure of NSS, code of conduct for NSS volunteers, points to be considered by NSS volunteers awareness about health

NSS programmes and activities

Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analysing guiding financial patterns of scheme, youth programme/ schemes of GOI, coordination with different agencies and maintenance of diary

Understanding youth

Definition, profile, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change

Community mobilisation

Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilisation involving youth-adult partnership

Social harmony and national integration

Indian history and culture, role of youth in nation building, conflict resolution and peace-building

Volunteerism and shramdan

Indian tradition of volunteerism, its need, importance, motivation and constraints; shramdan as part of volunteerism

Citizenship, constitution and human rights

Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information

Family and society

Concept of family, community (PRIs and other community based organisations) and society