Semester Fifth **Hrs. : 32**

Corse Code	Course Title	Load Allocation			Marks Distribution		Total	Credits
		L	T	P	Internal	External		
BSAG-501	Fundamental of Soil and Water Engineering	2	0	0	40	60	100	2
BSAG-502	Plant Tissue Culture and Genetic Transformation	2	0	0	40	60	100	2
BSAG-503	Chemistry of Agrochemicals	2	0	0	40	60	100	2
BSAG-504	Agriculture Marketing Trade and Prices	2	0	0	40	60	100	2
BSAG-505	Insect Pest of Crops and Stored Grains	3	0	0	40	60	100	3
BSAG-506	Introductory Forestry	1	0	0	40	60	100	1
BSAG-507	Introduction of Plant Breeding	2	0	0	40	60	100	2
BSAG-508	Livestock Production and Management	2	0	0	40	60	100	2
BSAG-509	Fundamental of Soil and Water Engineering (Practical)	0	0	2	20	30	50	1
BSAG-510	Plant Tissue Culture and Genetic Transformation (Practical)	0	0	2	20	30	50	1
BSAG-511	Insect Pest of Crops and Stored Grains (Practical)	0	0	2	20	30	50	1
BSAG-512	Introductory Forestry (Practical)	0	0	2	20	30	50	1
BSAG-513	Introduction of Plant Breeding (Practical)	0	0	2	20	30	50	1
BSAG-514	Livestock Production and Management (Practical)	0	0	2	20	30	50	1
BSAG-515	Practical Crops Production (*Kharif Crops)*	0	0	2	20	30	50	1
BSAG-516	Educational Tour	0	0	2	00	00	00	N.C.*
	TOTAL	16	0	16	460	690	1150	23

*Non Credit

BSAG 501 Fundamentals of Soil and Water Conservation Engineering 2+1

Unit I

Surveying- survey equipments, chain survey. Plotting procedure. Calculations of area of regular and irregular fields. Levelling- terminology, equipments, methods of calculation; types of levelling and contouring.

Unit II

Irrigation- classification of projects, flow irrigation and lift irrigation. Water sources. Water lifting devices; pumps, their capacity and power calculations.

Unit III

Irrigation water measurement- weirs, flumes and orifices, Water conveyance systems- open channel and underground pipeline. Surface, drip and sprinkler irrigation methods.

Unit IV

Soil and water conservation, soil erosion, types and control measures.

BSAG 502: Plant Tissue Culture and Genetic Transformation 2+1

Unit I

Tissue culture, Concepts and history'; Various aspects of plant tissue culture. Somatic cell cultures. Somatic embryogenesis. Meristem culture. In vitro grafting. Micropropagation. Somaclonal variation.

Unit II

Anther and pollen culture. Embryo/ovule/ovary culture.. Production of secondary metabolites through tissue culture.

Unit III

Protoplast culture and somatic hybridization; Cryopreservation of germplasm.

Unit IV

Methods of Genetic Transformation, commercialization of transgenic crops.

BSAG 503: Chemistry of Agrochemicals **2**

Unit I

Organic chemistry as prelude to agrochemicals. Diverse types of agrochemicals.

Unit II

Synthetic organic insecticides, major classes, chemistry and use of some important insecticides under each class.

Unit III

Herbicides-major classes, chemistry and use of 2,4-D, atrazine, glyphosate, butachlor, benthiocarb. Fungicides - major classes, Chemistry and use of carbendazim, carboxin, captan, tridemorph and copper oxychloride.

Unit IV

Botanical insecticides (neem), pyrethrum and synthetic pyrethroids. Plant growth regulators.

BSAG 504: Agricultural Marketing, Trade and Prices **2+0**

Unit I

Agricultural marketing: concept, definition, scope, components, classification, market structure, conduct and performance; Market functionaries; Producer's surplus: meaning, types, marketable surplus, marketed surplus. Marketing efficiency: meaning, marketing costs, margins and price spreads.

Unit II

Trade: domestic trade, free trade, international trade, GATT, WTO, implications of AOA. Market access, domestic support, export subsidies, EXIM policy and Ministerial conferences.

Unit III

Market integration: definition, types; Cooperative marketing; State trading. Ware Housing Corporation: objectives, functions and advantages. Food Corporation of India: objectives and functions.

Unit IV

Quality Control: agricultural products, AGMARK, meaning and need for agricultural marketing policy. Risk in marketing: meaning, importance and types; Speculations and hedging. Futures trading, Contract farming.

BSAG505: Insect Pests of Crops and Stored Grains 2+1

Unit I

Distribution, biology, symptoms of damage and management strategies of insect pests of rice, sorghum, maize, cotton, groundnut, sugarcane, ragi (Eleucine coracana), wheat, sunhemp, pulses, castor, safflower, sunflower, mustard,

Unit II

Distribution, biology, symptoms of damage and management strategies of insect pests of brinjal, bhindi, tomato, cruciferous and cucurbitaceous vegetables, potato, sweet potato, chillies, turmeric, onion, coriander, garlic, ginger

Unit III

Distribution, biology, symptoms of damage and management strategies of insect pests of mango, citrus, grapevine, cashew, banana, pomegranate, guava, sapota, ber, apple, coconut

Unit IV

Distribution, biology, symptoms of damage and management strategies of insect pests of tobacco, coffee, tea, ornamental plants and stored grain insect pests.

BSAG 506: Introductory Forestry **2**

Unit I

Forestry - definition, scope and important terminology. Status of forests in India and their role. History of forestry development in India. National and International Forestry Organizations. Distribution of forests and their classification.

Unit II

Tending operations. Locality factors: climatic, edaphic, topographical and biotic. Agroforestry, farm forestry and social forestry - definition, objectives and need. Role of trees in rural economy.

Unit III

Choice of species w.r.t. site/economic uses and constraints of tree growing. Tree propagation and planting methods.

Unit IV

Deforestation - forms, causes and remedial measures. Forest management: growing stock, normal forest, sustained yield, increment and rotation. Forest utilizationmajor and minor forest products. Forest policy and laws.

BSAG 507: Introduction to Plant Breeding **2+1**

Unit I

Floral biology, emasculation and pollination techniques in cereals, millets, pulses, oilseeds, fibers, plantation crops etc. Modes of reproduction- sexual and asexual

Unit II

Plant Breeding- Aims and objectives; Significance in plant breeding; Modes of pollination, genetic consequences, differences between self- and cross- pollinated crops; Methods of breeding - Introduction and Domestication; Johannsen's pure-line theory and its genetic basis; Selection: mass selection, pure-line selection; Hybridization, aims and objectives, types of hybridization; Methods of handling segregating generations, pedigree method, bulk method, back cross method

Unit III

Incompatibility and male sterility and their utilization in crop improvement; Heterosis, inbreeding depression, various theories of heterosis, exploitation of hybrid vigor, development of inbred lines, single-cross and doublecross hybrids; population improvement programmes, recurrent selection, synthetics and composites

Unit IV

Mutation breeding; Ploidy breeding; Apomixis- its types and significance; Wide hybridization and its role crop improvement.

BSAG 508 Livestock Production and Management 2+1

Unit I

Place of livestock in the national economy. Livestock development programmes. Exotic and Indian breeds of cattle, buffalo, sheep, goat and swine. Reproductive behaviour; estrous cycle, Artificial Insemination, Pregnancy and parturition in various livestock species. Care of pregnant animal and new born young one. Measures and factors affecting fertility in livestock

Unit II

Physiology of milk secretion and different milking methods. Factors affecting milk yield and composition. Selection procedure and various systems of breeding in livestock.

Unit III

Feeding and management of calves, heifers, pregnant and milch anima sheep, goat and swine. Housing principles for livestock. Vaccination and prevention of important diseases of livestock and poultry.

Unit IV

Important breeds of poultry, egg formation, abnormal eggs and factors affecting egg size. Moulting, incubation, hatching and brooding. Housing, breeding, feeding and management of poultry. Biotechnological interventions in animal production and reproduction.

BSAG-509 Fundamentals of Soil and Water Conservation Engineering (Practical)

Acquaintance with chain survey equipment. Ranging and measurement of offsets. Chain triangulation and plotting. Levelling equipments. Differential levelling. Profile levelling. Contour survey and plotting. Study of centrifugal pumping system and irrigation water measuring devices. Surface irrigation methods. Study of different components of sprinkler and drip irrigation systems. Uniformity of water application in drip and sprinkler systems. Study of soil and water conservation measures.

BSAG 510: Plant Tissue Culture and Genetic Transformation (Practical)

Medium preparation. Surface sterilization of explants. Establishment of callus/cell suspension cultures. Induction of plant regeneration. Hardening and transfer to soil. Micropropagtaion. Embryo culture. Anther and pollen culture. Particle Gun Bombardment

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BSAG511: Insect Pests of Crops and Stored Grains (Practical)

Identification of insect pests and their damage symptoms of rice, sorghum, maize, wheat, sugarcane, cotton, pulses, oil seeds crops and store gains ; important vegetables and fruits crops in the Punjab .

BSAG 512: Introductory Forestry (Practical)

Identification of trees. Measurement of tree height, diameter, girth, bark thickness, increment, age and volume. Nursery raising and silvicultural practices of some economic forest trees viz., safeda, poplar, shisham, mulberry, kikar, sagwan, dek, bamboo and subabul.

BSAG 513: Introduction to Plant Breeding (Practical)

Botanical description and floral biology; Study of megasporogenesis and microsporogenesis. Fertilization and life cycle of an angiospermic plant; Plant Breeder's kit: Hybridization techniques and precautions to be taken while attempting crosses; Floral morphology, selfing, emasculation and crossing techniques in different self and cross pollinated species; Study of male sterility and incompatibility.

BSAG 514 Livestock Production and Management (Practical)

Visit to livestock farms and breed identification. Study of external body parts. Handling and restraining of animals. Judging of animals. Milking methods. Feeding and ration formulation. Record keeping. Study of reproductive organs, artificial insemination and physiological norms in cattle and buffaloes. Hatching, housing and management of poultry.

BSAG 515 Practical Crops Production (*Kharif Crops)*

Crop planning, Raising filed corps in multiple cropping systems using improved agronomic practices. Field preparation, seed treatment, sowing, fertigation, water management and weed management. Disease and insect pest management in the crop. Harvesting, threshing, drying, winnowing, storage and marketing of the produce. Preparation of balance sheet including cost of cultivation.

(Above mentioned operation shall be conducted by students themselves under the supervision of teacher).
