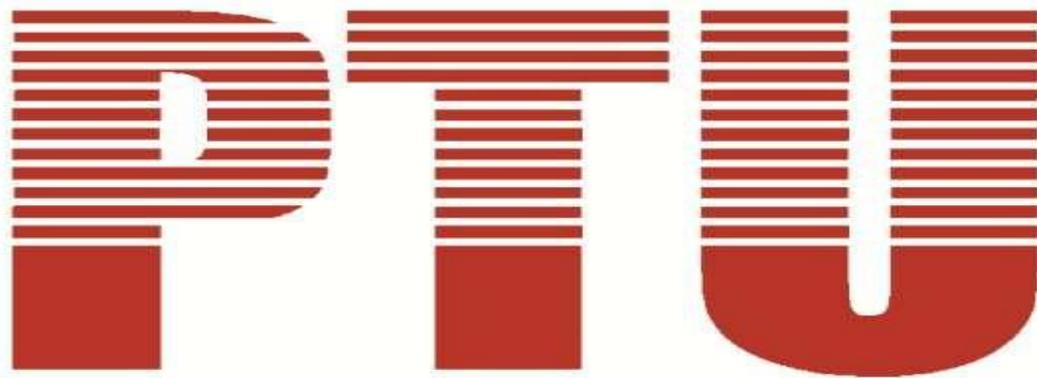


Scheme & Syllabus of

B.Sc. Agriculture

Batch 2014 onwards



Department of Academics
Board of Study Agricultural

Punjab Technical University

Semester Third

Hrs. : 26

Course Code	Course Title	Load Allocation			Marks Distribution		Total	Credits
		L	T	P	Internal	External		
BSAG-301	Principles of Agronomy-I	2	0	0	40	60	100	2
BSAG-302	Plant Physiology	2	0	0	40	60	100	2
BSAG-303	Fundamentals of Insect Morphology and Systematics	2	0	0	40	60	100	2
BSAG-304	Introduction to Genetics	2	0	0	40	60	100	2
BSAG-305	Dimensions of Agricultural extension	2	0	0	40	60	100	2
BSAG-306	Principles of Plant Pathology	2	0	0	40	60	100	2
BSAG-307	Soil Chemistry, Fertility and Nutrient Management	2	0	0	40	60	100	2
BSAG-308	Principles of Agronomy-I Practical	0	0	2	20	30	50	1
BSAG-309	Plant Physiology (Practical)	0	0	2	20	30	50	1
BSAG-310	Fundamentals of Insect Morphology and Systematics (Practical)	0	0	2	20	30	50	1
BSAG-311	Introduction to Genetics (Practical)	0	0	2	20	30	50	1
BSAG-312	Principles of Plant Pathology (Practical)	0	0	2	20	30	50	1
BSAG-313	Soil Chemistry, Fertility and Nutrient Management (Practical)	0	0	2	20	30	50	1
	TOTAL	14	0	12	400	600	1000	20

BSAG-301 Principles of Agronomy-I

2

Section-1

Meaning and scope of Agronomy; tillage and crop stand establishment. Planting geometry and its effect on growth and yield; Cropping systems- origin, geographic distribution, economic importance, soil and climatic requirements of major crops

Section-2

Varieties, cultural practices and yield of *kharif* cereal crops- rice, maize, sorghum, pearl millet

Section-3

Varieties, cultural practices and yield of *kharif* pulses- pigeonpea, mungbean, urdbean and oilseeds - groundnut, sesame, soybean

Section-4

Varieties, cultural practices and yield of *kharif* fibre crops- cotton, jute, sunhemp and forage crops - sorghum, maize, cowpea, cluster bean and napier

Books

1. Handbook of Agriculture-ICAR
2. Package of Practices for Kharif Crops, PAU
3. Text book of Field crops Production-Food grain crops by ICAR
4. Text book of Field Crops Production- Commercial Crops by ICAR

BSAG-302

Plant Physiology

Credits: 2

Section-1

Introduction and importance of plant physiology in agriculture

Section-2

Seed structure; Morpho-physiological and biochemical changes during seed development; Physiological and harvestable maturity; Seed germination and seed dormancy

Section-3

Growth and development; Crop water relations; Transpiration and its significance in relation to crop productivity; Water use efficiency; Significance of C3, C4 and CAM pathways; Photorespiration; Photosynthesis and crop productivity; Translocation of assimilates. Source-sink relationship; its types and significance

Section-4

Mineral nutrition; physiology of nutrient uptake, deficiency and toxicity symptoms and hydroponics; Photoperiodism and vernalization; Plant growth regulators- occurrence, biosynthesis, mode of action and commercial applications; Senescence and abscission; Fruit ripening and its hormonal regulation.

Books:

1. Introduction to Plant Physiology by William G.Hopkins and Norman P.A. Huner

BSAG-303 Fundamentals of Insect Morphology and Systematics

Credits: 2

Section-1

Entomology- definition and its history; importance and scope; Factors affecting insect abundance

Section-2

Integument, body regions and segmentation; Modification and function of mouth parts, antennae, legs and wings; wing venation and wing coupling apparatus; Sense organs; metamorphosis and diapauses; Types of reproduction.

Section-3

Morphology and anatomy of Grasshopper

Section-4

Taxonomy- its importance, history, development and binomial nomenclature; Classification of class Insecta up to orders, suborders and important families with special emphasis on distinguishing morphological characters.

Books:

1. A General Text Book of Entomology by A.D. Imms
2. Principles of Insect Morphology by R.E. Snodgrass.
3. The Insects: Structure and Function by R.F. Chapman.
4. Text Book of Agricultural Entomology by H.S. Pruthi.
5. General Entomology by M.S. Mani
6. Text Book of Agricultural Entomology by P.M..Srivastava and Ashok Kumar

BSAG-304 Introduction to Genetics

Credits: 2

Section- 1

Mitosis and meiosis, their significance and differences between them; Study of chromosome structure, morphology, number and types; Karyotype and idiogram; Mechanism of crossing over and cytological proof of crossing over; Numerical and structural chromosomal aberrations.

Section- 2

Mendel's laws of inheritance and exceptions to the laws, Cytoplasmic inheritance, its characteristic features and difference between chromosomal and cytoplasmic inheritance; Types of gene action, Multiple alleles, Pleiotropism, Penetrance and expressivity; Qualitative traits, Quantitative traits and differences between them; Multiple factor hypothesis;

Section- 3

DNA and its structure, function, types, modes of replication and repair. RNA and its structure, function and types; Transcription, Translation. Genetic code and outline of protein synthesis; Linkage, types of linkage and estimation of linkage; Mutation and its characteristic features; Methods of inducing mutations and detection of sex linked and autosomal mutations, (CLB technique).

Section- 4

Evolution of different crop species like cotton, wheat, gram, triticales and Brassicas.

Books:

1. Fundamentals of Genetics by B.D.Singh
2. Genetics by P.K. Gupta
3. Principles of Genetics by E.J. Gardner and M.J. Simmons

BSAG-305 Dimensions of Agricultural Extension

Credits: 2

Section-1

Education-meaning and types; agricultural extension education - meanings, objectives, principles, philosophy and emerging problems and challenges with reference to Human Values.

Section-2

Introduction, importance and problems of rural development, Historical perspective of major agricultural and rural development programmes of pre and post independence era

Section- 3

Panchayati Raj System – Brief history, objectives, Powers, functions and organizational set up of three-tier Panchayati Raj System, emerging problems of Panchayati Raj institutions

Section-4

New trends in agricultural extension education and privatization of extension; women development programmes, emergence of broad based extension in the context of international and national developments

Books:

1. Extension Education by A.K. Nayak Singh
2. Agricultural Extension by A.W. van den Ban and H. Staurt Hawkins
3. Panchayti Raj in India by Ravi Goel.

BSAG-306 Principles of Plant Pathology

Credits: 2

Section-1

Introduction, importance and general characters of fungi, bacteria, fastidious bacteria, nematodes, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa and phanerogamic parasites . Definition, objectives, history, terms and concept of plant pathology.

Section-2

Study of genera Pythium, Phytophthora, Albugo, Sclerospora, Peronosclerospora, Pseudoperonospora, Peronospora, Plasmopara, Bremia, Mucor, Rhizopus, Oidium, Erysiphe, Phyllactinia, Uncinula, Podosphaera, Puccinia, Uromyces, Hemileia, Sphacelotheca, Ustilago, Tolyposporium, Agaricus, Pleurotus, Ganoderma, Septoria, Colletotrichum, Pestalotia, Pyricularia, Aspergillus, Penicillium, Trichoderma, Fusarium, Drechslera, Alternaria, Stemphyllium, Cercospora, Phaeoisariopsis, Rhizoctonia, Sclerotinia, Xanthomonas, Pseudomonas, Meloidogyne and Anguina.

Section-3

Survival and dispersal of plant pathogens, Phenomenon of infection; defence mechanisms in plants; Plant disease epidemiology and forecasting.

Section-4

General principles of plant disease management. Plant quarantine and inspection. Genetic, cultural, biological, physical and chemical methods of plant disease management. Integrated plant disease management

Books:

1. Plant Pathology in India by S.S. Chahal
2. Introduction to Principles of Plant Pathology by R.S. Singh
3. Principles of Plant Pathology by M.K. Dasgupta

BSAG-307 Soil Chemistry, Fertility and Nutrient Management

Credits: 2

Section-1

Soil as a source of plant nutrients. Essential and beneficial elements- criteria of essentiality, forms of nutrients in soil, mechanisms of nutrient transport to plants. Factors affecting nutrient availability to plants.

Section-2

Measures to overcome deficiencies and toxicities. Problem soils- acid, salt affected and calcareous soils, characteristics, nutrient availabilities, Reclamation- mechanical, chemical and biological methods

Section-3

Fertilizer and insecticides and their effect on soil, water and air. Irrigation water- quality of irrigation water and its appraisal. Soil fertility- approaches for soil fertility evaluation. Methods of soil testing. Critical levels of different nutrients in soil. Plant analysis- DRIS approach, critical levels in plants. Rapid tissue tests.

Section-4

. Indicator plants. Biological methods of soil fertility evaluation. Soil test based fertilizer recommendations to crops. Factors influencing nutrient use efficiency (NUE) in respect of N, P, K, S, Fe and Zn fertilizers. Source, method and scheduling of nutrients for different soils and crops grown under rainfed and irrigated conditions.

Books:

1. The Nature and Properties of Soils by N.C. Brady and Ray R. Well
2. Soil Fertility & Nutrient Management by S.S. Singh

BSAG-308 Principles of Agronomy-I (Kharif Crops) Practical

Credits: 1

Study of tillage implements. Practice of ploughing and puddling. Seed bed preparation, sowing, fertilizer application, nursery raising and transplanting of Kharif crops. Calculations of seed rate. Effect of seed size and sowing depth on germination. Identification of weeds of Kharif crops; Study of yield components; Study of kharif crops and their important agronomic practices

BSAG-309 Crop Physiology (Practical) Credits: 1

Seed structure, germination and seed dormancy. Growth analysis. Calculation of growth parameters. Methods of measuring water status in roots, stems and leaves. Measurement of water potential. Absorption spectrum of chloroplastic pigments. Transpiration. Photosynthesis and respiration. Stomatal frequency and index. Deficiency symptoms of nutrients. Leaf anatomy of C3 and C4 plants.

BSAG-310 Fundamentals of Insect Morphology and Systematics (Practical) Credits: 1

Collection and preservation of insects including immature stages; Morphology and anatomy of grasshopper; different types of antennae, mouth parts, legs and wings; Wing venation and wing coupling apparatus; Types of larvae and pupae; Study of characters of orders - Odonata, Orthoptera, Dictyoptera, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance.

BSAG-311 Introduction to Genetics (Practical) Credits: 1

Microscopy (Light microscopes and electron microscopes; Preparation and use of fixatives and stains for light microscopy; Preparation of micro slides and identification of mitosis and meiosis; Monohybrid, Dihybrid and Trihybrid ratios and their modifications; Chi-square analysis; Interaction of factors; Epistatic factors, Supplementary factors and Duplicate factors; Complementary factors, Additive factors and Inhibitory factors; Linkage - Two point test cross; Linkage - Three point test cross; Induction of polyploidy using colchicine; Induction of chromosomal aberrations using chemicals

BSAG-312 Principles of Plant Pathology (Practical) Credits: 1

Acquaintance to plant pathology laboratory equipments. Preparation of culture media for fungi and bacteria. Isolation techniques and preservation of plant disease samples. Study of important plant pathogenic genera. Demonstration of Koch's postulates. Study of different groups of fungicides and antibiotics. Bio-control of plant pathogens; Visit to remote sensing laboratory and experimental area.

BSAG-313 Soil Chemistry Fertility and Nutrient Management (Practical) Credits: 1

Principles of analytical instruments and their calibration and applications, Colorimetry and flame photometry. Estimation of available N, P, K, S and Zn in soils. pH, Electrical Conductivity, carbonates, bicarbonates, Ca⁺⁺ and Mg⁺⁺ in soil and water. Lime requirement and gypsum requirement of problem soils. Estimation of N, P and K in plants.