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Programme

B. Sc. (Honours) Agriculture
Scheme (3rd-8th Semester)

BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR
DEPARTMENT OF AGRICULTURE SCIENCES

B. Sc. (Honours) Agriculture 3rdSem.

Contact Hours: 26 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	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

BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR

DEPARTMENT OF AGRICULTURE SCIENCES

B. Sc. (Honours) Agriculture 4thSem.

Contact Hours: 29 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BSAG-401	Principles of Agronomy II (Rabi Crops)	2	0	0	40	60	100	2
BSAG-402	Organic Farming	1	0	0	40	60	100	1
BSAG-403	Farm Management & Agriculture Finance	2	0	0	40	60	100	2
BSAG-404	Insect Ecology and Integrated Pest Management	2	0	0	40	60	100	2
BSAG-405	Extension Methodology and Communication Skills for Transfer of technology	2	0	0	40	60	100	2
BSAG-406	Principles of Seed Technology	2	0	0	40	60	100	2
BSAG-407	Manures and Fertilizers	2	0	0	40	60	100	2
BSAG-408	Farm Power & Machinery	2	0	0	40	60	100	2
BSAG-409	Basic Statistics	2	0	0	40	60	100	2
BSAG-410	Principles of Agronomy II (Rabi Crops) (Practical)	0	0	2	20	30	50	1
BSAG-411	Organic Farming (Practical)	0	0	2	20	30	50	1
BSAG-412	Farm Management and Agriculture Finance (Practical)	0	0	2	20	30	50	1
BSAG-413	Insect Ecology and Integrated Pest Management (Practical)	0	0	2	20	30	50	1
BSAG-414	Principles of Seed Technology (Practical)	0	0	2	20	30	50	1
BSAG-415	Farm Power & Machinery (Practical)	0	0	2	20	30	50	1
TOTAL		17	0	12	480	720	1200	23

BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR

DEPARTMENT OF AGRICULTURE SCIENCES

B. Sc. (Honours) Agriculture 5th Sem.

Contact Hours: 29 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	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

BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR

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B. Sc. (Honours) Agriculture 6thSem.

Contact Hours: 24 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BSAG-601	Crop Residue Management	2	0	0	40	60	100	2
BSAG-602	Diseases of Horticultural Crops and their Management	2	0	0	40	60	100	2
BSAG-603	Flower Cultivation and Landscape Gardening	2	0	0	40	60	100	2
BSAG-604	Breeding of Field and Horticultural Crops	2	0	0	40	60	100	2
BSAG-605	Environmental Science and Disaster Management	2	0	0	40	60	100	2
BSAG-606	Fundamentals of Agri-business management	2	0	0	40	60	100	2
BSAG-607	Protected Cultivation and Post-Harvest Technology	2	0	0	40	60	100	2
BSAG-608	Renewable Energy	1	0	0	40	60	100	1
BSAG-609	Post-Harvest Management of Fruits and Vegetables	2	0	0	40	60	100	2
BSAG-610	Practical Crop Production-II (Rabi Crops)	0	0	1	30	20	50	1
BSAG-611	Diseases of Horticultural Crops and their Management (Practical)	0	0	1	30	20	50	1
BSAG-612	Flower Cultivation and Landscape Gardening	0	0	1	30	20	50	1
BSAG-613	Breeding of Field and Horticultural Crops (Practical)	0	0	1	30	20	50	1
BSAG-614	Protected Cultivation and Post-Harvest Technology (Practical)	0	0	1	30	20	50	1
BSAG-615	Renewable Energy (Practical)	0	0	1	30	20	50	1
BSAG-616	Post-Harvest Management of Fruits and Vegetables (Practical)	0	0	1	30	20	50	1
TOTAL		17	0	7	570	680	1250	24

BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR
DEPARTMENT OF AGRICULTURE SCIENCES

B. Sc. (Honours) Agriculture 7th Sem.

Compulsory Courses for all streams of 7th semester

Contact Hours: 8 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BSAG-701	Diseases of Field Crops & their Management	2	0	0	40	60	100	2
BSAG-702	Introduction to Molecular Biotechnology	2	0	0	40	60	100	2
BSAG-703	Diseases of Field Crops & their Management (Practical)	0	0	2	20	30	50	1
BSAG-704	Introduction to Molecular Biotechnology (Practical)	0	0	2	20	30	50	1
TOTAL		4	0	4	120	180	300	6

BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR

DEPARTMENT OF AGRICULTURE SCIENCES

Elective Specialized Courses

1. Crop Science (Soil Science, Agronomy and Agro-Forestry)

Contact Hours: 30 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BSAG-CS 701	Soil Physical and Biological Environment	2	0	0	40	60	100	2
BSAG-CS 702	Analytical Techniques in Soils, Plants, Fertilizers and Water	2	0	0	40	60	100	2
BSAG-CS 703	Weed Management	2	0	0	40	60	100	2
BSAG-CS 704	Farming Systems and Sustainable Agriculture	2	0	0	40	60	100	2
BSAG-CS 705	Production Technology of Spices, Aromatic, Medicinal and Plantation Crops	2	0	0	40	60	100	2
BSAG-CS 706	Production Technology of Economic Forest Trees	2	0	0	40	60	100	2
BSAG-CS 707	Soil Survey, Classification and Mapping (Practical)	0	0	2	20	30	50	1
BSAG-CS 708	Soil Physical and Biological Environment (Practical)	0	0	2	20	30	50	1
BSAG-CS 709	Analytical Techniques in Soils, Plants, Fertilizers and Water (Practical)	0	0	6	60	90	150	3
BSAG-CS 710	Weed Management (Practical)	0	0	2	20	30	50	1
BSAG-CS 711	Farming Systems and Sustainable Agriculture (Practical)	0	0	2	20	30	50	1
BSAG-CS 712	Production Technology of Spices, Aromatic, Medicinal and Plantation Crops (Practical)	0	0	2	20	30	50	1
BSAG-CS 713	Production Technology of Economic Forest Trees (Practical)	0	0	2	20	30	50	1
TOTAL		12	0	18	420	630	1050	21

BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR

DEPARTMENT OF AGRICULTURE SCIENCES

Elective Specialized Courses

2. Horticulture (Pomology, Olericulture & Floriculture)

Contact Hours: 28 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BSAG- HC 701	Nursery Management of Horticultural Crops	2	0	0	40	60	100	2
BSAG- HC 702	Commercial Fruit Production	2	0	0	40	60	100	2
BSAG- HC 703	Processing and Value of Addition of Horticultural Crops	2	0	0	40	60	100	2
BSAG- HC 704	Commercial Vegetable Production	2	0	0	40	60	100	2
BSAG- HC 705	Vegetable Breeding and seed Production	2	0	0	40	60	100	2
BSAG- HC 706	Forcing Techniques in vegetable Production	2	0	0	40	60	100	2
BSAG- HC 707	Commercial Floriculture and landscaping	2	0	0	40	60	100	2
BSAG- HC 708	Nursery Management of Horticultural Crops (Practical)	0	0	2	20	30	50	1
BSAG- HC 709	Commercial Fruit Production (Practical)	0	0	2	20	30	50	1
BSAG- HC 710	Processing and Value of Addition of Horticultural Crops (Practical)	0	0	2	20	30	50	1
BSAG- HC 711	Commercial Vegetable Production (Practical)	0	0	2	20	30	50	1
BSAG- HC 712	Vegetable Breeding and seed Production (Practical)	0	0	2	20	30	50	1
BSAG- HC 713	Forcing Techniques in vegetable Production (Practical)	0	0	2	20	30	50	1
BSAG- HC 714	Commercial Floriculture and landscaping (Practical)	0	0	2	20	30	50	1
TOTAL		14	0	14	420	630	1050	21

BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR

DEPARTMENT OF AGRICULTURE SCIENCES

Elective Specialized Courses

3. Plant Breeding, Genetics & Biotechnology

Contact Hours: 27 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BSAG- PGB 701	Genetics of Crop Plants	2	0	0	40	60	100	2
BSAG- PGB 702	Cytogenetic of Crop Plants	2	0	0	40	60	100	2
BSAG- PGB 703	Theory and Practice of Plant Breeding	3	0	0	60	90	150	3
BSAG- PGB 704	Breeding of Field Crops	3	0	0	60	90	150	3
BSAG- PGB 705	Crop experimentation	1	0	0	20	30	50	1
BSAG- PGB 706	Plant Tissue Culture and Transformation	2	0	0	40	60	100	2
BSAG- PGB 707	Molecular Biotechnology and Genomics	2	0	0	40	60	100	2
BSAG- PGB 708	Genetics of Crop Plants (Practical)	0	0	2	20	30	50	1
BSAG- PGB 709	Cytogenetic of Crop Plants (Practical)	0	0	2	20	30	50	1
BSAG- PGB 710	Theory and Practice of Plant Breeding (Practical)	0	0	2	20	30	50	1
BSAG- PGB 711	Crop experimentation (Practical)	0	0	2	20	30	50	1
BSAG- PGB 712	Plant Tissue Culture and Transformation (Practical)	0	0	2	20	30	50	1
BSAG- PGB 713	Molecular Biotechnology and Genomics (Practical)	0	0	2	20	30	50	1
TOTAL		15	0	12	420	630	1050	21

BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR

DEPARTMENT OF AGRICULTURE SCIENCES

Elective Specialized Courses

4. Agri-extension, Economics & Business Management

Contact Hours: 25 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BSAG- AEB 701	Visual and Graphic Communication	1	0	0	20	30	50	1
BSAG- AEB 702	Communication and Information Technology	2	0	0	40	60	100	2
BSAG- AEB 703	Behavioral Skills for Human Resource Development	2	0	0	40	60	100	2
BSAG- AEB 704	Micro Economic Analysis	3	0	0	60	90	150	3
BSAG- AEB 705	Macro Economic Analysis	3	0	0	60	90	150	3
BSAG- AEB 706	Financial and Project Management	3	0	0	60	90	150	3
BSAG- AEB 707	Retailing and Supply Chain Management	3	0	0	60	90	150	3
BSAG- AEB 708	Visual and Graphic Communication (Practical)	0	0	2	20	30	50	1
BSAG- AEB 709	Communication and Information Technology (Practical)	0	0	2	20	30	50	1
BSAG- AEB 710	Micro Economic Analysis (Practical)	0	0	2	20	30	50	1
BSAG- AEB 711	Financial and Project Management (Practical)	0	0	2	20	30	50	1
TOTAL		17	0	8	420	630	1050	21

BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR

DEPARTMENT OF AGRICULTURE SCIENCES

Elective Specialized Courses

5. Plant Protection

Contact Hours: 32 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BSAG- PP 701	Apiculture	1	0	0	20	30	50	1
BSAG- PP 702	Biocontrol and Integrated Pest Management	2	0	0	40	60	100	2
BSAG- PP 703	Pesticides and Plant Protection Equipment	2	0	0	40	60	100	2
BSAG- PP 704	Biocontrol and Integrated Disease Management	2	0	0	40	60	100	2
BSAG- PP 705	Post Harvest Diseases and Their Management	2	0	0	40	60	100	2
BSAG- PP 706	Plant Nematology	1	0	0	20	30	50	1
BSAG- PP 707	Plant Disease Diagnosis (Practical)	0	0	4	40	60	100	2
BSAG- PP 708	Apiculture (Practical)	0	0	4	40	60	100	2
BSAG- PP 709	Biocontrol and Integrated Pest Management (Practical)	0	0	4	40	60	100	2
BSAG- PP 710	Pesticides and Plant Protection Equipment (Practical)	0	0	2	20	30	50	1
BSAG- PP 711	Biocontrol and Integrated Disease Management (Practical)	0	0	4	40	60	100	2
BSAG- PP 712	Post Harvest Diseases and Their Management (Practical)	0	0	2	20	30	50	1
BSAG- PP 713	Plant Nematology (Practical)	0	0	2	20	30	50	1
TOTAL		10	0	22	420	630	1050	21

BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR

DEPARTMENT OF AGRICULTURE SCIENCES

B. Sc. (Honours) Agriculture 8th Sem.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BSAG-801	Rural Experience	0	0	6	100	-	100	3
BSAG-802	On-campus Learning	0	0	12	300	-	300	12
BSAG-803	Industrial Attachment (Off campus)	0	0	8	100	-	100	4
BSAG-804	Documentation, reporting and Presentation	0	0	2	100	-	100	1

Syllabus (3-4th Semester)

Course: B.Sc (Honours) Agriculture

BSAG-301 Principles of Agronomy-I

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

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- pigeon pea, mungbean, urdbean and oilseeds - groundnut, sesame, soybean

Section-4

Varieties, cultural practices and yield of kharif fiber crops- cotton, jute, sun hemp and forage crops - sorghum, maize, cowpea, cluster bean and napier

Suggested 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

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

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.

Suggested Books:

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

BSAG-303 Fundamentals of Insect Morphology and Systematics

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

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.

Suggested 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

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

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, triticale and Brassicas.

Suggested 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

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

Section-1

Education-meaning and types; agricultural extension education - its meaning, 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

Suggested 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

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

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

Suggested 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

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

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.

Suggested 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

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

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)

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

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)

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

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)

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

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)

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

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)

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

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

BSAG-401: Principles of Agronomy -II (Rabi Crops)

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

Section-1

Origin, geographic distribution of crops, Area, yield and production of rabi crops in different states of India; Causes of variation in productivity; National and International Agricultural Research Institutes in India and their mandate.

Section-2

Economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi cereal crops

Section-3

Economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi pulse crops-chickpea, lentil, field pea, French bean and oilseed crops- rapeseed and mustard, sunflower, safflower, linseed

Section-4

Economic importance, soil and climatic requirements, varieties, cultural practices and yield of other rabi crops such as sugarcane, sugar beet, potato, tobacco and forage crops- berseem, Lucerne and oats

BSAG-402 Organic Farming

(In collaboration with Department of Soil Science, Entomology and Plant Pathology)

L T P
1 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

Section-1

Organic farming: introduction, concept, relevance in the present context; Organic production requirements; Biological intensive nutrient management.

Section-2

Recycling of organic residues; Soil improvement and amendments; integrated diseases and pest management

Section-3

Use of bio-control agents; bio-pesticides; pheromones, trap crops and bird perches

Section-4

Weed management; Quality considerations- certification, labeling and accreditation processors, marketing and exports.

BSAG-403 Farm Management and Agricultural Finance

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

Section-1

Agricultural Production Economics: definition, nature and scope; Laws of returns; Factor-product Relationships; determination of optimum input and output; Farm management: meaning, definition and Importance; Economic principles applicable to the organizations of farm business.

Section-2

Types and systems of farming; Farm planning and budgeting; Risk and uncertainty

Section-3

Agricultural finance: nature and scope, compounding and discounting. Agricultural credit: meaning, definition, need and classification; Credit appraisal; History of financing agriculture in India. Agricultural Financial Institutions

Section-4

Assessment of crop losses; Determination of compensation; Crop insurance; Agricultural Cooperation- philosophy and principles; History of Indian Cooperative Movement; Reorganization of cooperative credit structure and single window system

Suggested Books:

1. Farm Business Accounting-Joginder Singh
2. Agricultural Economics-Lekhi and Singh
3. Fundamental of Farm Management- Johl and Kapoor

BSAG-404 Insect Ecology and Pest Management

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

Section-1

Insect Ecology- Introduction, environment and its components, effect of abiotic and biotic factors. Biotic potential, environmental resistance and causes of pest outbreaks in agro-ecosystem. Categories of pests. Insects, Pests and Crop Losses; Present agriculture and pest problems. Beneficial insects: important pollinators, weed killers and scavengers; their importance. Important non-insect pests: mites, rodents and birds.

Section-2

Chemical Control: importance, hazards and limitations. Integrated Pest Management(IPM): need; its tools and limitations. Natural Control. Host plant resistance. Physical, Mechanical and Cultural Control. Biological Control: parasitoids, predators and microbes. Legislative Control. Insecticide Act 1968.

Section-3

Classification, toxicity and formulations of insecticides. Study of important insecticides: botanicals, organochlorines, organophosphates, carbamates, synthetic pyrethroids, neonicotinoids, oxydiazines, nereistoxin derivatives, phenyl pyrazoles, thiourea derivatives, pyridines, pyroles, etc., rodenticides, acaricides and fumigants. Biorational and other innovative approaches in pest management: insect growth regulators, semiochemicals, light-activated pesticides, propesticides, avermectins, antifeedants, chemosterilants, genetic control etc.

Section-4

Pest surveillance, monitoring and forecasting. Economic threshold and Economic injury levels. Integration of various control tactics. IPM in important vegetables.

Suggested Books:

1. Agricultural Pests of South Asia and Their Management. A. S. Atwal and G.S Dhaliwal. Kalyani Publishers, Ludhiana.
2. Principles of Insect Pest Management. G. S. Dhaliwal and Ramesh Arora. National Agricultural Technology Information Centre, Ludhiana.
3. Entomology At a Glance. R.C. Saxena and R. C. Srivastava. Agrotech Publishing Academy, Udaipur.
4. Applied Animal Ecology. S.S.Bains and A.S. Atwal. Kalyani Publishers, Ludhiana.

BSAG-405 Extension Methodologies and Communication Skills for Transfer of Technology

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

Section-1

Meaning, nature, importance, models and barriers in communication; Extension programme planning; Principles and steps in programme development process; Monitoring and evaluation of extension programmes

Section-2

Extension teaching methods and factors influencing their selection and use; Combination (Media Mix) of teaching methods; Innovative information sources; Audio- visual aids; Meaning, scope and importance of agricultural journalism.

Section-3

Diffusion and adoption of innovations; Models of adoption process. Factors influencing adoption process.

Section-4

Capacity building of extension personnel and farmers; Communication skills for effective transfer of technology; Organizing Field days, exhibitions; seminars and conferences

BSAG 406: Principles of Seed Technology

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

Section -1

Introduction to seed production; seed policy; deterioration of crop varieties; maintenance of genetic purity during seed production; seed quality

Section-2

Different classes of seed; Nucleus, Breeder, Foundation and certified seed production of varieties and hybrids of field and vegetable crops

Section-3

Seed certification, phases of certification, procedure for seed certification, field inspection and field counts etc.; central seed committee, central seed certification board, state seed certification agency, central and state seed testing laboratories; duties and powers of seed inspectors, offences and penalties; seed control order; Seed Act; other issues related to WTO, IPRs, Patenting, Plant Breeder's Rights; varietal identification through grow-out test and electrophoresis; seed drying; establishment of seed processing plant; establishing a seed testing laboratory

Section-4

Seed testing procedures for quality assessment, seed treatment, importance of seed treatment, types of seed treatment, seed packing and seed storage, stages of seed storage, factors affecting seed longevity during storage and conditions required for good storage, general principles of seed storage, measures for pest and disease control, temperature control, seed marketing, factors affecting seed marketing.

BSAG-407 Manures and Fertilizers

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

Section-1

Fertilizers- classification, manufacturing processes and properties of major nitrogenous (ammonium sulphate, urea, calcium ammonium nitrate, ammonium nitrate, ammonium sulphate nitrate), phosphatic (single super phosphate, enriched super phosphate, diammonium phosphate, ammonium poly phosphate), potassic and complex fertilizers

Section-2

Fate and reactions of various types of fertilizers in the soil

Section-3

Secondary and micronutrient fertilizers and amendments; Adulteration in fertilizers; Fertilizer Control Order; Fertilizer storage

Section-4

Bio-fertilizers and their advantages; Manures- bulky and concentrated, Farm Yard and poultry Manures; Composting – different methods, mechanical compost plants, vermin-composting, green manuring, oil cakes. Sewage and sludge-biogas plant slurry, plant and animal refuges.

BSAG-408 Farm Power & Machinery

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

Section-1

Historical perspective of farm power development in India, socio-economic implications of farm mechanization in India, internal combustion (IC) engines and terminology; working principles of two stroke and four stroke engines

Section-2

Different systems of tractors- types and selection

Section-3

Primary and secondary tillage implements; implements for agricultural operations; seed drills, paddy translators- their calibrations

Section-4

Plant protection equipments; harvesting and threshing equipments; cost of operation of tractor and other farm machinery

BSAG 409: Basic Statistics

L T P
2 0 0

Internal Marks: 40
External Marks: 60
Total Marks: 100

Section-1

Definition of statistics, its use and limitations; frequency distribution and frequency curves; Measures of central tendency- arithmetic mean, geometric mean, harmonic mean, median, mode, weighted mean; Measures of dispersion- mean deviation, standard deviation, coefficient of variation; Basic applications of probability theory; Normal distribution and its properties

Section-2

Introduction to sampling; tests of significance, standard normal deviate test for means, student's t-test for single sample, two samples and paired t-test, F-test, Chi-square test in 2*2 contingency tables; Yates correction for continuity

Section-3

Correlation; computation of correlation coefficient and its testing; linear regression of Y upon X and X upon Y; interrelation between correlation and regression coefficients

Section-4

Experimental designs, layout and analysis of Completely Randomized Design; Randomized Block Design, Latin Square Design and Factorial Design

BSAG 410: Principles of Agronomy -II (Rabi Crops) (Practical)

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

Study of manures, fertilizers and green manure crops; Study of interculture implements; Methods of fertilizer application; Seed bed preparation and sowing of wheat, sugarcane and sunflower; Calculations of seed rate; Identification of weeds in wheat and grain legumes; Morphological characteristics of wheat, sugarcane, chickpea and mustard; Yield components of wheat and sugarcane.

BSAG-411 Organic Farming (Practical)

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

Raising of vegetable crops through organic sources. Diseases and pest management; Vermi-composting; Vegetable and ornamental nursery raising; Macro quality analysis; Grading, packaging and post harvest management.

BSAG 412 Farm Management and Agricultural Finance (Practical)

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

Methods of depreciation. Analysis of net-worth statement. Farm inventory analysis: preparation of farm plans and budgets, profit and loss account. Break-even analysis. Economic analysis of different crop and livestock enterprises. Compounding and discounting. Preparation of balance sheet, income statement and cash flow analysis. Estimation of credit needs. Determination of unit costs. Preparations and analysis of loan proposals.

BSAG-413 Insect Ecology and Pest Management (Practical)

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

Study of terrestrial and pond ecosystem, behaviour, orientation, distribution patterns of insects. Sampling techniques for the estimation of insect population and damage. Pest surveillance through light and pheromone traps. Practicable IPM practices. Insecticides and their formulations; calculation of doses of insecticides. Compatibility of pesticides. Identification of common insect-pests, phytophagous mites, rodent, bird pests and their damage, other beneficial insect-pollinators, weed killers and scavengers.

BSAG-414 Principles of Seed Technology (Practical)

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

Seed sampling principles and procedures; physical purity analysis of field crops; germination analysis of field crops; moisture tests of field crops; viability test of field crops; seed health test of field crops; seed dormancy and breaking methods; grow out tests for varietal identification; visit to seed production plots; visit to seed processing plants; visit to seed testing laboratories; planting ratios, isolation distance and rouging, etc.

BSAG-415 Farm Power & Machinery (Practical)

L T P
0 0 2

Internal Marks: 20
External Marks: 30
Total Marks: 50

Study of different IC engines; Working of two stroke and four stroke engines; various systems of tractor, disc plough, seed-cum-fertilizer drills, furrow openers, metering mechanism and calibration; study of different types of farm machinery and equipment, repair, adjustment and operation of sprayers and dusters; registration procedures.